



TE TĀHUHU O TE MĀTAURANGA

Ministry of Education

Hei Tautoko i te Marautanga Pāngarau

Te Ine



Hei Whakamihi

Nā He Kupenga Hao i te Reo ngā tuhinga o tēnei pukapuka. E whakamihi ana ki ngā puna kōrero e whai ake nei, inā te ohonga ake o te hinengaro.

Te Reo Pāngarau: Putanga Tuarua. (2010). Papaioea: He Kupenga Hao i te Reo.

Van de Walle, J.A. (2007). *Elementary and Middle School Mathematics: Teaching Developmentally.* Boston: Pearson.

Ngā rauemi katoa o Te Poutama Tau

Ngā rauemi o <http://www.nzmaths.co.nz/>

Ngā mihi hoki ki:

Ngā kura, ngā pouako, ngā kaitakawaenga, nā rātou i tirotiro, i whakamātau te pukapuka nei, me te āhua o ngā whakahokinga kōrero mai.

Te kaitiroiro i te takoto o te reo: Hēni Jacob

Holly Destounis (te whakaahua kei whārangī 164)

Ko ngā kōrero me ngā whakaahua © nā He Kupenga Hao i te Reo 2011

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Kua rāhuitia ngā motika katoa kia āta whakaaetia rā anō e te hunga kei a ia te mana tārua.

HE KUPENGA HAO I TE REO



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Ngā Ihirangi

Wāhanga 1: Ngā Kōrero Whānui	4
He Kupu Whakataki	4
Ngā Huatau Matua o te Ine	7
He Tauira Mahere mō te Ine	11
Wāhanga 2: Ngā Whanaketanga Ine me ngā Tauira Aromatawai.....	16
Whanaketanga 1a	17
Whanaketanga 1e	19
Whanaketanga 2a	21
Whanaketanga 2e	23
Whanaketanga 3a	25
Whanaketanga 3e	26
Whanaketanga 4a	28
Whanaketanga 4e	30
Whanaketanga 5a	31
Wāhanga 3: He Ngohe Whakaako i te Ine	32
Whanaketanga 1a	33
Mata ki te Mata	34
Pēke Huna	36
Whanaketanga 1e	39
Te Aho hei Whakatairite i te Roa	40
Te Whakamahi Waeine Aro Kē	41
Inea te Roa Ake	43
Whakatairitea te Roa	46
Porowhita Hurihuri	48
Te Pūmautanga o te Horahanga	52
Whanaketanga 2a	54
Kia Taunga ki te Rahi o ngā Waeine Aro Whānui	55
Te Whakatairite Waeine	58
Te Hanga Āwhata 1	59
Te Hanga Āwhata 2	61
Te Whakatairite Horahanga	62
Whanaketanga 2e	63
Te Whakatutuki Inenga	64
Te Ine i te Wā	66
Te Koki Hāngai	68
Whanaketanga 3a	70
Waeine Koki	71
Te Pānui Āwhata	74
Whanaketanga 3e	75
Te Whiriwhiri Horahanga	76
Ko Tēhea te Horahanga Nui?	78

Te Horahanga Mata	79
Te Ine Rōrahi	81
Te Tātai Takanga Wā 1	83
 Whanaketanga 4a	84
Te Whakawhitiwhiti Waeine Ngahuru mō te Roa	85
Te Whakawhitiwhiti Waeine	86
Te Horahanga Tapawhā Hāngai	88
Te Horahanga Tapatoru	90
Te Horahanga Tapawhā Whakarara	94
Te Whakatairite i te Utu	96
 Whanaketanga 4e	98
Te Whiriwhiri Koki	99
Te Pānui Wātaka me te Tātai Takanga Wā	101
Te Tātai Takanga Wā 2	102
Te Paemahana	103
Te Horahanga Porowhitia	105
Te Ture hei Tātai Rōrahi Poro	108
 Whanaketanga 5a	110
He Koki Tauaro	111
Te Ture a Pythagoras	113
Ngā Tepe o te Tōtika	116
 Wāhanga 4: Ngā Whārangi Tārua	118
Whanaketanga 1a: Whārangi Tārua 1–2	119
Whanaketanga 1e: Whārangi Tārua 3–5	121
Whanaketanga 2a: Whārangi Tārua 6–8	124
Whanaketanga 2e: Whārangi Tārua 9–10	127
Whanaketanga 3a: Whārangi Tārua 11–13	129
Whanaketanga 3e: Whārangi Tārua 14–15	132
Whanaketanga 4a: Whārangi Tārua 16–19	135
Whanaketanga 4e: Whārangi Tārua 20–25	140
Whanaketanga 5a: Whārangi Tārua 26–28	146
 Wāhanga 5: He Tūhuratanga Ine	150
Whanaketanga 1e	
1e.1 Te Matikara	151
Whanaketanga 2a	
2a.1 Te Horohanga Rau Rākau	152
Whanaketanga 2e	
2e.1 Te Taumaha Kerepeti	153
Whanaketanga 3a	
3a.1 Te Ine i te Wā	154
Whanaketanga 3e	
3e.1 Te Paenga Taparau	155
3e.2 Te Pakitara Pereki	156
3e.3 Te Takai Pouaka Tiakareti	157

Whanaketanga 4a	
4a.1 Te Whakawhitihitī Waeine	158
4a.2 Te Rōrahi Pouaka	159
4a.3 Te Rōrahi Wairākau	160
4a.4 Te Horahanga Matapihi	161
4a.5 Te Taiapa Pāmu	162
Whanaketanga 4e	
4e.1 Te Pouaka Wai Ārani	163
4e.2 Te Whakatairite i te Tere	164
4e.3 Te Horahanga me te Paenga Tapawhā Hāngai	165
4e.4 Te Horahanga me te Paenga Tapawhā Whakarara	166
Whanaketanga 5a	
5a.1 He Papa Omaoma	167
5a.2 Te Tawhiti o te Omaoma	168
Te Kuputaka	169
Māori → Ingarihi	170
Ingarihi → Māori	178



Wāhanga 1

Ngā Kōrero Whānui



He Kupu Whakataki

Ko te kaupapa ia o tēnei pukapuka ko te āta whakaatu i ngā huatau matua o tēnei mea te ine me ngā whanaketanga ako, e eke ai ā tātou ākonga i ngā taumata o tēnei wāhanga o te pāngarau. Āpiti atu ki tēnā, ko te whakaatu i ētahi ngohe e hāngai ana ki tēnā taumata, ki tēnā taumata o te marautanga, me ngā hononga ki te Mahere Tau¹ me ngā Whanaketanga Pāngarau².

main ideas

Number Framework

He mea nui tonu te ine i roto i ā tātou mahi o ia rā, i roto hoki i ngā tūranga mahi whānui, waihoki ka tino whakamahia te tau i roto i aua mahi ine. Nō reira he nui ngā hononga o te ine me te tau, ā, ki te kore e pakari te mātauranga me ngā rautaki tau o te ākonga, e kore hoki e pakari tana mahi ine.

I tua atu i tērā, ka tino whai wāhi atu te ine ki roto i ērā atu whenu o te pāngarau. E whai ake nei ētahi tauira.

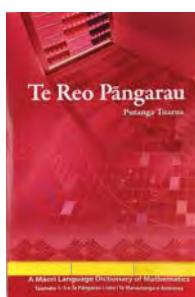
¹ Tirohia: *Té Poutama Tau, Pukapuka Tuatahi. Te Mahere Tau*. Papaioea: He Kupenga Hao i te Reo (2011).

² Tirohia: *Whanaketanga Pāngarau: He aratohu mā te pouako*. Te Whanganui-a-Tara: Te Tāhuhu o te Mātauranga (2010).

Te Tau

Ka tatauria ngā waeine hei whakatutuki inenga.

unit of measurement



E 3 rākau kōwhai te whānui o te pukapuka

Ka wāwāhia ngā waeine ki ūna hautanga.

break down/partition



13.7cm te roa o te pene

He mea matua te whakaaro pānga riterite e kitea ai ngā hononga o tētahi waeine ki tētahi.

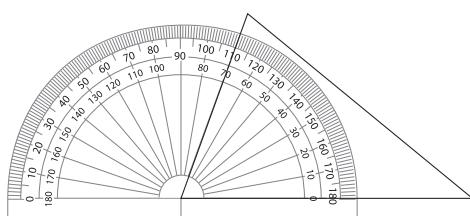
proportional thinking

karamu (g)	manokaramu (kg)	tana (t)
1,000	1	0.001
6,700	6.7	0.0067

Te Hangā

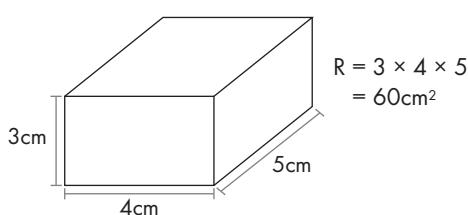
Ka ineia ngā koki o tētahi āhua e kitea ai ngā pānga.

relation



Ka ineia ngā tapa o tētahi āhua ahu-3 hei tātai i tōna rōrahi.

three-dimensional figure,
volume



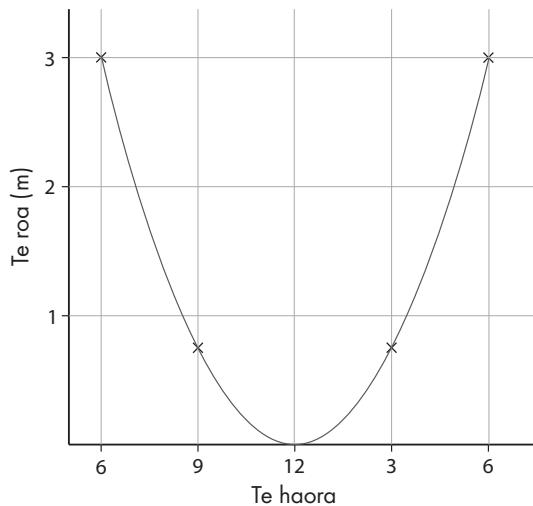
Te Tauira me te Pānga

Ka inea te roa o te ātārangi o tētahi pou i ngā haora o tētahi rā, e kitea ai te pānga o ngā taurangi e rua nei, te roa o te ātārangi me te haora o te rā:

relation
variable

te tāima	6 ata	9 ata	12 rānui	3 ahiahi	6 ahiahi
te roa o te ātārangi (m)	3	0.75	0	0.75	3

Te roa o te ātārangi i ētahi haora o te rā



Te Tauanga

Ka inea te tāroaroa o tētahi huinga tamariki me ō rātou matikara hei tūhura i ngā tāpaetanga kōrero pēnei i ēnei:

hand span
assertion

- He tāroaroa ake te hunga kōtiro i te hunga tamatāne, ina kei raro i te 12 tau te pakeke.
- He roa ake te matikara o te tangata tāroaroa i te tangata poto.



Ngā Huatau Matua o te Ine

E ai ki ngā tohunga whakaako pāngarau, tekau ngā huatau matua o te ine (hei tauira, tirohia tā Lehrer 2003³). E whai ake nei he kōrero whakarāpopoto, he whakatauira i aua huatau matua:

main ideas

- Ko te whakatairite te pūtake o te mahi ine. E toru ngā momo whakatairite hei ine i tētahi mea:

compare

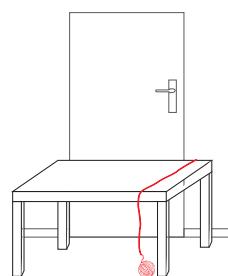
- Ko te whakatairite mata ki mata. Arā, ka whakanōhia ētahi mea e rua taha ki te taha kia kitea ai ko tēhea te mea nui, ko tēhea te mea iti, mēnā rānei he ōrite te rahi.



direct comparison

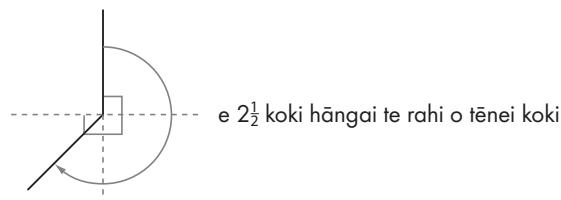
- Ko te whakatairite tipa. I konei, ka whakamahia tētahi mea kē atu hei whakatairite i te rahi o ētahi mea e rua. Hei tauira, ka whakamahia he aho e kitea ai mēnā he iti ake te whānui o te tēpu i te whānui o te kūaha.

indirect comparison



- Ko te whakatairite i tētahi mea ki tētahi waeine. Hei tauira, ko te koki hāngai hei ine i te rahi o tētahi koki.

right-angle



- He maha ngā āhuatanga o tētahi mea e taea ana te ine. Hei tauira, ko te pākete i te pikitia nei: ko tōna roa, tōna paenga, tōna rōrahi, tōna taumaha, me tōna horahanga mata. E tika ana kia hāngai te waeine ki te āhuatanga e inea ana. Hei tauira:

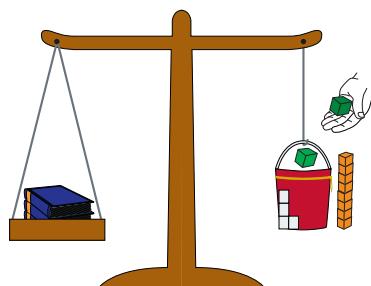
bucket circumference

- Ko te pukapuka tētahi waeine aro kē hei ine i te taumaha o te pākete. Ko te karamu te waeine ngahuru.

non-standard unit of measurement

- Ko te poro kākāriki tētahi waeine aro kē hei ine i te rōrahi (kītanga) o te pākete. Ko te rita (l) me te mitarau pūtoru (cm^3) ētahi waeine ngahuru.

metric unit



block

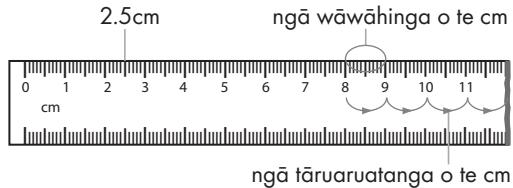
- Ko te poro karaka tētahi waeine aro kē hei ine i te roa o te pākete. Ko te mita (m) me te mitarau (cm) ētahi waeine ngahuru.

tile

- Ko te papariki tētahi waeine aro kē hei ine i te horahanga mata o te pākete. Ko te mitarau pūrua (cm^2) tētahi waeine ngahuru.

³ Lehrer, R. (2003). Developing Understanding of Measurement. Kei roto i tā J. Kilpatrick, W.G. Martin, me D.E. Schifter (Etitā). *A research companion to principles and standards for school mathematics.* (wh.179-192). Reston, VA: National Council of Teachers of Mathematics.

3. Mā te wāwāhi me te tāruarua waeine e puta ai he āwhata. Hei tauira: partition, repeat, scale
- Mā te tāruarua i te mitarau (cm), e puta ai te āwhata nei hei ine i te roa.
 - Mā te wāwāhi i te mitarau (cm), e puta ai te āwhata mitamano (mm) hei ine i ngā mea iti.



4. Karekau he āputa ki waenganui i te tāruaruatanga o ngā waeine, kāore hoki e inaki. gap overlap



E whakamahia ana te rākau karaka hei ine i te whānui o te tēpu, engari e hē ana, nā te mea he āputa kei waenganui i ngā rākau.



Kei te hē hoki tēnei, nā te mea e inaki ana ngā rākau karaka. E tika ana kia tāruaruatanga ngā waeine, pito ki te pito.

5. Mā te tatau i ngā waeine ūrite e tutuki ai te inenga.



Ka tatauria te maha o ngā rākau karaka e kapi ai te whānui o te tēpu.

6. Mā te whakamahi waeine aro whānui e mārama ai te katoa ki te rahi o te mea e inea ana. Ko ngā waeine ngahuru hei tauira o te waeine aro whānui e whakamahia ana e te nuinga, puta noa i te ao. Arā:

standard unit of measurement, metric unit

- Mō te roa:
Ko te mita (m), te mitarau (cm), te mitamano (mm), me te manomita (km).
- Mō te taumaha:
Ko te karamu (g), te karamumano (mg) me te manokaramu (kg).
- Mō te rōrahi, te kītanga rānei:
Ko te rita (l) me te ritamano (ml), ko te mita pūtoru (m^3) me te mitarau pūtoru (cm^3).
- Mō te koki:
Ko te putu ($^\circ$). E 360° i te huringa kotahi.

7. Ka taea te whakamahi waeine rerekē, me te whakatairite anō i aua waeine.

Ka tino puta te whakaaro pānga riterite i tēnei āhuatanga. Hei tauira:

proportional reasoning

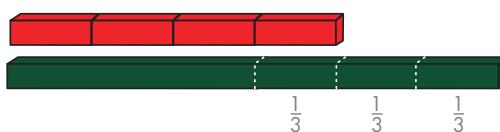
- E toru ngā rākau whero, ka rite ki te rākau kākāriki kotahi ($kā = 3wh$):



- Nō reira, mēnā e 4 rākau kākāriki te roa o tētahi mea, ko te 12 rākau whero hoki te roa ($4kā = 12wh$):



- Mēnā e 4 rākau whero te roa o tētahi mea, ko te $1\frac{1}{3}$ rākau kākāriki tērā ($4wh = 1\frac{1}{3}kā$):



- E ōrite ana te kotahi rau mitarau ki te kotahi mita ($100\text{cm} = 1\text{m}$). Nō reira mēnā e 4 mita (m) te roa o tētahi mea, ko te 400 mitarau (cm) hoki te roa ($4\text{m} = 400\text{cm}$). Mēnā e 4 mitarau (cm) te roa o tētahi mea, ko te 0.04 mita (m) tērā ($4\text{cm} = 0.04\text{m}$).

8. Ka taea tētahi inenga te wāwāhi. Ka rite te tapeke o ngā wehenga ki te katoa o te inenga. Hei tauira:

- Ka kania he papa rākau ki ētahi wehenga e toru, e 45cm, e 60cm, e 35cm te roa. Hui katoa ēnei wehenga ($45 + 60 + 35$), ko te 140cm (1.4m) te roa o te papa rākau i mua i te kaninga.



- He mīti kurī tēnei, e 2.1kg te taumaha. Ina tapahia kia 7 ngā wehenga ōrite (tētahi mō ia rā o te wiki), ko te 300g te taumaha o ia wehenga ($2.1\text{kg} \div 7 = 300\text{g}$).



9. Me āta tautohu te tīmatanga o te āwhata ine, waihoki kia hāngai tonu te tīmatanga o te āwhata ki te tīmatanga o te mea e ineana.

indicate



I konei e ineana te whānui o te pukapuka. Kua whakatakotoria te āwhata ki runga i te pukapuka kia noho pū te tohu '0' ki tētahi taha o te pukapuka.

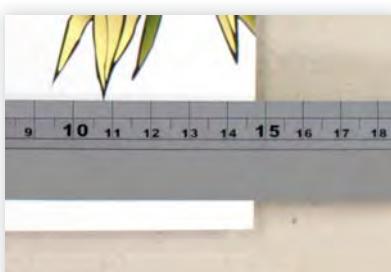


E taea ana ngā wāhi katoa o te āwhata hei wāhi tīmatanga, engari kia parematatia. I konei, ko te 3 te tīmatanga o te āwhata, nō reira hei whiriwhiri i te whānui o te pukapuka: $18 - 3 = 15\text{cm}$

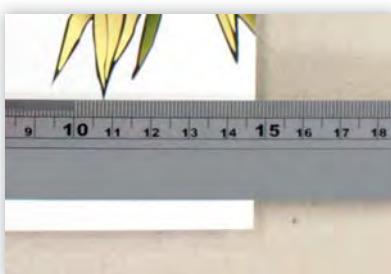
compensate

10. He whakaawhiwhinga ngā inenga katoa. Kei te rahi o te waeine te tōtika o te inenga.

round (a number),
accuracy



15cm te whānui o te pukapuka (he paku iti iho i te 15cm).



14.8cm (148mm) te whānui o te pukapuka (he paku nui ake i te 14.8).

He Tauira Mahere mō te Ine

Taumata 1	Te Mātauranga Ine	Te Whakaotipu Rapanga Ine	Te Reo Matatini o te Ine
Whanaketanga 1a	<p>E mōhio ana ki ēnei āhuatanga o tētahi mea e taea ana te ine:</p> <ul style="list-style-type: none"> • te roa; • te taumaha; • te wā; • te paemahana; • te utu. <p>E mōhio ana ki te pūmautanga o tētahi inenga.</p>	<p>Ka whakatairite i te rahi o ētahi mea e rua, mata ki te mata.</p> <p>Ka raupapa i ētahi mea e rua i runga i te rahi o tētahi āhuatanga ine o aua mea (pērā i te roa, i te taumaha rānei).</p>	<p>E mōhio ana ki ngā kupu whakatairite (pēnei i te roa <i>ake</i>, taumaha <i>rawa</i> ...).</p> <p>E mōhio ana ki ngā kupu e hāngai ana ki te roa (pēnei i te whānui, te tāroaroa, te teitei, te hahaka, te hōhonu, te pāpaku, te tawhiti ...).</p>
Whanaketanga 1e	<p>E mōhio ana ki ēnei āhuatanga o tētahi mea e taea ana te ine:</p> <ul style="list-style-type: none"> • te kītanga (rōrahi); • te horahanga; • te hurihangā. <p>E mōhio ana ki ngā momo waeine aro kē e hāngai ana ki ngā āhuatanga e inea ana (pērā i te papanui me te pukapuka mō te horahanga; te matikara mō te roa; te kapu mō te kītanga).</p> <p>E mōhio ana ki te mita (m) me te mitarau (cm) hei waeine aro whānui mō te roa.</p> <p>E mōhio ana ki te pūmautanga o tētahi waeine.</p> <p>E mōhio ana ki te pūtakenga o tēnei mea te ine, arā, he whakatairite i te āhuatanga e inea ana ki tētahi waeine e hāngai ana.</p>	<p>Ka whakamahi i tētahi mea kē atu hei whakatairite i te rahi o ētahi mea e rua (pērā i te whakamahi i tētahi aho).</p> <p>Ka tika te whakamahi taputapu ine māmā me ngā waeine aro kē māmā (pērā i te whārite ine-taumaha, te aho, te mārō). Arā:</p> <ul style="list-style-type: none"> • ka tūmata, ka mutu te ine i ngā wāhi e tika ana; • ka tāruaruatia te waeine, kāore he āputa, kāore hoki e inaki; • ka tatau i te mahā o ngā waeine e hāngai ana ki te mea e inea ana (me te whai wāhi anō o ngā hautanga waeine māmā, pērā i te haurua). 	<p>E mōhio ana ki ngā kupu hei whakaahua i te rahi o te rerekē o ngā mea e rua e whakatairitea ana. Hei tauira:</p> <ul style="list-style-type: none"> • He iti noa iho te taumaha ake ... • He tino rahi kē atu te roa o ... • Kāore i te tino rerekē te horahanga o ... • He paku te tāroaroa ake o ... • He haurua te rōrahi o ... • Kei te takiwā o te rearua te tawhiti ake o ...

Taumata 2	Te Mātauranga Ine	Te Whakaoti Rapanga Ine	Te Reo Matatini o te Ine
Whanaketanga 2a	<p>E mōhio ana ki te rahinga āwhiwhi o ngā waeine aro whānui nei:</p> <ul style="list-style-type: none"> • te mita (m), te mitarau (cm), te mitamano (mm), me te manomita (km) mō te roa; • te rita (l) mō te kītanga; • te manokaramu (kg) mō te taumaha. <p>E mōhio ana ki te wāwahi i tētahi waeine ki ūna hautanga māmā.</p> <p>E mōhio ana ki te pānui i te wā (karaka mati, karaka ringa), me ngā waeine mō te wā (pēnei i te meneti, te haora, te rā, te wiki, te marama me te tau).</p>	<p>Ka whakatau tata i tētahi inenga i runga i te mōhio ki te rahinga āwhiwhi o ngā waeine aro whānui.</p> <p>Ka tika te whakamahi taputapu ine, pēnei i te rūri, te ine-taumaha me te ipu ine-kītanga.</p> <p>Ka hanga taputapu māmā hei whakatutuki inenga roa, inenga taumaha hoki.</p>	<p>E mōhio ana ki ngā kupu me ngā tohu mō ngā waeine aro whānui.</p> <p>Ka tuhi pikitia hei whakaatu i te whakatairitenga o ētahi rahinga e rua.</p> <p>Ka whakaatu inenga ki tētahi rārangī tau.</p>
Whanaketanga 2e	<p>Ka arotake i te whaitakenga o tētahi inenga, arā:</p> <ul style="list-style-type: none"> • te tika o te waeine; • te tōtika e hāngai ana; • te pātata ki te whakataunga tata. <p>E mōhio ana ki te tātai inenga, mā te tāpiri, mā te tango, mā te whakarea, mā te whakawehe rānei.</p>	<p>E mōhio ana ki te pānui āwhata māmā e whakaatu ana i ngā hautanga waeine (pēnei i te haurua, te hauwhā, me te hautekau).</p> <p>Ka whakamahi i te koki hāngai me ngā hautanga koki hāngai hei waeine mō te koki me te hurihangā.</p>	<p>Ka tuhi kauwhata pou hei whakatairite inenga.</p>

Taumata 3	Te Mātauranga Ine	Te Whakaoti Rapanga Ine	Te Reo Matatini o te Ine
Whanaketanga 3a	<p>E mōhio ana ki ngā hautanga ā-ira (hautekau) o tētahi waeine (pērā i te 1.3 mita me te 4.5kg).</p> <p>E mōhio ana ki te rahinga āwhiwhi o tētahi koki (pēnei i te 45°, te 22.5°, te 180° me ētahi atu).</p>	<p>Ka whakatau tata i ngā inenga koki i runga i te mōhio ki te rahi o ngā koki matua.</p> <p>Ka tika te whakamahi i ngā taputapu ine nei, te ine-koki me te wāti tū.</p>	<p>E mōhio ana ki te tuhi me te whakahua tika i ngā hautanga ā-ira o tētahi waeine (kia kotahi te mati ā-ira).</p> <p>E mōhio ana ki te tuhi me te whakahua tika i ngā inenga wā (pērā i te 1:42.7 – kotahi meneti whā tekau mā rua ira whitu hākona).</p>
Whanaketanga 3e	<p>E mōhio ana ki ngā hautanga ā-ira o tētahi waeine, tae atu kia toru ngā mati ā-ira.</p> <p>E mōhio ana ki te tuhi me te whakamāori wātaka māmā.</p>	<p>Ka whakamahi tukutuku hei whakatau tata i te horahanga o tētahi āhua hikuwaru me tētahi taparau.</p> <p>Ka whakamahi tukutuku hei whiriwhiri i te horahanga o tētahi tapawhā hāngai.</p> <p>Ka whakamahi mataono rite hei whiriwhiri i te rōrahi o tētahi poro tapawhā.</p>	<p>E mōhio ana ki ngā kupu me ngā tohu mō ngā waeine horahanga (m^2, cm^2, ha), me te waeine rōrahi nei, te cm^3.</p>

Taumata 4	Te Mātauranga Ine	Te Whakaoti Rapanga Ine	Te Reo Matatini o te Ine
Whanaketanga 4a	<p>E mōhio ana ki te whakawhiti waccine ngahuru. Hei tauira:</p> <ul style="list-style-type: none"> • mm ↔ cm ↔ m ↔ km; • g ↔ kg; • l ↔ ml. <p>E mōhio ana ki te pāpātanga hei ine i ētahi āhuatanga (pērā i te tere me te utu).</p>	<p>Ka whakamahi i ngā inenga tapa me ngā ture e hāngai ana hei tātai i te paenga, te horahanga me te rōrahi o ngā āhua māmā (pērā i te tapatoru, te tapawhā hāngai, me te pouaka).</p> <p>Ka whakamahi rautaki whakarea hei tātai i ngā inenga tapa o ngā āhua whakarahi.</p>	<p>E mōhio ana ki te tuhi me te whakahua tika i ngā inenga pāpātanga (pēnei i te km/h me te utu/kg).</p> <p>E mōhio ana ki te tuhi, ki te whakahua hoki i ngā whārite hei tātai horahanga māmā, rōrahi māmā hoki (pēnei i te $H = r \times wh$ mō te horahanga tapawhā hāngai).</p>
Whanaketanga 4e	<p>E mōhio ana ki ngā inenga tōraro mō te paemahana me ngā tātaitanga e hāngai ana.</p> <p>E mōhio ana ki te tuhi, ki te whakamāori wātaka e whakaatu ana i ngā āhuatanga matatini.</p> <p>E mōhio ana ki ngā tikanga o te wā-24.</p>	<p>Ka tātai takanga wā (pērā i te roa o tētahi haerenga mēnā e mōhiotia ana te wā tīmata me te wā mutu).</p> <p>Ka whakamahi i ngā inenga me ngā ture hei tātai i te paenga me te horahanga o ngā āhua ahu-2 (pērā i te porowhita me te tapaono rite).</p> <p>Ka whakamahi i ngā inenga me ngā ture hei tātai i te rōrahi o ngā āhua ahu-3 (pērā i te rango me te poro tapatoru).</p> <p>Ka waihanga rautaki hei tātai i te horahanga me te rōrahi o ngā āhua whīwhiwhi.</p>	<p>Ka whakaatu inenga pāpātanga ki te kauwhata rārangī, ki te rārangī tau matarua, ki te tūtohi hoki.</p> <p>E mōhio ana ki te tuhi me te whakahua wā-24.</p>

Taumata 5	Te Mātauranga Ine	Te Whakaoti Rapanga Ine	Te Reo Matatini o te Ine
Whanaketanga 5a	E mōhio ana ki ngā tepe tōtika o tētahi inenga.	Ka whakamahi i te ture a Pythagoras hei tātai i te tapa o tētahi tapatoru hāngai. Ka waihanga rautaki whaihua, ka whakamahi ture hei tātai i ngā tapa, te horahanga, te rōrahi, ngā koki me te horahanga mata o ngā āhua whānui. Ka whakatutuki i ngā momo inenga whānui, me te whakaatu anō i ngā tepe o te tika.	E mōhio ana ki te tohu ± hei whakaatu i ngā tepe tōtika o tētahi inenga. Ka whakaatu inenga ki te rārangi tau me ūna tepe tōtika.

Wāhanga 2

Ngā Whanaketanga Ine me ngā Tauira Aromatawai



He mea tango mai ngā whārangi e whai ake nei i te pukapuka *Whanaketanga Pāngarau: He Aratohu mā te Pouako*, i whakaputaina e Te Pou Taki Kōrero i te tau 2010. Koia ko ngā whanaketanga mō te Ine, mai i te 1a ki te 5a, me ngā tauira aromatawai e hāngai ana.

WHANAKETANGA 1a

Te Ine

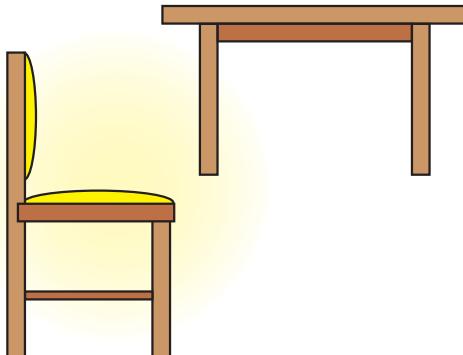
Ngā Whāinga		
Ka whakaoti rapanga te ākonga, ka whakamārama otinga, e whai wāhi mai ana:	He tauira ēnei o ngā āhuatanga me mātua mōhio te ākonga e tutuki ai tana whakaoti rapanga:	⁷ compare ⁸ measurement attributes
<ul style="list-style-type: none"> te whakatairite⁷ me te whakaraupapa i te rahi o ngā āhuatanga ine⁸ o ētahi mea e rua 	<ul style="list-style-type: none"> ēnei āhuatanga e taea ana te ine: te roa, te taumaha, te wā, te paemahana, me te utu te reo māmā hei whakatairite i ngā āhuatanga ine o ētahi mea 	

Te Reo Matatini o te Pāngarau

Hei tauira kupu
<ul style="list-style-type: none"> roa utu ine ake/atu (pēnei i te "roa ake") ngā kupu mō te wā: ata, ahiahi, pō, pouputanga o te rā ...
<ul style="list-style-type: none"> wā kokonga oho (pēnei i te "iti oho") ngā kupu pānui wā karaka: te hāora tauotī me te hāora haurua taumaha
Hei tauira whakaahuahanga
<ul style="list-style-type: none"> he rārangī wā he whārite ine-taumaha

He Tauira Rapanga

Te Ine me te Hanga 1a

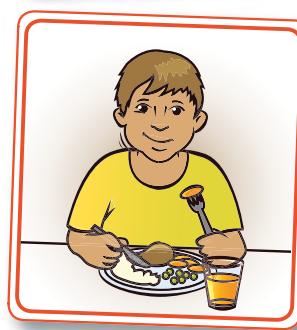
Rapanga 6	Rapanga 7
<p>Rauemi: He tūru, he tēpu. Kia āhua rite te teitei o te tūru me te roa o te tēpu.</p> <p>Tohua mai te teitei o te tūru. Tohua mai te roa o te tēpu. Ko tēhea te mea roa ake – ko te teitei o te tūru, ko te roa rānei o te tēpu? He aha koe i mōhio ai?</p>  <p>Kia tika te otinga, mā te whakatairite mata ki mata. Hei tauira, ka whakatakoria pea te tūru ki te taha o te tēpu, kia hāngai tonu tētahi pito o te tūru me tētahi tapa o te tēpu.</p>	<p>Rauemi: He poi kirikiti, he poi tēnehi, he whārite ine-taumaha.</p> <ol style="list-style-type: none"> Ki tōu whakaaro ko tēhea te mea taumaha ake, ko te poi kirikiti, ko te poi tēnehi rānei? Whakamahia te ine-taumaha, kia kitea ai mēnā kei te tika tō whakaaro.  <p>Ka matapaetia te poi taumaha ake, ā, ka tika te whakamahinga o te whārite ine-taumaha hei whakatairite i te taumaha o tēnā me tēnā.</p>

WHANAKETANGA 1a

Te Ine me te Hangā 1a

Rapanga 8

Rauemi: He huinga kāri* e whakaatu ana i ētahi mahi e ono e hāngai ana ki tēnā wāhangā o te rā, ki tēnā (hei tauira: te oho, te parakuhi, te haere ki te kura, te tākaro, te kai o te ahiahi/pō, te hoki ki te moe). He rārangī wā e whakaatu ana i te ono karaka i te ata i tētahi pito me te iwa karaka i te pō i tētahi.



6:00 aīā



9:00 pō

He kāri ēnei e whakaatu ana i ngā mahi a Haki i tētahi rā, mai i tana mahi tuatahi o te rā ki tana mahi whakamutunga.

1. Raupapahia ēnei kāri ki te rārangī – ko tana mahi tuatahi ki te taha mauī, ko tana mahi whakamutunga ki te taha matau.
2. Whakamāramatia mai he aha i pēnā ai tō raupapa mai i āna mahi.

Ka raupapahia ngā kāri me te hāngai anō o ngā whakamārama mō ngā wā e tika ana mō ia mahi.

WHANAKETANGA 1e

Te Ine

Ngā Whāinga

Ka whakaoti rapanga te ākonga, ka whakamārama otinga, e whai wāhi mai ana:

- te whakamahi waeine aro kē¹³ hei ine i tētahi mea
- te whakamahi waeine aro whānui¹⁴ māmā hei ine i tētahi mea

He tauira ēnei o ngā āhuatanga me mātua mōhio te ākonga e tutuki ai tana whakaoti rapanga:

- ēnei āhuatanga e taea ana te ine – te hurihangā, te rōrahi/kītanga, me te horahangā
- te pūmautanga o te waeine
- te tāruarua¹⁸ i te waeine hei ine i tētahi mea, kāore he āputa¹⁹, kāore e inaki²⁰ rānei
- te wāhi tīmata me te wāhi mutu o tētahi inenga

¹³non-standard unit

¹⁴standard unit

¹⁸repeating

¹⁹gap

²⁰overlap

Te Reo Matatini o te Pāngarau

Hei tauira kupu

- | | | |
|-----------|-------------|----------|
| • waeine | • hurihangā | • rōrahi |
| • kītanga | • horahangā | |

He Tauira Rapanga

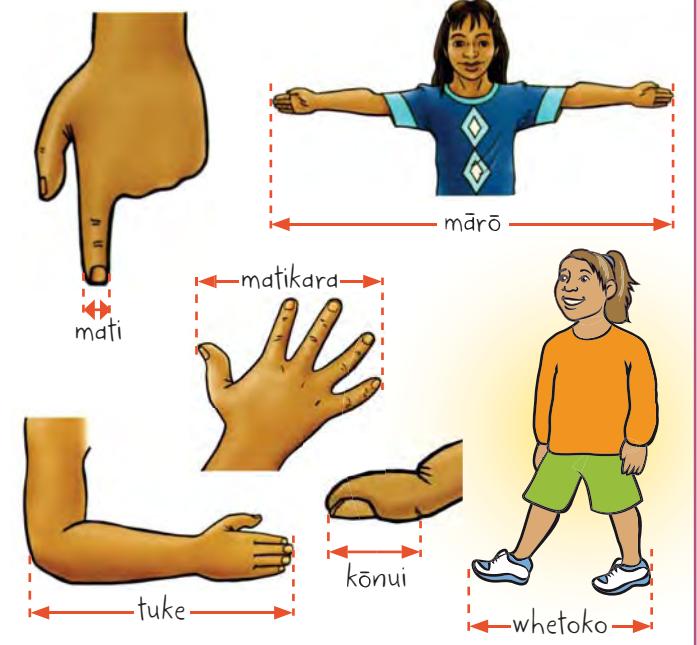
Te Ine me te Hanga 1e

Rapanga 8

Whiriwhiria tētahi waeine aro kē e tika ana hei ine i ngā mea nei.

- te roa o tētahi pene
- te whānui o tētahi pukapuka
- te teitei o tētahi tūru
- te whānui o te akomanga
- te roa o te papa tākarō whutupōro

Ngā waeine:



WHANAKETANGA 1e

Me whakatau tata i te tuatahi, kātahi ka ine i ngā mea nei. Whakaotia te tūtohi nei:

Te mea hei ine	Te waeine	Te whakataunga tata	Te inenga
te roa o tētahi pene			
te whānui o tētahi pukapuka			
te teitei o tētahi tūru			
te whānui o te akomanga			
te roa o te papa tākaro whutupōro			

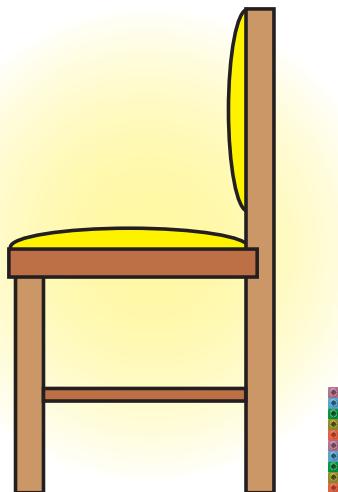
Ka whiriwhiria ngā waeine e tika ana, me te whakamārama anō he aha i tika ai. Ka whakatau tata i ngā inenga, ā, ka tika te tāruarua me te tatau i ngā waeine.

Te Ine me te Hanga 1e

Rapanga 9

Rauemi: Kia 23 ngā mataono honohono.

E hia ngā mataono honohono kia ōrite ki te teitei o te tūru?



**Ka hanga te ākonga i tētahi waeine, pēnei i ngā mataono 10.
Kia tika te whakamahinga o tēnei waeine hei ine i te teitei o te tūru.**

WHANAKETANGA 2a

Te Ine

Ngā Whāinga

Ka whakaoti rapanga te ākonga, ka whakamārama otinga, e whai wāhi mai ana:	He tauira ēnei o ngā āhuatanga me mātua mōhio te ākonga e tutuki ai tana whakaoti rapanga:	¹² unit of measure ¹³ approximate ¹⁴ pace, stride ¹⁵ reasonableness ¹⁶ estimation
<ul style="list-style-type: none"> • te hanga me te whakamahi taputapu ine, waeine¹² hoki e whaitake ana • te wāwāhi me te tāpiri inenga • te whakaputa whakaaro mō te whaitakenga¹⁵ o tētahi inenga, i runga anō i ngā whakataunga tata¹⁶ 	<ul style="list-style-type: none"> • te rahiinga āwhiwhi¹³ o ngā waeine aro whānui māmā me te hononga ki te rahi o tētahi mea e tino mōhiotia ana (pērā i te roa o te whetoko¹⁴ me te rōrahi o tētahi ipu miraka) • ngā hautanga māmā o tētahi waeine 	

Te Reo Matatini o te Pāngarau

Hei tauira kupu

- | | | |
|-----------------|-------------------------------------|----------------------------------|
| • waeine | • mita, mitarau, mitamano, manomita | • rita, ritamano |
| • whakatau tata | • rūri | • karamu, karamumano, manokaramu |
| • koki | • tapa | |

Hei tauira whakaahuahanga

- | | | |
|-----------------|---------|-------------|
| • mm, cm, m, km | • L, mL | • mg, g, kg |
|-----------------|---------|-------------|

He Tauira Rapanga

Te Ine me te Hanga 2a

Rapanga 6

Whakamahia tō rūri hei ine i ngā mea nei. Inea ki te mitamano (mm) pātata rawa. Tuhia ō inenga ki te tūtohi, engari me whakatau tata ngā inenga i te tuatahi.

Te mea hei ine	Te whakataunga tata	Te inenga
te roa o te pukapuka taki kupu a Ngata		
te whānui o te pukapuka taki kupu a Ngata		
te mātotoru o te pukapuka taki kupu a Ngata		
te roa o tō pene		
tō matikara		

Kia tika te whakamahi i te rūri hei whakatutuki inenga roa. Ko ngā whakatau tata e tohu ana i te mōhio ki te rahi o te mitarau (cm).

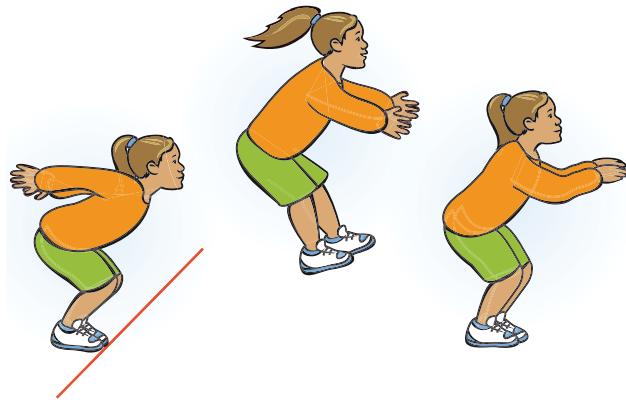
WHANAKETANGA 2a

Te Ine me te Hanga 2a

Rapanga 7

Rauemi: He rūri mita.

E $\frac{3}{2}$ mita te roa o te peke a Hineora. Tuhia he rārangi ki te papa hei whakaatu i te roa o tana peke.



Kia tika te ine me te tuhi i te rārangi, mā te tatau i ngā haurua mita e toru, mā te tāpiri rānei i te haurua mita ki te kotahi mita.

Te Ine me te Hanga 2a

Rapanga 9

Tuhia ēnei inenga ki te taha o te mea e tika ana, me te tuhi hoki i te waeine tika:

2 10 $4\frac{1}{2}$ 1

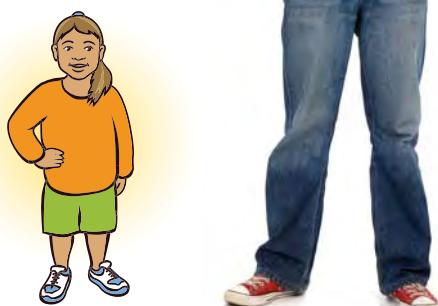
- te rōrahi o tētahi pākete
- te tāroaroa o tētahi tamaiti
- te tāroaroa o tētahi pakeke
- te roa o tētahi motukā



Whakamāramatia he aha i pēnā ai ō whakaaro.

Kia tika te hoatu i ngā inenga me ngā waeine:

- 10 L (rita) te rōrahi o tētahi pākete
- 1 m (mita) te tāroaroa o tētahi tamaiti
- 2 m (mita) te tāroaroa o tētahi pakeke
- $4\frac{1}{2}$ m (mita) te roa o tētahi motukā



Ko ngā whakamārama kia āhua pēnei:

- E mōhio ana ahau he āhua rite taku mārō ki te kotahi mita. E rua o ēnā ka pātata ki te tāroaroa o taku matua.
- Kei te takiwā o te kotahi mita taku tāroaroa.
- E whā, e rima rānei ngā hīkoitanga (whetoko) kia rite ki te roa o tētahi motukā. Ko te whā mita, te rima mita rānei tērā.
- E mōhio ana ahau ki te rahi o te ipu miraka e rua rita te rahi. E rima o ēnā ka uru ki te pākete, nō reira ko te 10 rita tērā.

WHANAKETANGA 2e

Te Ine

Ngā Whāinga

Ka whakaoti rapanga te ākonga, ka whakamārama otinga, e whai wāhi mai ana:

- te kōwhiri i ngā waeine⁷ e hāngai ana ki te horopaki me te tōtika anō o te inenga e whaitake ana.

He tauira ēnei o ngā āhuatanga me mātua mōhio te ākonga e tutuki ai tana whakaoti rapanga:

- te whakamahi i te rūri, te tāporowhita⁸, me te koki hāngai⁹, hei ine, hei tuhi āhua.

⁷unit of measurement

⁸compass

⁹right angle

Te Reo Matatini o te Pāngarau

Hei tauira kupu

- | | | |
|---------------|----------------|-----------------------|
| • waeine | • hoahoa | • poro tapawhā hāngai |
| • mata | • koki hāngai | • poro tapawhā rite |
| • tāporowhita | • mataono rite | |

Te Ine me te Hanga 2e

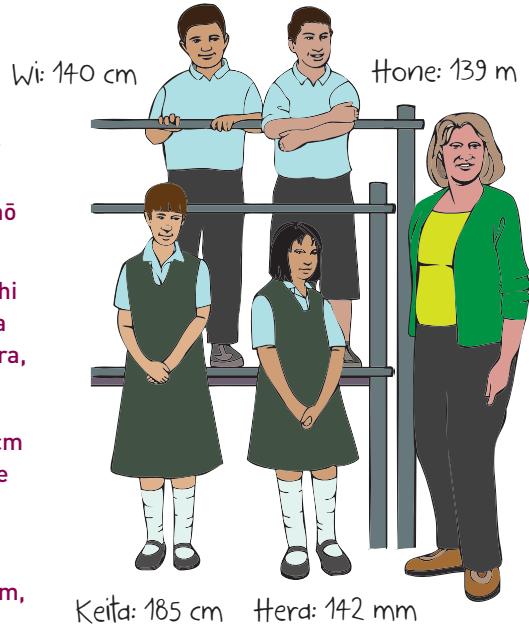
Rapanga 9

E whakaaturia ana ki te whakaahua nei te tāroaroa o ētahi ākonga tokowhā. Kotahi anake te tāroaroa e tika ana.

1. Ko ēhea ngā tāroaroa e hē ana?
2. Whakamāramatia mai he aha, ki ō whakaaro, e hē ana?

Kia tika te tautohu i ngā tāroaroa e hē ana me te hāngai anō o ngā whakamārama. Hei tauira:

- E hē ana te tāroaroa o Hone. He roa atu te 139 m i tētahi papa tākarō whutupōro. E hē ana te waeine. Ākene pea ko te 139 cm te tāroaroa e tika ana. Kua taka rānei te ira, arā, ko te 1.39 m tōna tāroaroa.
- Kāore e tika ana te tāroaroa o Keita. E rite ana te 185 cm ki te tāroaroa o tētahi pakeke, engari he poto ake ia i te whaea e tū ana i te taha.
- E hē ana te tāroaroa o Hera. He tino poto te 142 mm, he rite pea ki te whānui o tētahi pukapuka. Ko te 142 cm, te 1.42 m rānei te tāroaroa tika.



WHANAKETANGA 2e

Te Ine me te Hangā 2e

Rapanga 10

Rauemi: He taura ine tīhaehae, he pukapuka, he rīpene, he kete.

Whakamahia te taura ine tīhaehae hei ine i ēnei mea:

- te whānui, te roa, me te mātotoru o te pukapuka
- te roa o te rīpene
- te whānui me te hōhonu o te kete.



Kia tika te whakamahi i te taura ine tīhaehae. Arā, ka tīmata pea i te 7, i te 10 rānei, ā, ka tangohia te 7 (te 10 rānei) i te inenga.

Ka whakaaturia te waeine e tika ana.

Kia tōtika te inenga ki te mitamano (mm) e pātata ana mō te whānui, te roa, me te mātotoru o te pukapuka, me te roa o te rīpene.

Kia tōtika te inenga ki te mitarau (cm) e pātata ana mō te whānui me te hōhonu o te kete.

WHANAKETANGA 3a

Te Ine

Ngā Whāinga		
Ka whakaoti rapanga te ākonga, ka whakamārama otinga, e whai wāhi mai ana:	He tauira ēnei o ngā āhuatanga me mātua mōhio te ākonga e tutuki ai tana whakaoti rapanga:	⁸ scale ⁹ unit of measurement ¹⁰ protractor
<ul style="list-style-type: none"> ngā momo āwhata⁹ maha me ngā hautanga ā-ira o tētahi waeine⁹ 	<ul style="list-style-type: none"> te whakamahi i ngā momo taputapu ine whānui [pērā i te ine-koki¹⁰]. 	

Te Reo Matatini o te Pāngarau

Hei tauira kupu
<ul style="list-style-type: none"> waeine koki hāngai ine-koki āwhata tākiri/putu ahu-2, ahu-3
Hei tauira tohu
<ul style="list-style-type: none"> ◦

He Tauira Rapanga

Te Ine me te Hanga 3a

Rapanga 8

Rauemi: He rūri, he ine-koki.

Tuhia tētahi tapatoru hāngai. Kia 12.7 cm te roa o tētahi tapatoru. Kia 35° te rahi o tētahi o ngā koki.

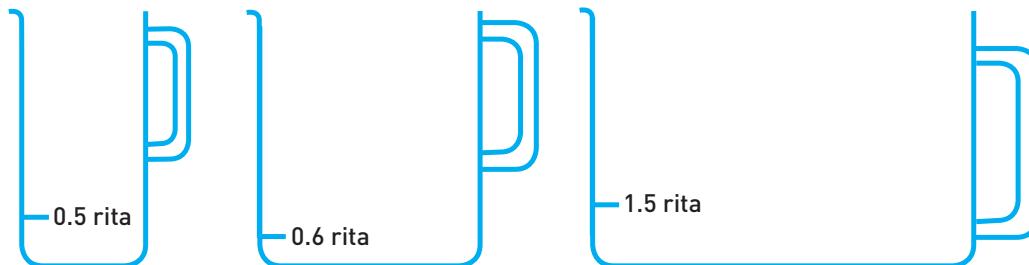
Kia tika te tuhi i te tapatoru hāngai (me te mōhio anō he aha te tapatoru hāngai), me te whakamahi i ngā taputapu ine. E tōtika ana te inenga roa (12.7 cm), me ngā inenga koki (90° me te 35°).

Te Ine me te Hanga 3a

Rapanga 9

Rauemi: He rūri

E ringia ana e Pine te 2.5 rita wai ki roto i ngā ipu e toru nei. Āta whiriwhiria te teitei o te wai ki ia ipu, ka tohu ai.



Kia tika te whiriwhiri i te āwhata o ngā ipu, me te tohu anō i te teitei o te 2.5 rita. Hei tauira:

Mō te ipu tuatahi: Ka whakareatia te inenga mō te 0.5 ki te 5, ā, ka whakamahia te rūri hei tohu i tēnei kītanga (te 2.5 rita) ki te ipu.

Mō te ipu tuarua: Ka whakareatia te inenga mō te 0.6 ki te 4, ā, ka whakamahia te rūri hei ine i tēnei kītanga (te 2.4 rita). Ka whakatau tata i te wāhi mō te 2.5 rita ki runga ake i te 2.4.

Mō te ipu tuatoru: Ka whakawehia te inenga mō te 1.5 rita ki te 3 (ko te inenga tēnei mō te 0.5 rita). Kātahi ka whakareatia tēnei ki te 5, ā, ka whakamahia te rūri hei tohu i tēnei kītanga (te 2.5 rita) ki te ipu.

WHANAKETANGA 3e

Te Ine

Ngā Whāinga		
Ka whakaoti rapanga te ākonga, ka whakamārama otinga, e whai wāhi mai ana:	He tauira ēnei o ngā āhuatanga me mātua mōhio te ākonga e tutuki ai tana whakaoti rapanga:	⁹ unit of measurement ¹² grid ¹³ cube
<ul style="list-style-type: none"> te whakatau tata me te whiriwhiri horahanga māmā, rōrahi māmā 	<ul style="list-style-type: none"> ngā <i>waeine</i>⁹ e tika ana mō te horahanga me te rōrahi, pēnei i te cm^2, te cm^3, te m^2, me te m^3 te whakamahi <i>tukutuku</i>¹² hei whiriwhiri horahanga te whakamahi <i>mataono rite</i>¹³ hei whiriwhiri rōrahi. 	

Te Reo Matatini o te Pāngarau

Hei tauira kupu
<ul style="list-style-type: none"> mitarau pūrua horahanga
Hei tauira tohu
<ul style="list-style-type: none"> cm^2, m^2 cm^3, m^3
<ul style="list-style-type: none"> rita
<ul style="list-style-type: none"> L, mL

He Tauira Rapanga

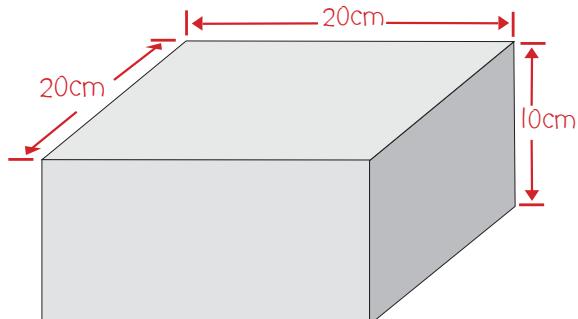
Te Ine me te Hanga 3e

Rapanga 8

Kua hangaia he pouaka hei tākai i ngā mataono rite.
E 20cm ki te 20cm ki te 10cm ngā tapa o te pouaka.

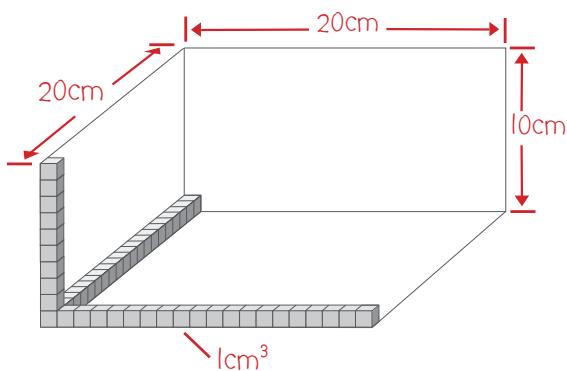


- E hia ngā mataono rite, 1cm ki te 1cm ki te 1cm ka uru ki te pouaka?
- E hia ngā mataono rite, e 2cm ki te 2cm ki te 2cm ka uru ki te pouaka?



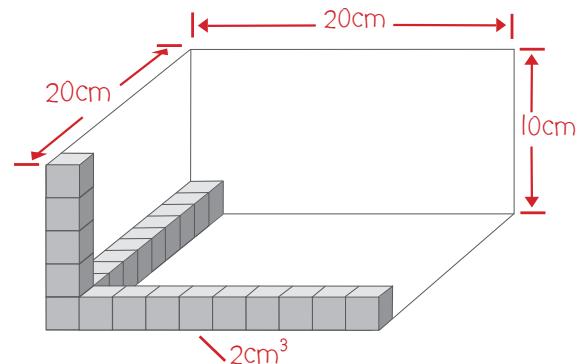
Kia tika te whiriwhiri i te rōrahi me te whakaatu anō i te mōhio ki te tikanga o te rōrahi. Hei tauira:

- Ka tātaihia te mahia o ngā cm^3 ka takoto ki te papa o te pouaka (mā te whakarea $20 \times 20 = 400$), kātahi ka tātaihia te mahia o ngā paparanga cm^3 (mā te whakarea $400 \times 10 = 4000$).



WHANAKETANGA 3e

2. Ka tātaihia te maha o ngā mataono rite 2cm^3 ka takoto ki te papa o te pouaka (mā te whakarea $10 \times 10 = 100$), kātahi ka tātaihia te maha o ngā paparanga o ngā mataono 2cm^3 (mā te whakarea $100 \times 5 = 500$).



WHANAKETANGA 4a

Te Ine

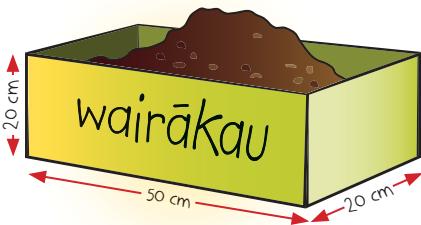
Ngā Whāinga		
Ka whakaoti rapanga te ākonga, ka whakamārama otinga, e whai wāhi mai ana:	He tauira ēnei o ngā āhuatanga me mātua mōhio te ākonga e tutuki ai tana whakaoti rapanga:	¹⁰ perimeter ¹¹ ratio ¹² scale factor ¹³ scale diagram ¹⁴ rate
<ul style="list-style-type: none"> • te whakawhitihitī waeine • ngā inenga tapa me ngā ture hei tātai paenga¹⁰, horahanga, rōrahi hoki o ngā īhua māmā • te pāpātanga¹⁴ hei ine i tētahi mea (pēnei i te km/h hei ine i te tere) • te tuhi hoahoa īwhata 	<ul style="list-style-type: none"> • te whakamahinga o te ūwehenga¹¹ me te taurahi¹² hei tuhi hoahoa īwhata¹³. 	

Te Reo Matatini o te Pāngarau

Hei tauira kupu
<ul style="list-style-type: none"> • ture tātai • rōrahi • hoahoa īwhata • paenga • horahanga • taurahi • pāpātanga
Hei tauira whakaahuahanga
<ul style="list-style-type: none"> • he hoahoa inerite • ngā momo tirohangā • he hoahoa īwhata

He Tauira Rapanga

Te Ine me te Hanga 4a

Rapanga 8	
<p>E 20 rita te rōrahi o tētahi pēke wairākau.</p>  <ol style="list-style-type: none"> 1. Tuhia he hoahoa o tētahi pouaka e taea ai te katoa o te wairākau o tētahi pēke te ringi atu ki roto. He pēhea nei te roa, te whānui, me te teitei o te pouaka? 2. Hauruatia ia taha o tō pouaka. E hia ngā rita wairākau ka taea ki roto ināianei? 3. Kia tika te tuhi hoahoa o te pouaka me te whakamārama i ngā roa o ngā tapa o te pouaka. Ka mōhio i te ūrite o te 1L me te 1 000 cm³. Nō reira, e tika ana kia 20 000 cm³ te rōrahi o te pouaka. 	<p>Ka whakamahia te ture tātai $R = r \times wh \times t$ ($R = \text{rōrahi}$, $r = \text{roa}$, $wh = \text{whānui}$, $t = \text{teitei}$) mō te rōrahi o tētahi poro tapawhā hāngai, ā, ka whirihiria ngā tapa e toru. Ina whakareatia aua tapa e toru, ka rite ki te 20 000. Hei tauira:</p> $20 \text{ cm} \times 50 \text{ cm} \times 20 \text{ cm} (20 \times 50 \times 20 = 20 000)$  <ol style="list-style-type: none"> 2. Kia tika te whakamahi i te ture hei tatai i te rōrahi o tētahi pouaka, arā: $R = r \times wh \times t$ $= 25 \times 10 \times 10 \quad (\text{te haurua o ngā inenga o te pouaka kei runga ake nei})$ $= 2,500 \text{ cm}^3$ $= 2.5 \text{ L (rita) wairākau ka taea ki roto}$

WHANAKETANGA 4a

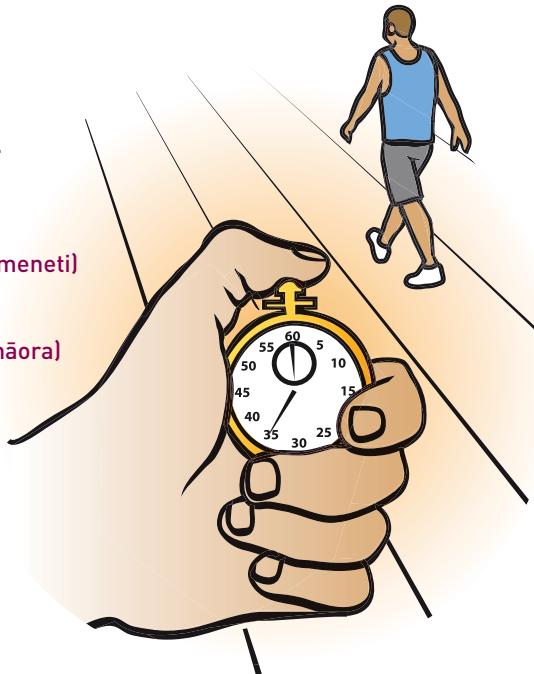
Te Ine me te Hanga 4a

Rapanga 11

Inea te tere e oti ai i tētahi hoa te 100 mita mā raro. E hia manomita i te hāora (km/h) te tere o tana hīkoi?

Kia tika te whakatutuki i ngā mahi nei:

- Ka whakamahi wati [wati tū rānei] hei ine i te wā o tētahi hoa ki te hīkoi i te 100 mita. (Ākene pea me ine hoki te 100 mita, mēnā karekau he papa omaoma i te rohe o te kura.)
- Ka hurihia tēnei inenga hei manomita i te hāora (km/h). Hei tauira, 100 mita i te 45 hākona:
 - Whakareatia ki te 4:
400 mita i te 3 meneti ($45 \text{ hākona } [\frac{3}{4} \text{ meneti}] \times 4 = 3 \text{ meneti}$)
 - Whakareatia ki te 20:
8 000 mita i te hāora ($3 \text{ meneti} \times 20 = 60 \text{ meneti} = 1 \text{ hāora}$)
 - Hurihia ngā mita hei manomita:
8 km/h



WHANAKETANGA 4e

Te Ine

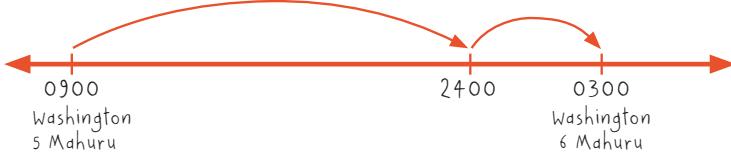
Ngā Whāinga		
Ka whakaoti rapanga te ākonga, ka whakamārama otinga, e whai wāhi mai ana:	He tauira ēnei o ngā āhuatanga me mātua mōhio te ākonga e tutuki ai tana whakaoti rapanga:	
<ul style="list-style-type: none"> • ngā momo wātaka whānui • te whiriwhiri i te rahi o tētahi koki. 	<ul style="list-style-type: none"> • te tātai i te takanga o te wā • te whakaatu wā-24 	

Te Reo Matatini o te Pāngarau

Hei tauira kupu
<ul style="list-style-type: none"> • wātaka • wā-24

He Tauira Rapanga

Te Ine me te Hanga 4e

Rapanga 8
Kei mua te taima o Aotearoa i ērā atu whenua o te ao:
<ul style="list-style-type: none"> • 12 hāora kei mua i Ingārangi • e 2 hāora kei mua i Piripane (Brisbane) • e $4\frac{1}{2}$ hāora kei mua i Malaysia • 17 hāora kei mua i Washington.
<ol style="list-style-type: none"> 1. He aha te taima i Piripane (Brisbane), mēnā ko te 1425 hāora te taima i Aotearoa? 2. He aha te taima i Aotearoa mēnā ko te 0930 hāora te taima i Ingārangi? 3. Kei Aotearoa a Hinewai. Kei te waea atu a Hinewai ki tana kuia, kei Ingārangi e noho ana. E hiahia ana ia kia tangi te waea a tōna kuia i te 8.00 karaka i te pō. He aha te taima me waea atu a Hinewai i Aotearoa? 4. E hoki mai ana a Hororangi mai i Washington ki Aotearoa. Ka wehe mai ia i te 0900 hāora i te 5 o Mahuru. 18 hāora te roa o te rerenga. He aha te rā me te taima i Washington i tana taunga mai ki Aotearoa? He aha te rā me te taima i Aotearoa i tana taunga mai?
Kia tika te whiriwhiri i ngā taima, me te whakamārama rautaki:
1. 1225 hāora 2. 2130 hāora 3. 8:00 i te ata 4. 0300 hāora i te ata o te 6 Mahuru i Washington, ā, 2000 hāora i te pō o te 6 o Mahuru i Aotearoa
Hei tauira whiriwhiringa:
<ul style="list-style-type: none"> • Ka tāpirihia te 18 hāora ki te 0900 hei whiriwhiri i te taima i Washington: 
<ul style="list-style-type: none"> • 17 hāora te tōmua o Aotearoa i Washington, nō reira ko te 2000 tērā i te 6 o Mahuru: 

WHANAKETANGA 5a

Te Ine

Ngā Whāinga

Ka whakaoti rapanga te ākonga, ka whakamārama otinga, e whai wāhi mai ana:	He tauira ēnei o ngā āhuatanga me mātua mōhio te ākonga e tutuki ai tana whakaoti rapanga:	⁷ formulae
<ul style="list-style-type: none"> ngā ture⁷ hei tātai tapa, paenga, horahanga, koki, horahanga mata, rōrahi hoki o ngā āhua whānui 	<ul style="list-style-type: none"> te whakamahi i te ture a Pythagoras 	

Te Reo Matatini o te Pāngarau

Hei tauira kupu

- | | | |
|--------------|-------------|---------|
| • ture tātai | • pūtakerua | • tāroa |
| • mati ā-ira | • tātaitai | • pūrua |

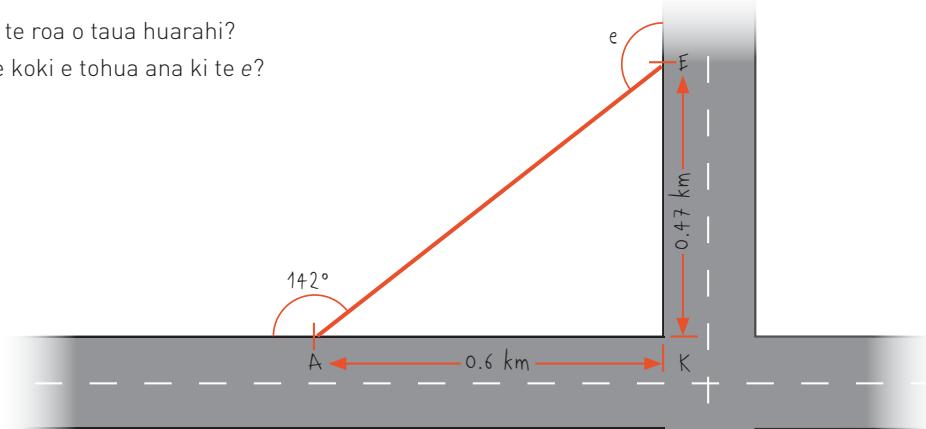
He Tauira Rapanga

Te Ine me te Hanga 5a

Rapanga 7

He mahere tēnei o tētahi kokonga huarahi. E whakaaro hia ana kia hangaia he huarahi torotika mai i te A ki te E (te rārangi whero).

- E hia manomita te roa o taua huarahi?
- E hia te rahi o te koki e tohua ana ki te e?



- Kia tika te whakamahi i te ture a Pythagoras hei tātai i te tāroa o te tapatoru, me te whakamārama i ngā mahi:

Ko tā te ture a Pythagoras e mea ana, ko te tapeke o ngā pūrua o ngā tapa poto, he rite ki te pūrua o te tapa roa o tētahi tapatoru hāngai. Arā:

$$a^2 + e^2 = i^2$$

$$0.6^2 + 0.47^2 = AE^2$$

$$0.76 = AE \text{ (mā te tātaitai, kia 2 ngā mati ā-ira)}$$

- Kia tika hoki te whiriwhiri i te koki e, me tētahi whakamārama pēnei:

E 38° te koki KAE nā te mea ko te 180 te tapeke o ngā koki o tētahi rārangi torotika ($142 + 38 = 180$).

Nō reira, e 52° te koki KEA nā te mea 180 te tapeke o ngā koki o tētahi tapatoru ($38 + 90 + 52 = 180$).

Nō reira 128° te koki e, nā te mea 180 te tapeke o ngā koki i te rārangi torotika ($52 + 128 = 180$).

Wāhanga 3

He Ngohe Whakaako i te Ine



He ngohe whakaako ēnei e hāngai ana ki ngā taumata whanaketanga 1a ki te 5a. Hei tauira noa iho ēnei ngohe, hei āta whakaaro mā te pouako, hei whakawhānui, otirā hei whakahāngai ki āna ake ākonga.

Kei te Wāhanga 4 (whārangi 118) ngā Whārangi Tārua e hiahiatia ana hei whakatutuki i ētahi o ngā ngohe. Kei te pae ipurangi o www.nzmaths.co.nz hoki ēnei whārangi tārua.



Whanaketanga 1a

Mātauranga Matua kua Mau kē

Te Tau

- te tatau pānga tahi

Mātauranga Matua hei Ako

- ēnei āhuatanga o tētahi mea e taea ana te ine: te roa, te taumaha, te wā, te paemahana, te utu, te pūmautanga o tētahi inenga
- te whakatairite i te rahi o ētahi mea e rua, mata ki te mata
- ngā kupu whakatairite i ngā āhuatanga ine (pēnei i te hahaka ake, te teitei ake ...)
- ngā kupu e hāngai ana ki te roa (pēnei i te whānui, te tāroaroa, te teitei, te hahaka, te hōhonu, te pāpaku, te tawhiti ...)

Mata ki te Mata

1a 1e 2a 2e 3a 3e 4a 4e 5a

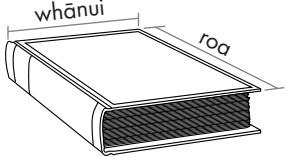
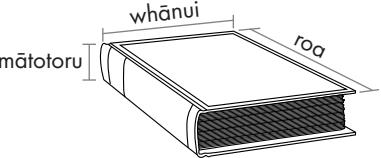
E ako ana ahau ki te whakatairite i te roa o ētahi mea e rua, mata ki te mata.

Rauemi

- Whārangi Tārua 1 & 2
- Ngā taonga o roto i te akomanga

Kupu matua

mātotoru, poto ake, roa, roa ake, teitei, whānui

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Whakawhitiwhiti kōrero mō ngā kupu nei e hāngai ana ki te roa o tētahi mea, arā:</p> <ul style="list-style-type: none">• roa• whānui• mātotoru• teitei	<p>Titiro mai ki tēnei rīpene. Tohua mai te roa o te rīpene. Mai i tētahi pito o te rīpene ki tētahi, koia tōna roa.</p> <p>Ko hea te roa o te papa tuhituhi nei? Mai i tētahi taha ki tētahi.</p> <p>Titiro ki te pukapuka. Tohua mai te roa o te pukapuka. Ko ēnei taha e rua o te pukapuka ka kīia ko tōna roa. Mai i runga ki raro.</p> <p>Ko te kupu e hāngai ana ki ngā tapa poto, ko te whānui o te pukapuka. Tohua mai te roa me te whānui o tēnei pukapuka.</p>  <p>Ko hea te mātotoru o te pukapuka? Koia tēnei, mai i te uhi o mua ki te uhi o muri.</p>  <p>Pēhea nei te mātotoru o te pepa? He tino iti noa iho. He papatahi te pepa, karekau he mātotoru o te pepa.</p> <p>Titiro ki te kūaha. Mai i hea ki hea tōna teitei? Mai i te papa ki te tapa runga o te kūaha.</p>

	<p>Mai i hea ki hea tōna whānui? Mai i tētahi taha ki tētahi. Tohua mai te mātotoru o te kūaha.</p>
<p>Tirohia ngā kāri (Whārangi Tārua 1), ka tono ai i ngā ākonga kia tohu i te mea e kōrerohia ana. Hei tauira:</p> <ul style="list-style-type: none"> • te whānui o tētahi pouaka • te roa o tētahi pene <p>Tonoa ngā ākonga kia whakaputa kōrero mō te mea e tohu ana rātou.</p>	<p>Ko te kōrero kei tēnei kāri e mea ana, ‘te whānui o tētahi pouaka’. “E Hera, kimihia tētahi pouaka, ka whakaatu mai ai i tōna whānui.”</p> <p>E tohu ana koe i te aha? Koinei te whānui o tēnei pouaka. Mai i konei ki konei.</p>
<p>Tikina ētahi mea e rua hei whakatairite mā ngā ākonga i te roa o ētahi wāhangā o aua mea. Hei tauira:</p> <ul style="list-style-type: none"> • te whānui o tētahi pukapuka me te whānui o te tēpu • te whānui o tētahi pukapuka me te roa o tētahi pene 	<p>Titiro ki te pukapuka nei. Ki tō titiro he rahi ake te whānui o te pukapuka i te whānui o te tēpu? He rahi ake te whānui o te tēpu.</p> <p>He aha koe i mōhio ai? Mā te titiro noa a te karu i mōhio ai. He ngāwari te kitea atu. He tino rahi kē atu te whānui o te tēpu i te whānui o te pukapuka.</p> <p>Pēhea te whānui o te pukapuka me te roa o te pene? Ko tēhea te mea rahi ake? E āhua pātata ana ngā roa e rua nei.</p> <p>He uaua pea mā te titiro noa iho a te karu e kitea ai ko tēhea te mea roa ake. Me pēhea tātou e tino mōhio ai? Me whakatakoto te pene ki te taha o te pukapuka. Kia hāngai tonu tētahi pito o te pene ki tētahi taha o te pukapuka. Kātahi nā ka kitea atu ko tēhea te mea roa ake.</p> 
<p>Hoatu ētahi atu mea takirua hei whiriwhiri mā ngā ākonga i te mea roa ake. Kei te Whārangi Tārua 2 ētahi tauira.</p> <p>Tonoa ngā ākonga kia whakaputa kōrero mō tā rātou mahi whakatairite i te roa.</p>	<p>Māku e hoatu tētahi kāri. Ko tāu mahi, he kimi i ngā mea e rua e tohua mai ana i te kāri, me te whiriwhiri ko tēhea te mea roa ake.</p> <p>Inia, he aha ngā mea e rua i tō kāri? Ko tēhea te mea roa ake? Ko te roa o tētahi pene me te whānui o tētahi kōpae rorohiko. He roa ake te pene i te whānui o te kōpae rorohiko.</p>

Pēke Huna

1a 1e 2a 2e 3a 3e 4a 4e 5a

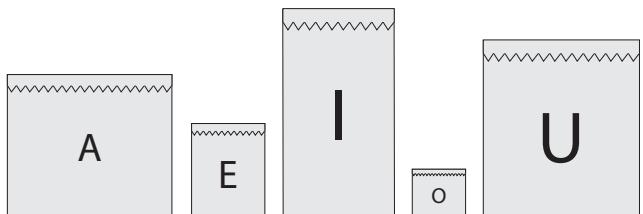
E ako ana ahau ki te whakatairite i te taumaha o ētahi mea e rua, mata ki te mata.

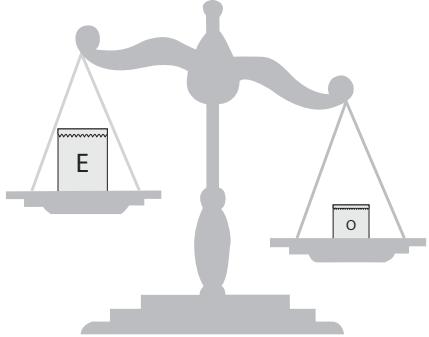
Rauemi

- Ētahi pēke pepa parauri
- He taonga hei rau atu ki roto i ngā pēke

Kupu matua

māmā ake, taumaha, taumaha ake

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Whakaritea ētahi pēke, hei hiki mā ngā ākonga, hei āta whakaaroaro i te taumaha. Kuhuna ētahi taonga rerekē ki tēnā pēke ki tēnā, engari kia kaua e kitea e ngā ākonga.</p> <p>E tika ana kia āhua ūrite te taumaha o ētahi pēke, kia tino rerekē te taumaha o ētahi.</p>	<p>Anei ētahi pēke e rima e rārangī mai ana. Kua tuhia ngā oropuare ki ngā pēke. Ki tō titiro, ko tēhea te mea taumaha rawa?</p>  <p>Kei te kī mai a Mere, ko te U te mea taumaha rawa. He aha ai e Mere? Nā te mea koia te pēke nui katoa.</p> <p>Haere mai koe ki te hiki i te pēke. Pēhea nei ū whakaaro ināianei mō te taumaha o te pēke? Kāore i te taumaha, he tino māmā. Ākene pea karekau he mea i roto, he huruhuru heihei noa iho rānei.</p> <p>Hīkina ake tētahi atu o ngā pēke. Pēhea nei te taumaha? He āhua taumaha. He taumaha ake i te pēke U.</p> <p>Nō reira ahakoa te rahi o tētahi mea pēnei i te pēke U, kāore tātou i te mōhio ki tōna taumaha mā te titiro noa iho, nē rā. Mā te hiki ake e rongo ai koe i tōna taumaha.</p> <p>He aha tētahi atu mea nui, engari he iti noa iho tōna taumaha? Ko tētahi poi takutai. Ko tētahi pouaka karekau he mea o roto.</p>
<p>Tonoa ngā ākonga ki te raupapa i ngā pēke mai i te mea māmā rawa ki te mea taumaha rawa.</p>	<p>Nō reira haere mai ki te hikihiki i ngā pēke kia rongo ai koe i te taumaha o tēnā, o tēnā. Raupapahia ngā pēke mai i te mea māmā rawa, piki ake ki te mea taumaha rawa.</p>

	<p>He aha tētahi pēke he taumaha ake i te pēke A? Ko te pēke I.</p> <p>E hia ngā pēke he māmā ake i te pēke E? E rua, ko te U me te A.</p>						
<p>Hoatu he poi kirikiti, ka tono ai i ngā ākonga ki te whakarōpū i ngā pēke – ko tētahi rōpū he māmā ake i te poi kirikiti, ko tētahi he taumaha ake.</p>	<p>Anei tētahi poi kirikiti. Hīkina kia rongo ai koe i tōna taumaha.</p> <p>Ki tō rongo, he taumaha ake te poi kirikiti nei i ēhea o ngā pēke? He taumaha ake pea i te U me te A.</p> <p>Tēnā, tuhia te oropuare o ngā pēke ki te wāhi tika i te tūtohi nei:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 5px;">He māmā ake i te poi kirikiti</th> <th style="text-align: center; padding: 5px;">He āhua ūrite ki te taumaha o te poi kirikiti</th> <th style="text-align: center; padding: 5px;">He taumaha ake i te poi kirikiti</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;"></td> <td style="text-align: center; padding: 5px;"></td> <td style="text-align: center; padding: 5px;"></td> </tr> </tbody> </table>	He māmā ake i te poi kirikiti	He āhua ūrite ki te taumaha o te poi kirikiti	He taumaha ake i te poi kirikiti			
He māmā ake i te poi kirikiti	He āhua ūrite ki te taumaha o te poi kirikiti	He taumaha ake i te poi kirikiti					
<p>Aratakina ngā ākonga ki te whakamahi i te whārite ine-taumaha hei tirotiro i ngā pēke he āhua ūrite te taumaha.</p>	<p>I rongo anō koe i ētahi pēke he āhua ūrite te taumaha? Āe, ko te pēke O me te pēke E. Kāore e tino rangona te rerekē o te taumaha o tēnā me tēnā.</p> <p>Nō reira me pēhea tātou e mōhio ai ko tēhea o ngā pēke te mea taumaha rawa? Mā te whakamahi i te whārite ine-taumaha. Meatia tētahi pēke ki te taha mauī, ko tētahi ki te taha matau.</p> <p>Anei te whārite hei mahi māu:</p>  <p>Kua rewa ake te pēke E. E tohu ana tērā i te aha? E tohu ana he māmā ake te pēke E i te pēke O, he taumaha ake te O.</p>						

Tonoa ngā ākonga ki te whakamahi i te whārite ine-taumaha hei whakatairite i te taumaha o ngā pēke ki tētahi atu mea, pērā i tētahi pukapuka, i tētahi kapu onepū rānei.

Hei whakawhānui

Tonoa mā ngā ākonga e whakarite ētahi pēke huna hei mahi mā ō rātou hoa.



Whanaketanga 1e

Mātauranga Matua kua Mau kē

Te Tau

- te tatau ake
- te tatau māwhitiwhiti
- te hautau māmā (haurua, hauwhā)

Te Ine

- ēnei āhuatanga o tētahi mea e taea ana te ine: te roa, te taumaha, te wā, te paemahana, te utu
- te pūmautanga o tētahi inenga
- te whakatairite i te rahi o ētahi mea e rua, mata ki te mata
- ngā kupu whakatairite i ngā āhuatanga ine (pēnei i te hahaka ake, te teitei ake ...)
- ngā kupu e hāngai ana ki te roa (pēnei i te whānui, te tāroaroa, te teitei, te hahaka, te hōhonu, te pāpaku, te tawhiti ...)

Mātauranga Matua hei Ako

- ēnei āhuatanga o tētahi mea e taea ana te ine: te kītanga (rōrahi), te horahanga, te hurihangā
- ngā momo waeine aro kē e hāngai ana ki ngā āhuatanga e inea ana (pērā i te papanui me te pukapuka mō te horahanga; te matikara mō te roa; te kapu mō te kītanga)
- te mita (m) me te mitarau (cm) hei waeine aro whānui mō te roa
- te pūmautanga o tētahi waeine
- te pūtakenga o tēnei mea te ine, arā, he whakatairite i te āhuatanga e inea ana ki tētahi waeine e hāngai ana
- te whakamahi i tētahi mea kē atu hei whakatairite i te rahi o ētahi mea e rua (pērā i te whakamahi i tētahi aho)
- te whakamahi tika i ngā taputapu ine māmā me ngā waeine aro kē māmā
- ngā kupu me ngā kīanga kōrero hei whakaahua i te rahi o te rerekē o ngā mea e rua e whakatairitea ana

He Tūhuratanga Ine

1e.1 Te Matikara (wh. 151)

Rauemi kē atu e Hāngai ana

Ngā Kōwae Ako o nzmaths

- Pēhea nei te Tāroaroa
 - <http://www.nzmaths.co.nz/resource/p-hea-nei-te-t-roaroa>

Pukapuka

- Te huuinga *Pipī Pangarau* mō te ine. Te Pou Taki Kōrero, 2011.

Te Aho hei Whakatairite i te Roa

1a 1e 2a 2e 3a 3e 4a 4e 5a

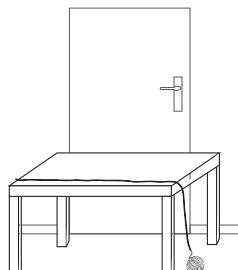
E ako ana ahau ki te whakatairite i te roa o ētahi mea mā te whakamahi aho.

Rauemi

- Whārangi Tārua 3
- He aho

Kupu matua

āhua roa ake, paku nei te roa ake, poto iho, roa ake, tino roa ake

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Tuhia te rapanga nei ki te papa tuhituhi, ka pānui tahi ai me ngā ākonga:</p> <p>Kei te nuku a Hēmi i tana tēpu mai i tētahi rūma ki tētahi. E whakaaro ana ia mēnā ka uru mā te kūaha, he rahi rawa rānei te tēpu. Me pēhea ia e mōhio ai?</p> <p>Tonoa ngā ākonga kia whakaputa whakaaro mō te huarahi hei whiriwhiri mā Hēmi i tēnei rapanga i mua i te hiki i te tēpu.</p>	<p>Titiro ki tēnei tēpu a tātou. Ki tō titiro ka uru ki te kūaha o tō tātou akomanga, kāore rānei?</p> <p>He āhua ūrite te whānui o te tēpu me te whānui o te kūaha. Ākene pea ka uru.</p> <p>Me pēhea tātou e mōhio ai i mua i te hikinga ake o te tēpu? He tauira whakautu:</p> <ul style="list-style-type: none">• Ka whakamahi au i aku ringaringa. Ka whātoro au i aku ringa e rua i te taha o te tēpu kia kitea ai mēnā he nui ake, he poto iho rānei te whānui o te tēpu i te whātoronga o aku ringaringa. Kātahi ka whātoro i aku ringaringa i te taha o te kūaha. Kātahi au ka mōhio ko tēhea te nui ake.• Ka whakamahi au i tētahi aho. Ka tapahia tētahi aho kia ūrite ki te whānui o te tēpu. Ina whakatakotoria te aho ki te kūaha, kātahi ka kitea ko tēhea te mea roa ake. <p>Pēhea te whānui me te teitei o te tēpu? Ko tēhea te mea roa ake?</p> <p>He māmā te whakamahi anō i te aho. Tapahia tētahi aho kia ūrite ki te whānui o te tēpu. Kātahi ka puritia tētahi pito o te aho ki te papa, ka whātoro ake kia kitea ai mēnā he roa ake i te teitei o te tēpu, kāore rānei.</p> 
<p>Hoatu ētahi atu mea takirua hei whakatairite i te roa mā te whakamahi aho. Kei te Whārangi Tārua 3 ētahi tauira.</p> <p>Me āta tirotiro mēnā e mōhio ana te ākonga ki te wāhi e tika ana hei whakatakoto i te tīmatanga o te aho.</p> <p>Ina taunga ki tēnei mahi, tukuna rātou kia raupapa i ētahi mea e toru i runga i te roa o tēnā me tēnā.</p>	

Te Whakamahi Waeine Aro Kē

1a	1e	2a	2e	3a	3e	4a	4e	5a
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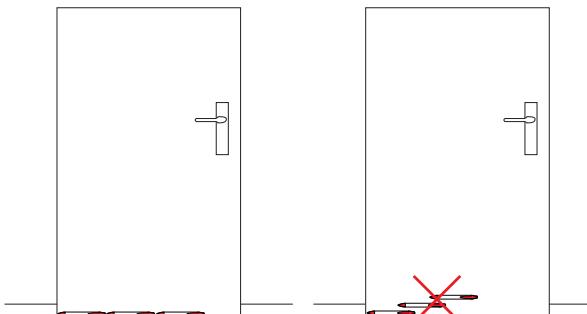
E ako ana ahau ki te whakamahi waeine aro kē mō te roa.

Rauemi

- He pene
- He rākau Ātaarangi

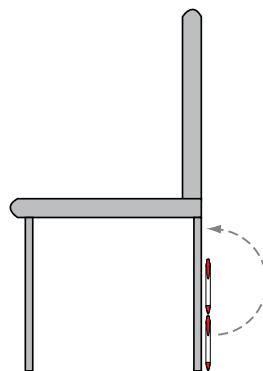
Kupu matua

āputa, inaki, tāruarua, waeine

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Tuhia te rapanga nei ki te papa tuhituhi, ka pānui tahi ai me ngā ākonga:</p> <p>Kei te tuku a Mere i tana tēpu hei koha mā tana hoa. Ka waea mai te hoa ki te pātai he pēhea nei te whānui o te tēpu. Ko te whakahoki a Mere, e 5 pene te whānui.</p> <p>Whakawhitiwhiti kōrero mō te whakamahi pene hei ine i te whānui o tētahi kūaha.</p> <p>Āta kōrerohia ngā tikanga matua mō te ine.</p>	<p>Me pēhea tātou e mōhio ai mēnā ka uru mai te tēpu a Mere i te kūaha o tō tātou akomanga?</p> <p>Me whakatakoto kia 5 ngā pene i te kūaha kia kitea mēnā he roa ake tēnā i te whānui o te tēpu.</p> <p>He mahi ine tēnā, ko te ine i te whānui o te kūaha. Arā, kia mōhio ai tātou e hia pene te whānui o te kūaha.</p> <p>E Hine, māu e whakatakoto ētahi pene hei ine i te whānui o te kūaha. He aha ngā tikanga matua mō te mahi ine?</p> <ul style="list-style-type: none"> • Me whakatakoto te pene tuatahi kia noho pū tētahi pito ki tētahi taha o te kūaha. • Me whakatakoto ngā pene pito ki te pito. Kāore he āputa i waenganui, kāore e inaki. • Ka tatau i te maha o ngā pene mai i tētahi taha o te kūaha ki tētahi. • Kia ūrite te roa o ia pene. 
<p>Tonoa ngā ākonga kia whakatau tata i ngā inenga nei i te tuatahi, kātahi ka ine ai. Hei tauira:</p> <ul style="list-style-type: none"> • E hia pene te teitei o te tūru? • E hia pene te whānui o te matapihī? 	<p>E Tama, ki tō titiro, e hia pene te teitei o te tūru?</p> <p>Kei te takiwā pea o te whā.</p> <p>Whakamahia ēnei pene e rua, ka ine ai i te teitei o te tūru. Ki hea tīmata ai te ine? Whakamāramatia mai tō mahi.</p>

- E hia rākau kōwhai te roa o te pukapuka?
- E hia pukapuka te roa o te tēpu?
- E hia kōpae rorohiko te roa o te papa tuhituhi?
- E hia hū te whānui o te akomanga?

Ka whakatakotoria tētahi pene kia noho pū tētahi pito ki te tīmatanga o te waewae muri o te tūru. Ka whakatakotoria te pene tuarua kia pā ki tērā atu pito o te pene tuatahi. Ka hīkina te pene tuatahi, me te whakatakoto anō kia pā ki te pito whakarunga o te pene tuarua. Ka pēnei te haere o te mahi kia tae atu ki te teiteitanga o te tūru, me te tatau anō i te maha o ngā pene.



Hei whakawhānui

1. Whakamahia he pukapuka hei ine i te horahanga o ētahi papa. Āta tirohia mēnā ka whakawhitia ngā tikanga matua mō te ine ki tēnei horopaki, arā:
 - me whakatakoto te waeine tuatahi kia hāngai ki tētahi taha o te mea e inea ana
 - me tāruaruua ngā waeine, kāore he āputa ki waenganui, kāore hoki e inaki
 - ka tatau i ngā waeine e kapi ai te katoa o te mea e inea ana
 - kia pūmau tonu te rahi o ngā waeine
2. Whakawhitiwhiti kōrero mō ngā hautanga waeine (hautau māmā nei, pērā i te haurua me te hauwhā). Hei tauira: E pātata ana ki te whā me te haurua pene te whānui o te tēpu.
3. Whakawhitiwhiti kōrero mō te tikanga o te waeine aro whānui. Hei tauira, i te horopaki o te rapanga i mua nei, tērā pea he rerekē te roa o te pene a Mere me te pene a tōna hoa. Nō reira ko te tikanga o te waeine aro whānui (pēnei i te mitarau – cm), kia āta mōhiotia ai e tētahi te rahi o te inenga a tētahi atu.

Inea te Roa Ake

Te Ine: E ako ana ahau ki te whiriwhiri i te roa o ētahi mea mā te tatau waeine māmā.

Te Tau: E ako ana ahau ki te tatau ake hei whiriwhiri tāpiritanga pēnei i te $8 + 4 = \square$.

E ako ana ahau ki te tatau whakamuri hei whiriwhiri tangohanga pēnei i te $13 - 5 = \square$.

Rauemi

- He taputapu ine aronga kē, pērā i ngā rākau Ātaarangi

Kupu matua

āhua roa ake, paku nei te roa ake, poto ake, roa ake, tatau ake, tatau whakamua, tatau whakamuri, tino roa ake

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Tuhia tētahi rārangi ki te pepa, kia waru pea ngā rākau whero te roa o te rārangi.</p> <p>Tonoa ngā ākonga kia tuhi i ētahi atu rārangi, kia roa ake.</p> <p>Whakawhitiwhiti kōrero mō ngā whārite tāpiritanga e tūhono ana i ngā roa o ngā rārangi.</p>	<p>Anei tētahi rārangi. E Mara, māu e tuhi tētahi rārangi roa ake ki raro iho.</p> <p>E Hine, tuhia he rārangi poto ake i tēnei.</p> <p>Ki tō titiro, he pēhea nei te roa ake o te rārangi a Mara i te rārangi tuatahi nei?</p> <p>He tino roa ake. (He āhua roa ake. He paku nei te roa ake.)</p> <p>E Tama, tuhia he rārangi kia paku nei te poto ake i te rārangi nei.</p> <p>Whakamahia te rākau whero hei ine i te roa o te rārangi nei. E hia rākau whero te roa o te rārangi? E 8 rākau whero.</p> <p>Tuhia he rārangi kia 3 ngā rākau whero te roa ake i tēnei rārangi. Whakamāramatia mai te mahi. Ka whakatakoto kia toru ngā rākau whero ki te pito o te rārangi, ka tohu ai i te wāhi whakamutunga.</p> <p style="text-align: center;">e 8 rakau whero te roa </p> <p>E hia rākau whero te roa o te rārangi hou? Tekau mā tahi.</p> <p>He aha ū whiriwhiringa? Ka tīmata i te 8, ka tatau ake kia toru atu anō ... iwa, tekau, tekau mā tahi.</p> <p>He aha te whārite tāpiritanga e hāngai ana? E waru ngā rākau whero, tāpirihia kia toru ngā rākau whero, ka tekau mā tahi katoa ngā rākau whero. $8 + 3 = 11$</p>

Kia pērā anō te mahi mō ētahi atu tāpiritanga. Kei te taumata tonu o te ākonga te āhua o ngā tāpiritanga, pēnā pea ko ngā tauhono o te 5, ngā tauhono o te tekau, ngā tāpiritanga whakawhiti i te tekau rānei. Hei tauira:

Ngā tauhono o te rima:

- Te roa o te rārangī = 3; te tāpiritanga = 2 $3 + 2 = 5$
- Te roa o te rārangī = 1; te tāpiritanga = 4 $1 + 4 = 5$
- Te roa o te rārangī = 2; te tāpiritanga = 3 $2 + 3 = 5$

Ngā tauhono o te tekau:

- Te roa o te rārangī = 7; te tāpiritanga = 3 $7 + 3 = 10$
- Te roa o te rārangī = 4; te tāpiritanga = 6 $4 + 6 = 10$
- Te roa o te rārangī = 5; te tāpiritanga = 5 $5 + 5 = 10$
- Te roa o te rārangī = 2; te tāpiritanga = 8 $2 + 8 = 10$

Ngā tāpiritanga e whakawhiti ana i te tekau:

- Te roa o te rārangī = 7; te tāpiritanga = 5 $7 + 5 = 12$
- Te roa o te rārangī = 9; te tāpiritanga = 4 $9 + 4 = 13$
- Te roa o te rārangī = 6; te tāpiritanga = 7 $6 + 7 = 13$
- Te roa o te rārangī = 8; te tāpiritanga = 5 $8 + 5 = 13$

Tuhia tētahi rārangī ki te pepa, kia waru pea ngā rākau whero te roa o te rārangī.

Tonoa ngā ākonga kia tuhi i ētahi atu rārangī, kia poto ake.

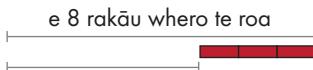
Whakawhitiwhiti kōrero mō ngā whārite tangohanga e tūhono ana i ngā roa o ngā rārangī.

Whakamahia te rākau whero hei ine i te roa o te rārangī nei. E hia rākau whero te roa o te rārangī?

E 8 rākau whero.

Tuhia he rārangī kia 3 ngā rākau whero te poto ake i tēnei rārangī. Whakamāramatia mai te mahi.

Ka whakatakoto kia toru ngā rākau whero, mai i te pito matau o te rārangī, haere whakatemauī. Kātahi ka tuhia te rārangī poto mai i te wāhi e hāngai ana ki te timatanga o te rārangī tuatahi, ko te mutunga e hāngai ana ki te pito o ngā rākau whero.



E hia rākau whero te roa o te rārangī hou?

E rima.

He aha ō whiriwhiringa?

Ka tīmata i te 8, ka tatau whakamuri kia toru ... whitu, ono, rima.

He aha te whārite tangohanga e hāngai ana?

E waru ngā rākau whero, tangohia kia toru ngā rākau whero, ka rima ngā rākau whero. $8 - 3 = 5$

Kia pērā anō te mahi mō ētahi atu tangohanga. Hei tauira:

Ngā tauhono o te rima:

- Te roa o te rārangi = 5; te tangohanga = 3 $5 - 3 = 2$
- Te roa o te rārangi = 5; te tangohanga = 4 $5 - 4 = 1$
- Te roa o te rārangi = 5; te tangohanga = 2 $5 - 2 = 3$

Ngā tauhono o te tekau:

- Te roa o te rārangi = 10; te tangohanga = 7 $10 - 7 = 3$
- Te roa o te rārangi = 10; te tangohanga = 4 $10 - 4 = 6$
- Te roa o te rārangi = 10; te tangohanga = 5 $10 - 5 = 5$

Ētahi tangohanga kē atu:

- Te roa o te rārangi = 7; te tangohanga = 4 $7 - 4 = 3$
- Te roa o te rārangi = 12; te tangohanga = 5 $12 - 5 = 7$

Hei tauira pātai whakawhānui

E ono rākau kōwhai te roa o te rārangi:

- Tuhia he rārangi kia **haurua** te roa. Tuhia te whārite e hāngai ana.
- Tuhia he rārangi kia **rearua** te roa. Tuhia te whārite e hāngai ana.

Whakatairitea te Roa

1a 1e 2a 2e 3a 3e 4a 4e 5a

Te Ine: E ako ana ahau ki te whakatairite i te roa o ētahi mea.

Te Tau: E ako ana ahau ki te tatau ake hei whiriwhiri tāpiritanga pēnei i te $8 + \square = 12$.

Rauemi

- Whārangi Tārua 4
- He taputapu ine aronga kē, pērā i ngā rākau Ātaarangi

Kupu matua

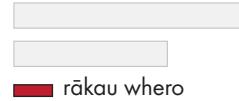
āhua roa ake, paku nei te roa ake, poto ake, roa ake, tatau ake, tino roa ake

Ngā tohutohu	He tauira kōrero mā te pouako
Whakatairitea te roa o ētahi mea e rua, e taea ana te whakatakoto tētahi ki te taha o tētahi.	<p>Ko tā tātou mahi i tēnei rā, he whakatairite i te roa o ētahi mea.</p> <p>Ko tēhea te mea roa ake, ko tēhea te mea poto ake o Hana rāua ko Mairangi?</p> <p>Me pēhea tātou e tino mōhio ai?</p> <p>Me tū rāua tuara ki te tuara.</p> <p>Ko wai te mea roa ake?</p> <p>He roa ake a Mairangi i a Hana.</p> <p>Ko wai te mea poto ake?</p> <p>He poto ake a Hana i a Mairangi.</p>

Koia nei ētahi atu mea hei whakatairite i te roa:

- Ko ngā matikara o ētahi tamariki tokorua.
- Ko ngā pene rākau a ētahi.
- Ko ngā hū o ētahi.
- Ko ngā whetoko a ētahi.
- Ko ētahi pukapuka e rua.

Whakawhitiwhiti kōrero mō te roa ake, te poto ake rānei o tētahi mea i tētahi. Tonoa ngā ākonga kia tuhi pikitia hei whakaatu i te roa ake o tētahi mea i tētahi. Me āta whakaaro te rahi o te roa ake.	Me titiro anō ki te roa o Hana rāua ko Mairangi. Ko tēhea o ēnei kōrero e hāngai ana ki ū rāua roa: <ul style="list-style-type: none">• He tino roa ake a Mairangi i a Hana.• He āhua roa ake a Mairangi i a Hana.• He paku nei te roa ake o Mairangi i a Hana.
--	--

		<p>Ka tuhi au i tētahi pou hei whakaatu i te roa o Hana.</p> <p>Hinewai, haramai ki te tuhi i tētahi atu pou ki te taha o tēnei hei whakaatu i te roa o Mairangi. Me poto ake te pou, me roa ake rānei?</p> <p>Me roa ake.</p> <p>Me tino roa ake, me āhua roa ake, me paku nei te roa ake rānei?</p> <p>Me paku noa iho te roa ake.</p>
Whakamahia he taputapu ine aronga kē hei ine i te roa ake o tētahi mea i tētahi.		<p>Anei ētahi ngaku kāri e rua. Whakamahia te rākau whero hei ine i te roa o ia ngaku, ka tuhi ai.</p>  <p>E hia rākau whero te roa o te ngaku tuatahi?</p> <p>E 6.</p> <p>E hia rākau whero te roa o te ngaku tuarua?</p> <p>E 4.</p> <p>Me pēhea te whiriwhiri e hia rākau whero te roa ake o tētahi ngaku i tētahi?</p> <ol style="list-style-type: none"> 1. Mā te whakamahi i te rākau whero hei ine i te roa ake o te ngaku tuatahi i te ngaku tuarua. 2. Mā te tatau ake i te 4 ki te 6. “Rima, ono” – e rua ngā tatauranga, nō reira e rua rākau whero te roa ake o te ngaku tuatahi i te ngaku tuarua. <p>He aha te whārite tāpiritanga hei whakaatu i te roa ake o tētahi ngaku i tētahi? $4 + 2 = 6$</p>
<p>Kia pēnei anō te mahi hei whakatairite i ētahi mea e rua. Kei te Whārangī Tārua 4 ētahi mahi pēnei hei mahi takitahi, takirua rānei.</p>		

Porowhita Hurihuri

1a	1e	2a	2e	3a	3e	4a	4e	5a
----	----	----	----	----	----	----	----	----

Te Ine: E ako ana ahau ki te whakaatu, ki te tuhi hautanga hurihanga.

Te Tau: E ako ana ahau i te tikanga o ngā hautau māmā.

Rauemi

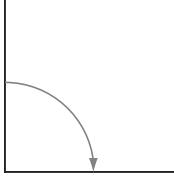
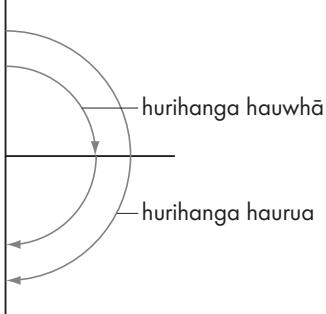
- He Porowhita Hurihuri (Whārangī Tārua 5)

Kupu matua

hurihanga, porowhita, whakatekaraka

Ngā tohutohu	He tauira kōrero mā te pouako
Tohutohua ngā ākonga kia whakamahi i ō rātou tinana hei whakaatu hurihanga me ngā hautanga hurihanga.	<p>E tū tātou, ka anga atu ki te papa tuhituhi. Whakaaturia mai te hurihanga kotahi.</p> <p>Whakaaturia mai te hurihanga haurua. E anga atu ana ki hea ināianei? Pēhea nei te rahi o te hurihanga kia oti te hurihanga kotahi?</p> <p>Ko te hurihanga haurua anō.</p> <p>E hia ngā hurihanga haurua kei roto i te hurihanga kotahi?</p> <p>E 2.</p> <p>Mēnā ka huri koe ki tō taha matau, ko te hurihanga whakatekaraka tērā. He rite ki te huri a ngā ringa o te karaka.</p> <p>Whakaaturia mai te hurihanga hauwhā whakatekaraka. E hia ngā hurihanga hauwhā kia rite ki te hurihanga haurua?</p> <p>E 2.</p> <p>Whakaaturia mai te hurihanga hauwhā whakatekaraka. E hia atu anō ngā hurihanga hauwhā kia oti te hurihanga kotahi?</p> <p>E 3.</p> <p>E hia ngā hurihanga hauwhā kei roto i te hurihanga kotahi?</p> <p>E 4.</p> <p>E hia ngā hurihanga hauwhā e oti ai ngā hurihanga e 2?</p> <p>E 8.</p>
Tuhia he rārangi tau matarua hei whakaatu i te hononga o ngā hurihanga haurua me ngā hurihanga kotahi.	<p>E hia ngā hurihanga haurua e oti ai te hurihanga kotahi?</p> <p>E 2.</p> <p>E hia ngā hurihanga haurua e oti ai ngā hurihanga e 2?</p> <p>E 4.</p>

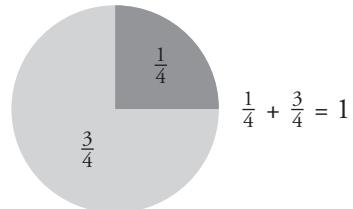
	<p>E hia ngā hurihangā haurua e oti ai ngā hurihangā e 3? E 6.</p> <p>He rārangi tau tēnei. Kei runga o te rārangi tau ko te tatauranga o ngā hurihangā kotahi. Kei raro ko te tatauranga o ngā hurihangā haurua. Tuhia ētahi anō o ngā tau.</p>				
Kia pērā anō te mahi mō te hurihangā hauwhā.	<p>E hia ngā hurihangā hauwhā e oti ai te hurihangā kotahi? E 4</p> <p>E hia ngā hurihangā hauwhā e oti ai ngā hurihangā e 2? E 8</p> <p>E hia ngā hurihangā hauwhā e oti ai ngā hurihangā e 3? 12.</p> <p>He rārangi tau tēnei. Kei runga o te rārangi tau ko te tatauranga o ngā hurihangā hauwhā. Kei raro ko te tatauranga o ngā hurihangā hauwhā. Tuhia ētahi anō o ngā tau.</p>				
<p>Whakaaturia ngā Porowhita Hurihuri (Whārangi Tārua 5) ki ngā ākonga, ka whakawhitihiti kōrero ai mō te whakaatu hurihangā.</p> <p>E tika ana kia maha ngā Porowhita Hurihuri, kia rerekē anō te rahi me ngā tae o tēnā me tēnā.</p>	<p>He Porowhita Hurihuri ēnei. E rua ngā porowhita e hono ana, e mahi ngātahi ana ki te whakaatu hurihangā. Titiro ki tēnei Porowhita Hurihuri. E whakaaturia ana te hurihangā hauwhā.</p> <p>Mā koutou e whakaatu mai te hurihangā haurua ki ā koutou Porowhita Hurihuri. He aha ngā āhuatanga ūrite me ngā āhuatanga rerekē o tēnā me tēnā o ngā Porowhita Hurihuri?</p> <table border="1"> <thead> <tr> <th>Āhuatanga ūrite</th> <th>Āhuatanga rerekē</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • te hautanga o te porowhita e whakaaturia ana (haurua) • te rahi o te hurihangā </td> <td> <ul style="list-style-type: none"> • te rahi o ngā porowhita </td> </tr> </tbody> </table>	Āhuatanga ūrite	Āhuatanga rerekē	<ul style="list-style-type: none"> • te hautanga o te porowhita e whakaaturia ana (haurua) • te rahi o te hurihangā 	<ul style="list-style-type: none"> • te rahi o ngā porowhita
Āhuatanga ūrite	Āhuatanga rerekē				
<ul style="list-style-type: none"> • te hautanga o te porowhita e whakaaturia ana (haurua) • te rahi o te hurihangā 	<ul style="list-style-type: none"> • te rahi o ngā porowhita 				

	<p>Titiro ki te rārangi e whakaaturia ana ki te Porowhita Hurihuri. Pēhea nei te āhua o tēnei rārangi? He rārangi torotika.</p> <p>Mēnā ko te haurua te rahi o te hurihangā, ka hua mai he rārangi torotika.</p>
<p>Whakamahia te Porowhita Hurihuri, ka tūhura ai i ngā hautanga hurihangā. Tuhia hoki he pikitia me te whārite hei whakaatu i ngā mahi.</p> <p>E tika ana kia mōhio kē te ākonga ki ngā tohu hautau, pērā i te $\frac{1}{2}$ me te $\frac{1}{4}$.</p>	<p>Whakaaturia he hurihangā hauwhā ki te Porowhita Hurihuri.</p> <p>Tuhia he pikitia hei tohu i te hurihangā hauwhā.</p>  <p>E rua ngā rārangi o te hurihangā hauwhā nei e pūtahi ana. Ko te pere e whakaatu ana i te hurihangā. He hurihangā whakatekaraka.</p> <p>E hia ngā hurihangā hauwhā hei hanga i te hurihangā haurua?</p> <p>E 2.</p> <p>Whakaaturia ngā hurihangā hauwhā e rua ki te Porowhita Hurihuri. Tuhia he pikitia hei tohu i ngā hurihangā hauwhā e rua.</p>  <p>He aha ngā whārite hei whakaatu i te rahi o ngā hurihangā hauwhā e rua?</p> $\frac{1}{4} + \frac{1}{4} = \frac{1}{2} \quad \frac{1}{4} \times 2 = \frac{1}{2}$ <p>Whakaaturia kia whā ngā hurihangā hauwhā ki te Porowhita Hurihuri. Tuhia hoki he pikitia.</p> <p>He aha ngā whārite hei whakaatu i te rahi o ngā hurihangā hauwhā e whā?</p> $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = 1 \quad \frac{1}{4} \times 4 = 1$

Whakaaturia te hurihangā hauwhā ki te Porowhita Hurihuri.
E rua ngā wehenga porowhita e whakaaturia ana. Pēhea nei
te rahi o aua wehenga porowhita?

Ko te hauwhā tētahi wehenga, ko te toru hauwhā tētahi.

Tuhia he pikitia hei whakaatu i ngā wehenga porowhita e
rua nei, me te whārite e hāngai ana.



Te Pūmautanga o te Horahanga

1a 1e 2a 2e 3a 3e 4a 4e 5a

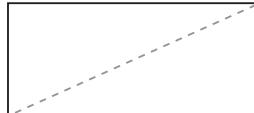
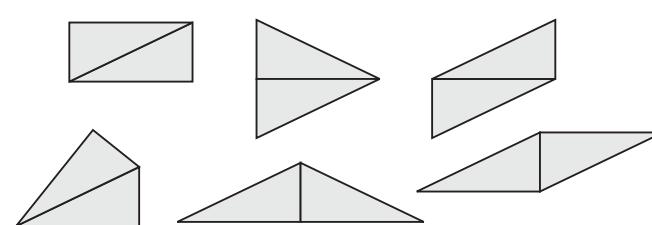
E ako ana ahau i te noho pūmau o te horahanga o tētahi papa, ahakoa te wāwāhitanga o taua papa.

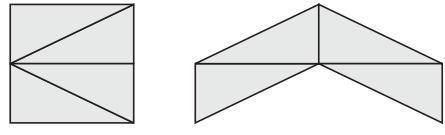
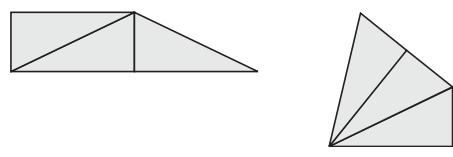
Rauemi

- He tapawhā hāngai kua hangaia ki te kāri mārō
- He kutikuti

Kupu matua

horahanga, pūmautanga, tapatoru, tapawhā hāngai

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Tapahia ētahi tapawhā hāngai i te kāri mārō, kia ōrite te rahi (hei tauira: 10cm mā te 6cm).</p> <p>Hoatu kia ono ngā tapawhā hāngai ki ia takirua ākonga.</p> <p>Tonoa ngā ākonga kia tapahi i te rārangi hauroki o ngā tapawhā hāngai.</p> <p>Ka whakapiria takiruatia ngā tapatoru tētahi ki tētahi hei hanga i ētahi āhua hou.</p>	<p>Anei ētahi tapawhā hāngai. He ōrite te horahanga o ēnei tapawhā hāngai katoa. He aha te tikanga o tēnei kupu te horahanga?</p> <p>Koia e mea ana i te rahi o tētahi papa. I konei ko te rahi o ngā tapawhā hāngai.</p> <p>Tuhia he rārangi hauroki ki ngā tapawhā hāngai katoa – mai i tētahi kokonga ki tētahi e noho tauaro ana. Mai i te kokonga matau o runga ki te kokonga mauī o raro, mai i te kokonga mauī o runga ki te kokonga matau o raro rānei.</p>  <p>Tapahia ngā rārangi. He aha ngā āhua ka puta mai?</p> <p>E rua ngā tapatoru ka puta.</p> <p>Honoa ngā tapatoru tapa ki tapa hei hanga i ētahi āhua hou. E hia ngā āhua hou ka taea te hanga?</p> 
<p>Whakawhitiwhiti kōrero mō te pūmautanga o te horahanga, ahakoa te rerekē o te āhua ka hangaia ki ngā tapatoru.</p>	<p>Titiro ki ngā āhua hou nei kua hangaia ki ngā tapatoru. Ko tēhea te mea he nui rawa te horahanga ki tō titiro? He ōrite te horahanga o tēnā me tēnā, nā te mea he ōrite ngā tapatoru e rua o tēnā āhua o tēnā.</p>

	<p>He ūrite, he rerekē rānei te horahanga o ēnei āhua hou ki te horahanga o te tapawhā hāngai i te tīmatanga? He ūrite. Kāore i tāpirihia he kāri anō, i tangohia atu rānei tētahi wāhanga o te tapawhā hāngai.</p> <p>Āe, ahakoa he rerekē ngā āhua, kua pūmau tonu te horahanga o te tapawhā hāngai.</p>
Whakamahia ngā tapatoru hei hanga i ētahi āhua hou, māu anō e tohu te horahanga.	<p>Honoa ētahi o ngā tapatoru, hei hanga i ētahi āhua hou. Koia nei ngā horahanga o ngā āhua hei hanga māu:</p> <ul style="list-style-type: none"> • kia 2 te whakareatanga ake i te horahanga o te tapawhā hāngai i te tīmatanga • kia 3 te whakareatanga ake i te horahanga o te tapawhā hāngai i te tīmatanga • kia $1\frac{1}{2}$ te whakareatanga ake i te horahanga o te tapawhā hāngai i te tīmatanga • kia $2\frac{1}{2}$ te whakareatanga ake i te horahanga o te tapawhā hāngai i te tīmatanga • ... <p>E 2 te whakareatanga ake:</p>  <p>Kotahi me te haurua te whakareatanga ake:</p> 
Kia pēra anō te arataki i ngā ākonga ki te tapahi i ētahi atu āhua (pēnei i te tapaono, te tapatoru rānei) kia haurua, kia hautoru, kia hauwhā rānei. Ka whakapiria ngā wāhanga hei hanga i ētahi āhua hou, me te whakawhitiwhiti kōrero mō te pūmautanga o te horahanga.	



Whanaketanga 2a

Mātauranga Matua kua Mau kē

Te Tau

- ngā rautaki wāwāhi tau māmā

Te Ine

- ēnei āhuatanga o tētahi mea e taea ana te ine: te kītanga (rōrahi), te horahanga, te hurihangā
- ngā momo waeine aro kē e hāngai ana ki ngā āhuatanga e inea ana (pērā i te papanui me te pukapuka mō te horahanga; te matikara mō te roa; te kapu mō te kītanga)
- te mita (m) me te mitarau (cm) hei waeine aro whānui mō te roa
- te pūmautanga o tētahi waeine
- te pūtakenga o tēnei mea te ine, arā, he whakatairite i te āhuatanga e inea ana ki tētahi waeine e hāngai ana
- te whakamahi i tētahi mea kē atu hei whakatairite i te rahi o ētahi mea e rua (pērā i te whakamahi i tētahi aho)
- te whakamahi tika i ngā taputapu ine māmā me ngā waeine aro kē māmā
- ngā kupu me ngā kīanga kōrero hei whakaahua i te rahi o te rerekē o ngā mea e rua e whakatairitea ana

Mātauranga Matua hei Ako

- te rahinga āwhiwhi o ngā waeine aro whānui
- te wāwāhi i tētahi waeine ki ōna hautanga māmā
- te pānui i te wā (karaka mati, karaka ringa), me ngā waeine mō te wā (pēnei i te meneti, te haora, te rā, te wiki, te marama me te tau)
- te whakatau tata i tētahi inenga i runga i te mōhio ki te rahinga āwhiwhi o ngā waeine aro whānui
- te whakamahi taputapu ine, pēnei i te rūri, te ine-taumaha me te ipu ine-kītanga
- te hanga taputapu māmā hei whakatutuki inenga roa, inenga taumaha hoki
- ngā kupu me ngā tohu mō ngā waeine aro whānui
- te tuhi pikitia hei whakaatu i te whakatairitenga o ētahi rahinga e rua
- te whakaatu inenga ki tētahi rārangī tau

He Tūhuratanga Ine

2a.1 Te Horahanga Rau Rākau (wh. 152)

Rauemi kē atu e Hāngai ana

Ngā Kōwae Ako o nzmaths

- Te teiteitanga me te haurua i te haora
<http://www.nzmaths.co.nz/resource/te-teiteitanga-me-te-haurua-i-te-h-ora>
- He uhi pukapuka – te ine i te roa
<http://www.nzmaths.co.nz/resource/he-uhi-pukapuka-te-ine-i-te-roa>

Kia Taunga ki te Rahi o ngā Waeine Aro Whānui

1a 1e 2a 2e 3a 3e 4a 4e 5a

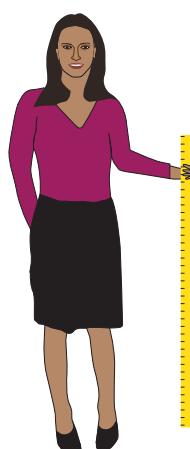
E ako ana ahau i te rahinga āwhiwhi o ētahi waeine aro whānui (te mita, te manokaramu me te rita).

Rauemi

- He rūri mita
- He tioka
- He ipu miraka (1 rita te rōrahi)
- He maihea (1 manokaramu te taumaha)
- He whārite ine-taumaha
- He rākau Ātaarangi

Kupu matua

māmā ake, manokaramu, mita, pātata, poto ake, rita, roa ake, rūri, taumaha ake, whārite ine-taumaha

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Tirohia te rūri mita, ka whakatairite ai ki ētahi āhuatanga tinana:</p> <ul style="list-style-type: none"> • te whetoko • te whātoronga ringaringa • mai i te pokohiwi ki ngā matimati • te paenga o te hope (whakamahia he aho) • te roa o te peke tū • ... 	<p>He rūri tēnei hei ine i te roa o tētahi mea. Kotahi mita te roa o te rūri. E Mina, ki tō titiro he tāroaroa ake koe i te kotahi mita, he poto ake rānei?</p> <p>He tāroaroa ake.</p> <p>Ina tū koe ki te taha o te rūri mita, ka tae atu te mita ki hea i tō tinana?</p> <p>Ki taku titiro, ka tae ake ki tōku uma.</p> <p>Tēnā, whakamātauria.</p>  <p>Me ka tū au ki te taha o te rūri mita, ka tae atu te mita ki hea i taku tinana?</p> <p>Ki tō hope pea.</p> <p>Ki tō titiro, he tāroaroa ake au i te rua mita, he poto ake rānei?</p>

	<p>E Tama, whakaaturia mai kia kotahi te whetoko. Tuhia he rārangi ki te papa hei tohu i te tīmatatanga o te whetoko me tētahi anō rārangi hei tohu i te mutunga.</p> <p>He nui ake, he poto ake, he āhua ōrite rānei te whetoko a Tama ki te mita kotahi?</p> <p>Pēhea te whetoko a Huria? Whakamātauria.</p>															
<p>Waiho te rūri mita ki rahaki kia kore ai e kitea e ngā ākonga. Tonoa ngā ākonga ki te kimi mai i ētahi mea i te akomanga, me te whakatairite anō i te roa o aua mea ki te mita kotahi.</p> <p>Whakamahia te rūri mita kia kitea ai te tika o ā rātou whakataunga tata i te roa.</p>	<p>E Hine, tirohia ngā mea i te akomanga ka tohu mai i tētahi mea he āhua rite ki te mita kotahi te roa.</p> <p>Tikina atu te rūri mita, ka whakamātau ai i te mea i tohua e koe.</p> <p>E pātata ana ki te mita? He iti ake, he roa ake rānei?</p> <p>Tuhia ētahi mea mai i te akomanga ki ngā rōpū e toru nei:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>E pātata ana ki te haurua mita</th> <th>E pātata ana ki te mita kotahi</th> <th>E pātata ana ki te rua mita</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p>Whakamahia te rūri mita hei whakamātau i ū whakataunga tata i te roa o ēnei mea. I āhua tika ū whakataunga tata?</p>	E pātata ana ki te haurua mita	E pātata ana ki te mita kotahi	E pātata ana ki te rua mita												
E pātata ana ki te haurua mita	E pātata ana ki te mita kotahi	E pātata ana ki te rua mita														
<p>Waiho te rūri mita ki rahaki kia kore e kitea e ngā ākonga. Whakamōhiotia atu te roa o ētahi rārangi hei tuhi mā ngā ākonga ki te papa.</p> <p>Whakamahia te rūri mita hei whakamātau i ngā whakataunga tata a ngā ākonga.</p>	<p>Anei te tioka hei tuhi mā i tētahi rārangi ki te papa. Kia kotahi mita te roa o tō rārangi.</p> <p>Whakatakotoria te rūri mita ki runga i tō rārangi. Pēhea nei te pātata o tō rārangi ki te kotahi mita?</p> <p>Whakamahia he rākau Ātaarangi whero, ka ine ai i te roa ake (te poto ake) o tō rārangi i te mita kotahi. Tuhia ki te tūtohi nei:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Ingoa</th> <th>Poto ake</th> <th>Roa ake</th> </tr> </thead> <tbody> <tr> <td>Tama</td> <td>e 4 rākau whero</td> <td> </td> </tr> <tr> <td>Hine</td> <td> </td> <td>e 3 rākau whero</td> </tr> <tr> <td>Waiora</td> <td>$\frac{1}{2}$ rākau whero</td> <td> </td> </tr> <tr> <td>...</td> <td> </td> <td> </td> </tr> </tbody> </table> <p>Ko wai o tātou te mea tino pātata ki te kotahi mita?</p>	Ingoa	Poto ake	Roa ake	Tama	e 4 rākau whero		Hine		e 3 rākau whero	Waiora	$\frac{1}{2}$ rākau whero		...		
Ingoa	Poto ake	Roa ake														
Tama	e 4 rākau whero															
Hine		e 3 rākau whero														
Waiora	$\frac{1}{2}$ rākau whero															
...																

Kia pērā anō te mahi mō ētahi atu inenga: te haurua mita, te hauwhā mita, te toru hauwhā mita, te rua mita, te kotahi me te haurua mita ...

Hei whakawhānui

1. Kia pērā anō te mahi, engari kia hāngai ki te manokaramu (kg) hei waeine mō te taumaha, me te whakamahi anō i te whārite ine-taumaha hei whakamātau i ngā whakataunga tata.
2. Kia pērā anō te mahi, engari kia hāngai ki te rita (l) hei waeine mō te kītanga/rōrahi, me te whakamahi anō i te ipu miraka (1 rita) hei whakamātau i ngā whakataunga tata.

Te Whakatairite Waeine

1a	1e	2a	2e	3a	3e	4a	4e	5a
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Te Ine: E ako ana ahau ki te whakamahi waeine rerekē mō te roa, me te whakatairite i ngā inenga.

Te Tau: E ako ana ahau i te hononga o te haurua me te rearua.

Rauemi

- Whārangī Tārua 6
- He rākau Ātaarangi

Kupu matua

haurua, rākau Ātaarangi, rearua

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Tonoa ngā ākonga ki te whakamahi i ngā rākau Ātaarangi hei ine i te roa o ētahi mea.</p> <p>Kātahi ka whakamahi i tētahi rākau he haurua te roa o te rākau i whakamahia tuatahitia.</p> <p>Ka matapaetia i te tuatahi te roa o te mea e inea ana, kātahi ka whakamātauria.</p>	<p>Whakamahia he rākau whero hei ine i te roa o te pukapuka nei e Wi. E hia rākau whero te roa o te pukapuka? E pātata ana ki te 10.</p> <p>Mēnā ka whakamahia he rākau māwhero hei ine i te roa o te pukapuka, he aha tō whakataunga tata? Ki tō titiro, e hia rākau māwhero te roa o te pukapuka?</p> <p>Taku matapae, e 5 rākau māwhero te roa o te pukapuka.</p> <p>He aha koe i matapae ai ka 5 rākau māwhero te roa o te pukapuka?</p> <p>Ko te rākau whero he haurua i te roa o te rākau māwhero. Nō reira he haurua te inenga mēnā ka whakamahia te rākau māwhero.</p> <p>Ka rearuatia te roa o te waeine, nō reira ka hauruatia te inenga.</p> <p style="text-align: center;">Te Reo Pāngarau</p> <p style="text-align: center;">—> rearuatia ($\times 2$) —></p> <p style="text-align: center;">—> hauruatia ($\times \frac{1}{2}$) —></p>

Kia pērā anō te mahi hei ine i te roa o ētahi mea. Kei te **Whārangī Tārua 6** ētahi rārangī hei ine me te whakatairite anō i ngā inenga o ngā rākau rerekē. He mea nui kia tonoa ngā ākonga ki te whakamārama i ā rātou matapae/whakataunga tata.

Te Hanga Āwhata 1

1a 1e 2a 2e 3a 3e 4a 4e 5a

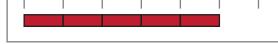
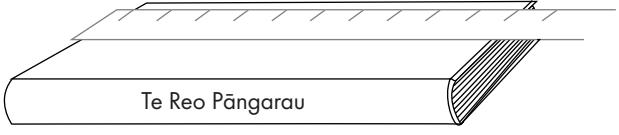
E ako ana ahau i te tikanga o te āwhata hei ine i te roa o tētahi mea.

Rauemi

- Whārangi Tārua 7
- He rākau Ātaarangi
- He ngaku kāri

Kupu matua

āwhata, hahae, ngaku, rūri

Ngā tohutohu	He tauira kōrero mā te pouako
Whakamahia he rākau Ātaarangi hei hanga āwhata mō te roa.	<p>Mēnā ka whakamahi au i te rākau whero hei ine i te roa o te pukapuka, he āhua uaua nei te whakatakoto haere i ngā rākau whero ki runga i te pukapuka, he wā roa hoki e tutuki ai te inenga.</p> <p>Nō reira, he māmā ake te whakamahi rūri. Ka whakamahi i ngā rākau whero hei hanga i tētahi rūri.</p> <p>Whakatakotoria ngā rākau whero ki runga ngaku kāri. Tuhia he rārangi paku hei tohu i te tīmatanga me te mutunga o ia rākau whero.</p> 
Whakawhitihiti kōrero mō te whakamahi i te āwhata hei ine i te roa o tētahi mea.	<p>Me pēhea te whakamahi i te rūri kua hangaia e koe hei ine i te roa o te pukapuka?</p> <p>Me whakatakoto te rūri ki runga i te pukapuka. Kia hāngai te tīmatanga o te rūri ki tētahi tapa o te pukapuka. Tatauria te maha o ngā tohu kia tae atu ki tērā atu tapa o te pukapuka. Ia tohu e rite ana ki tētahi rākau whero kotahi. Nō reira koirā te maha o ngā rākau whero e rite ana ki te roa o te pukapuka.</p> 
	<p>Anei te whakamahinga o tētahi rūri hei ine i tētahi rākau. Ko te kī a tētahi ākonga, e 9 te roa o tēnei rākau. Kei te tika, kei te hē rānei?</p>

	<p>Kei te hē. E 8 kē te roa o te rākau. Kāore te hahae tuatahi o te rūri e tohu ana i tētahi roa, koia e tohu ana i te tīmatanga o te rūri. Nō reira kāore e tika ana kia tatauria taua hahae.</p> 
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Hoatu te Whārangi Tārua 7 hei whakaoti mā ngā ākonga.

<p>Whakawhitiwhiti kōrero mō te tuhi tau ki te āwhata, hei āwhina i te whakamahinga o te āwhata.</p>	<p>E tika ana kia tatauria te hahae tuatahi o tētahi āwhata? Kāore. Ko te hahae tuatahi hei tohu i te tīmatanga o te rūri, te wāhi e tīmata ai te inenga.</p> <p>Kotahi rākau whero te roa mai i te hahae tuatahi ki te hahae e whai mai ana. Nō reira e tika ana kia tuhia te 1 kia hāngai tonu ki taua hahae. He aha te tau e tika ana ki te taha o te hahae tuatahi?</p> <p>Ko te 0. Karekau he roa e tohua ana i taua hahae tuatahi.</p> <p>Tuhia ngā tau e tika ana mō ērā atu hahae o te rūri.</p>
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Tonoa ngā ākonga ki te whakamahi i ā rātou rūri hei tuhi i ētahi rārangi. Māu e tohutohu te roa o ngā rārangi. Mā tētahi e tirotiro ngā rārangi a tētahi kia kitea ai mēnā e tika ana. Whakahautia ngā ākonga kia whakaatu i te waeine e hāngai ana ki te inenga, pērā i te rākau whero. Hei tauira, e 4 rākau whero te roa o te rārangi.

Hei whakawhānui

1. Tonoa ngā ākonga kia whakaatu i ngā haurua waeine ki ā rātou rūri. Whakawhitiwhiti kōrero mō te āhua o te hahae e tika ana (ākene pea kia rerekē te tae, kia poto ake rānei ngā hahae mō ngā waeine haurua).
2. Tukuna ngā ākonga kia whakamahi i te rūri mita hei ine i ētahi mea, me te tuhi anō i ētahi rārangi.
Hei tauira:

Inea:

- te roa o te akomanga
- te whānui o te akomanga
- te whānui o te papa tākaro poitarawhiti

Tuhia he rārangi:

- kia 3 mita te roa
- kia $2\frac{1}{2}$ mita te roa
- kia $6\frac{1}{4}$ mita te roa

Te Hanga Āwhata 2

1a 1e 2a 2e 3a 3e 4a 4e 5a

Te Ine: E ako ana ahau i te tikanga o te āwhata hei ine i te roa o tētahi mea.

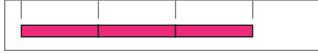
Te Tau: E ako ana ahau ki te kimi mai i te haurua me te hauwhā o ētahi tau me ētahi roa.
E ako ana ahau ki te tatau māwhitiwhiti.

Rauemi

- He rākau Ātaarangi
- He ngaku kāri

Kupu matua

āwhata, ngaku, rūri

Ngā tohutohu	He tauira kōrero mā te pouako
Whakamahia he rākau Ātaarangi hei hanga āwhata mō te roa.	<p>Whakamahia he rākau māwhero hei hanga i tētahi rūri.</p>  <p>E hia ngā rākau mā e rite ana ki te rākau māwhero? E whā.</p> <p>Nō reira ko te 4 te tau e tika ana mō te hahae tuatahi o te rūri. Ko te rākau mā te waeine mō tēnei rūri. He aha ngā tau e tika ana mō ērā atu hahae o te rūri? Ko te 8, te 12, te 16, haere ake nei, haere ake nei. Ko te tatau mawhiti-4 te āwhata o te rūri.</p>
Whakamahia te rūri hei tuhi rārangī.	<p>Whakamahia te rūri hei tuhi i ētahi rārangī:</p> <ul style="list-style-type: none"> • kia 20 rākau mā te roa • kia 6 rākau mā te roa • kia 10 rākau mā te roa • kia 5 rākau mā te roa • kia 8 rākau whero te roa • kia $8\frac{1}{2}$ rākau whero te roa • ...
Whakamahia te rūri hei tuhi tapawhā hāngai.	<p>Whakamahia te rūri hei tuhi i ētahi tapawhā hāngai:</p> <ul style="list-style-type: none"> • kia 8rm mā te 4rm ngā tapa (rm = rākau mā) • kia 6rm mā te 2rm ngā tapa (rm = rākau mā) • kia 5rm mā te 3rm ngā tapa (rm = rākau mā) • ...

Te Whakatairite Horahanga

1a 1e 2a 2e 3a 3e 4a 4e 5a

E ako ana ahau i te pūmautanga o te horahanga o tētahi papa, ahakoa te wāwāhitanga o taua papa.

Rauemi

- He tapawhā hāngai takirua kua hangaia ki te kāri mārō (Whārangī Tārua 8)
- He kutikuti

Kupu matua

horahanga, pūmautanga, tapawhā hāngai

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Tapahia ngā tapawhā hāngai takirua kei te Whārangī Tārua 8, ka hoatu ai ki ngā ākonga.</p> <p>Ko tā ngā ākonga, he whiriwhiri i te tapawhā hāngai o ia takirua he nui rawa atu te horahanga, me te whakamārama he aha i pērā ai ō rātou whakaaro. E pai ana te whētui i ngā tapawhā hāngai hei āwhina i te whakatairitenga.</p> <p>E pai ana kia mahi takirua ngā ākonga e puta ai ngā whakawhitiwhitinga kōrero.</p>	<p>Anei ētahi tapawhā hangai e rua. Me āta whiriwhiri kōrua ko tō hoa, ko tēhea te mea he nui rawa te horahanga. E pai ana te whētui i ngā tapawhā hāngai, me te tuhi rārangī ki runga, engari i te mutunga iho me whakamārama ā kōrua whiriwhiringa.</p> <div style="background-color: #cccccc; height: 100px; width: 100%; margin-top: 10px;"></div> <div style="background-color: #cccccc; height: 100px; width: 100%; margin-top: 10px;"></div>
	<p>He ūrite te horahanga o ēnei tapawhā hāngai e rua. Ina whētuia te tapawhā hāngai tūpuhi kia toru ngā wāhangā ūrite, ko aua wāhangā e toru ka noho pū ki runga i ngā wāhangā e toru o tērā o ngā tapawhā hāngai, ā, ka kapi katoa te horahanga.</p>
Kia pērā anō te tirotiro i ngā tapawhā hāngai takirua kei te Whārangī Tārua 8.	



Whanaketanga 2e

Mātauranga Matua kua Mau kē

Te Tau

- ngā rautaki wāwāhi tau hei whakaoti tāpiritanga, tangohanga hoki
- te tāpiri tāruarua hei whakaoti whakareatanga
- ngā tikanga me ngā whakaahuahanga hautau

Te Ine

- te rahinga āwhiwhi o ngā waeine aro whānui
- te wāwāhi i tētahi waeine ki ūna hautanga māmā
- te pānui i te wā (karaka mati, karaka ringa), me ngā waeine mō te wā (pēnei i te meneti, te haora, te rā, te wiki, te marama me te tau)
- te whakatau tata i tētahi inenga i runga i te mōhio ki te rahinga āwhiwhi o ngā waeine aro whānui
- te whakamahi taputapu ine, pēnei i te rūri, te ine-taumaha me te ipu ine-kītanga
- te hanga taputapu māmā hei whakatutuki inenga roa, inenga taumaha hoki
- ngā kupu me ngā tohu mō ngā waeine aro whānui
- te tuhi pikitia hei whakaatu i te whakatairitenga o ētahi rahinga e rua
- te whakaatu inenga ki tētahi rārangī tau

Mātauranga Matua hei Ako

- te whaitakenga o tētahi inenga, arā, te tika o te waeine; te tōtika e hāngai ana; te pātata ki te whakataunga tata
- te tātai inenga mā te tāpiri, mā te tango, mā te whakarea, mā te whakawehē rānei
- te pānui āwhata māmā e whakaatu ana i ngā hautanga waeine, pēnei i te haurua, te hauwhā, me te hautekau
- te koki hāngai me ngā hautanga koki hāngai hei waeine mō te koki me te hurihangā
- te tuhi kauwhata pou hei whakatairite inenga

He Tūhuratanga Ine

2e.1 Te Taumaha Kerepeti (wh. 153)

Rauemi kē atu e Hāngai ana

Ngā Kōwae Ako o nzmaths

- He Uhi Pukapuka – Te Ine i te Roa
<http://www.nzmaths.co.nz/ine>

Te Whakatutuki Inenga

1a 1e 2a 2e 3a 3e 4a 4e 5a

E ako ana ahau ki te ine i te roa, te taumaha me te kītanga, ngā waeine e hāngai ana, me te tōtika o te inenga e hāngai ana ki te horopaki.

Rauemi

- He rūri 30cm, he rūri mita
- He ine-taumaha
- He ipu ine-kītanga

Kupu matua

roa, taitapa, tapa, whakatau tata, whānui

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Hoatu he horopaki ine hei whiriwhiri mā ngā ākonga i te taputapu ine me te waeine e tika ana mō te horopaki.</p> <p>Tonoa ngā ākonga kia whakatau tata i te inenga i te tuatahi, kātahi ka whakatutuki i te inenga.</p> <p>Whakawhitiwhiti kōrero mō te tōtika o te inenga e hāngai ana ki te horopaki.</p>	<p>He tauira horopaki:</p> <p>Kei te hiahia a Whaea Hinetai ki te tuitui i ētahi uhi tēpu mō tō tātou akomanga. Nāna te tono kia whakamōhiotia atu ngā inenga tapa mō ngā uhi tēpu.</p> <p>He aha tā tātou mahi hei whakahoki kōrero atu ki a Whaea Hinetai?</p> <p>Ka ine i te roa me te whānui o te tēpu.</p> <p>He aha te taputapu ine hei whakamahi mā tātou?</p> <p>Ko te rūri mita te mea pai, engari ka taea hoki te rūri poto.</p> <p>Ka hoatu ngā inenga hei mita, hei mitarau, hei mitamano rānei?</p> <p>E pai ana te mitarau. Kāore he take kia tino tōtika rawa atu te inenga, nā te mea ka tāepa noa te uhi tēpu i ia tapa o te tēpu.</p> <p>Ki tō titiro, e hia mitarau te roa me te whānui o te tēpu. Me whakatau tata i mua i te inenga.</p> <p>Ki taku titiro, e pātata ana ki te rua mita te roa o te tēpu, ko te 200cm tērā. He iti ake i te mita te whānui o te tēpu, engari he nui ake i te haurua mita. Nō reira ko te 75cm taku whakatau tata i te whānui.</p> <p>Whakamahia te rūri hei whakatutuki i te inenga. Pēhea nei te pātata o ngā whakataunga tata?</p>
<p>Ētahi atu tauira horopaki:</p> <ul style="list-style-type: none">• Kei te hanga taitapa a Hakiwai hei whakairi i tētahi whakaahua ki te pakitara. Māu e whiriwhiri tētahi whakaahua, ka whakamōhiotia atu ngā inenga e tika ana mā Hakiwai.	

- Kei te whatu poraka tō kuia mōu ake. Kei te hiahia ia kia whakamōhiotia atu te roa o tō ringaringa, mai i tō kēkē (i raro pokohiwi) ki te kawititanga o tō ringaringa.
- Kei te peita a Matua Hirini i ngā paetapa o te papa tākaro netipōro. Pēhea nei te whānui me te roa o te papa tākaro hei peita māna?
- E taraiwa ana a Waiora, mai i Tāmakimakaurau ki Kirikiriroa. E hiahia ana ia kia mōhio ki te tawhiti o tana haere.
- Kei te whakatō ūwai a Rena. E ai ki ngā tohutohu, kia 30cm ki waenganui i ia ūwai. Ka hia ngā ūwai i te rārangi kotahi i te māra o te kura?
- Kei te tunu keke āporo a Wiremu. E hiahia ana ia kia mōhio ki te taumaha o tētahi āporo kotahi.
- Kei te tunu pihikete a Anaru. E hiahia ana ia kia mōhio ki te taumaha o te kapu huka kotahi.
- Kei te whakarite a Aromai i ngā kai mā tana kurī. E hiahia ana ia kia mōhio ki te taumaha o tētahi rango mīti kurī kotahi.
- Kei te tunu keke a Maioha. E hiahia ana ia kia mōhio ki te rōrahi miraka ka uru ki tētahi kapu kotahi.
- Kei te whakaranu wairehu paturiha a Kahurangi hei tuku ki tana māra. E hiahia ana ia kia mōhio ki te rōrahi wai ka uru ki te pākete kotahi.

Te Ine i te Wā

1a	1e	2a	2e	3a	3e	4a	4e	5a
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E ako ana ahau i ngā waeine tika hei ine i te wā poto me te wā roa.

Rauemi

- He wāti tū

Kupu matua

hākona, meneti, wāti tū, whakatau tata

Ngā tohutohu	He tauira kōrero mā te pouako															
<p>Whakatau tatahia te roa o te wā e oti ai tētahi omanga, kātahi ka ine ai.</p> <p>Whakawhitihiti kōrero mō te waeine e tika ana.</p> <p>Rearuatia te roa o te omanga, ka whakatairite i te roa o te wā e oti ai te omanga.</p>	<p>Ko tā tātou mahi i tēnei rā, he ine i te roa o te wā e oti ai tētahi omaoma. Tuatahi, ko te ine i te wā e oti ai te 25 mita te omaoma. He aha te mahi tuatahi?</p> <p>Ko te ine i te 25 mita i te papa tākaro.</p> <p>Āta titiro ki te 25 mita kua tohua ki te papa tākaro. Ki tō whakaaro, he pēhea nei te roa o te wā e oti i a koe taua 25 mita te omaoma? Tuhia tō whakatau tata ki tō pukapuka.</p> <p>He aha te waeine i whakamahia e koe? I tuhia tō whakatau tata hei meneti?</p> <p>Kāore. He roa rawa te meneti. Ko te hākona kē te waeine e tika ana nā te mea he poto noa iho te wā hei omaoma i te 25 mita.</p> <p>Whakamahia te wāti tū hei ine i te roa o te wā e oti i a koe te 25 mita. Mā tētahi hoa tō omaoma e ine, māu tāna omaoma e ine. Tuhia te inenga ki te taha o tō whakataunga tata. Pēhea nei te pai o tō whakataunga tata?</p> <p>Ināianei, ka inea te wā e oti i a koe te 50 mita, te 100 mita me te 200 mita te omaoma. Tuhia ō whakataunga tata me ū inenga ki te tūtohi. Hei tauira:</p> <table border="1"><thead><tr><th>Te roa o te omanga</th><th>Te whakataunga tata</th><th>Te inenga</th></tr></thead><tbody><tr><td>25 mita</td><td></td><td></td></tr><tr><td>50 mita</td><td></td><td></td></tr><tr><td>100 mita</td><td></td><td></td></tr><tr><td>200 mita</td><td></td><td></td></tr></tbody></table> <p>He aha i pēnā ai tō whakataunga tata mō te 50 mita? Ko te 50 mita te rearuatanga o te 25 mita. Nō reira ka rearuatia te wā i oti ai te 25 mita.</p>	Te roa o te omanga	Te whakataunga tata	Te inenga	25 mita			50 mita			100 mita			200 mita		
Te roa o te omanga	Te whakataunga tata	Te inenga														
25 mita																
50 mita																
100 mita																
200 mita																

	<p>Pēhea nei te pātata o tō whakataunga tata mō te 50 mita? He nui ake i te rearuatanga o te wā i oti ai te 25 mita. I pēnei ai nā te mea i te āhua pau haere taku hau.</p>
	<p>Hoatu ētahi atu horopaki hei whakatau tata mā ngā ākonga i te roa o te wā, kātahi ka ine ai. Whakawhitihiti kōrero mō te waeine e tika ana. Hei tauira:</p> <ul style="list-style-type: none"> • te roa o te wā e oti ai tā te ākonga haere ki te kura i te ata • te roa o te wā e oti ai tētahi haerenga (pērā i te haerenga mai i Tāmakimakaurau ki Kirikiriroa) • te roa o te wā e oti ai te piu o tētahi tārere • te wā e oti ai tētahi amionga kotahi a Papatūānuku i te Rā • te wā e oti ai tētahi waiata te waiata

Te Koki Hāngai

1a 1e 2a 2e 3a 3e 4a 4e 5a

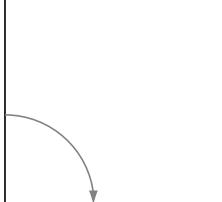
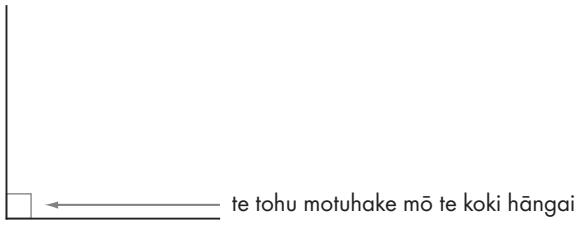
E ako ana ahau ki te whakamahi koki hāngai hei waeine mō te hurihangā.

Rauemi

- Whārangī Tārua 9 & 10
- He Porowhitia Hurihuri (Whārangī Tārua 5)

Kupu matua

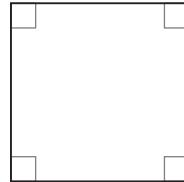
hurihangā, koki, koki hāngai, koki rārangi

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Whakawhitihiti kōrero mō te koki hāngai.</p> <p>Tohua he koki hāngai i te taiao o te akomanga.</p>	<p>Whakaaturia mai te hurihangā kotahi.</p> <p>Whakaaturia mai te hurihangā hauwhā.</p> <p>Me pēhea te whakaatu i te hurihangā hauwhā ki te pepa?</p> 
	<p>Ko te rārangi poutū o te whakaahua e tohu ana i te aronga i mua i te hurihangā. Ko te rārangi huapae e tohu ana i te aronga i muri i te hurihangā.</p> <p>Ko te koki hāngai hei ingoa motuhake mō te hurihangā hauwhā. He tohu motuhake anō hoki tōna:</p>  <p>te tohu motuhake mō te koki hāngai</p> <p>Titiro ki te Whārangī Tārua 9. Tuhia te tohu motuhake ki ngā koki hāngai.</p> <p>Ko hea ngā wāhi i te akomanga e kitea ana he koki hāngai? Kei ngā kokonga o ngā matapihi me ngā kūaha. Kei ngā kokonga o ngā pakitara. Kei ngā kokonga o te papa tuhituhi ...</p>

Tirohia ētahi āhua ahu-rua, ka tohu ai i ngā koki hāngai. Kei te **Whārangi Tārua 10** ētahi tauira āhua.

Tuhia he tapawhā rite ki tō pepa. Tuhia te tohu motuhake hei whakaatu i ngā koki hāngai. E hia ngā koki hāngai o te tapawhā rite?

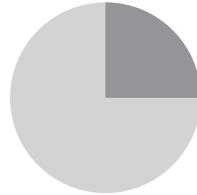
E whā.



Tohua ngā koki hāngai ki ngā āhua kei te **Whārangi Tārua 10**. Tuhia te ingoa o te āhua mēnā e mōhio ana koe.

Whakamahia te Porowhita Hurihuri (**Whārangi Tārua 5**) hei whakaatu i ētahi koki, me te whakatairite anō ki te koki hāngai. Tuhia ētahi o ngā koki ki te pepa.

Whakaaturia mai he koki hāngai ki te Porowhita Hurihuri.

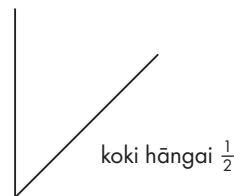


Whakaaturia mai he koki nui ake (iti ake) i te koki hāngai.

Whakaaturia te koki e rite ana ki ētahi koki hāngai e rua. He aha te ingoa motuhake mō tēnā koki?

Ko te koki rārangī.

Whakaaturia mai te koki hāngai haurua. Tuhia tēnei koki ki tō pukapuka. Tuhia te ingoa ki raro iho.



Whakaaturia ēnei koki ki te Porowhita Hurihuri, me te tuhi anō ki tō pukapuka:

- $1\frac{1}{2}$ koki hāngai
- $\frac{1}{4}$ koki hāngai
- $2\frac{1}{4}$ koki hāngai
- $3\frac{1}{4}$ koki hāngai
- $1\frac{1}{4}$ koki hāngai
- $\frac{1}{2}$ koki hāngai



Whanaketanga 3a

Mātauranga Matua kua Mau kē

Te Tau

- ngā tau ā-ira (kia kotahi te mati ā-ira)
- ngā rautaki whakarea māmā
- te whiriwhiri hautanga māmā o tētahi tauoti

Te Ine

- te whaitakenga o tētahi inenga, arā, te tika o te waeine; te tōtika e hāngai ana; te pātata ki te whakataunga tata
- te tātai inenga, mā te tāpiri, mā te tango, mā te whakarea, mā te whakawehe rānei
- te pānui āwhata māmā e whakaatu ana i ngā hautanga waeine, pēnei i te haurua, te hauwhā, me te hautekau
- te koki hāngai me ngā hautanga koki hāngai hei waeine mō te koki me te hurihangā
- te tuhi kauwhata pou hei whakatairite inenga

Mātauranga Matua hei Ako

- ngā hautanga ā-ira (hautekau) o tētahi waeine (pērā i te 1.3 mita me te 4.5kg)
- te rahinga āwhiwhi o tētahi koki (pēnei i te 45°, te 22.5°, te 180° me ētahi atu)
- te whakatau tata i ngā inenga koki i runga i te mōhio ki te rahi o ngā koki matua
- te whakamahi i ngā taputapu ine nei, te ine-koki me te wāti tū
- te tuhi me te whakahua tika i ngā hautanga ā-ira o tētahi waeine (kia kotahi te mati ā-ira)
- te tuhi me te whakahua tika i ngā inenga wā (pērā i te 1:42.7 – kotahi meneti whā tekau mā rua ira whitu hākona)

He Tūhuratanga Ine

3a.1 Te Ine i te Wā (wh. 154)

Rauemi kē atu e Hāngai ana

Ngā Kōwae Ako o nzmaths

- Te Ine i te Roa
<http://www.nzmaths.co.nz/resource/te-ine-i-te-roa>
- He Kēmu Hākinakina
<http://www.nzmaths.co.nz/resource/he-k-mu-h-kinakina>
- Te Koki
<http://www.nzmaths.co.nz/resource/te-koki>

He Pūtahi Pāngarau

- *Te Koki, Te Āwhata Me Te Taumaha.* Te Pou Taki Kōrero, 2006.

Waeine Koki

1a	1e	2a	2e	3a	3e	4a	4e	5a
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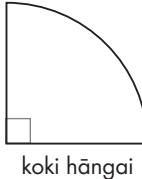
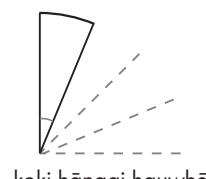
E ako ana ahau ki te whakamahi ine-koki hei ine, hei tuhi koki.

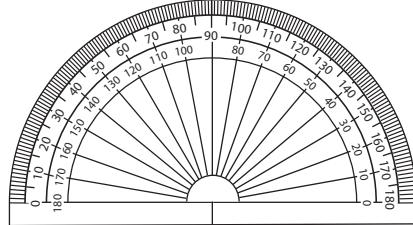
Rauemi

- Whārangi Tārua 11
- He ine-koki
- He tāporowhita

Kupu matua

hurihangā, koki, koki hāngai, koki rārangī, putu (tākiri), waeine

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Tonoa ngā ākonga ki te whakamahi tāporowhita hei tuhi i tētahi porowhita ki te pepa, ka tapahi ai. E pai ana kia rerekē te rahi o ngā porowhita a tēnā me tēnā.</p> <p>Ka whētui, ka tapahi anō i te porowhita hei whakaputa i tētahi koki hāngai hauwhā.</p> <p>Ka whakamahia te koki hangai hauwhā hei tuhi, hei ine hoki i ētahi koki.</p>  <p><i>(Diagram: A quarter circle with a small square at the bottom-left corner indicating it is a right angle. Below the circle is the label 'kokī hāngai').</i></p>  <p><i>(Diagram: A sector of a circle with dashed lines from the center to the circumference. Below the sector is the label 'kokī hāngai hauwhā').</i></p>	<p>Tuhia he porowhita ki te pepa, ka tapahi ai. Ki waenganui i te 5 mitarau (5cm) me te 10 mitarau (10cm) te pūtoro.</p> <p>Tapahia te porowhita, ka whētui ai hei whakaatu i te koki hāngai. Whētuia anō te koki hāngai hei hanga i te koki hāngai hauwhā. Tapahia te koki hāngai hauwhā.</p> <p>Tuhia tēnei koki ki tō pukapuka. Tapaina tēnei koki, ko WAE.</p> <p>E hia ngā WAE kei roto i te koki hāngai?</p> <p>E 4.</p> <p>E hia ngā WAE kei roto i te koki rārangī?</p> <p>E 8.</p> <p>E hia ngā WAE kei roto i te hurihangā kotahi?</p> <p>16.</p> <p>Tuhia ēnei koki ki tō pukapuka:</p> <ul style="list-style-type: none"> • 2 WAE • $\frac{1}{2}$ WAE + $\frac{1}{2}$ WAE • $\frac{1}{2}$ WAE + $\frac{1}{4}$ WAE • 1 WAE - $\frac{1}{4}$ WAE • 2 WAE - $\frac{3}{4}$ WAE • $\frac{3}{4}$ WAE + $\frac{3}{4}$ WAE • 3 WAE • 1.5 WAE <p>Whakamahia te WAE hei ine i ngā koki kei te Whārangi Tārua 11.</p>

<p>Whakawhitihiti kōrero mō ngā raruraru ka puta i te whakamahinga o te WAE hei ine, hei tuhi koki.</p>	<p>He aha ētahi o ngā raruraru o te whakamahinga o te WAE hei ine, hei tuhi koki? Hei tauira whakahokinga kōrero:</p> <ul style="list-style-type: none"> • He uaua te tāruarua i te WAE, kia tino tōtika te whai mai a tētahi WAE i tētahi. • He nui te whakamahinga hautau – he uaua te kimi i ētahi hautanga o te WAE. • He uaua te ine me te tuhi koki iti.
<p>Whakawhitihiti kōrero mō te ine-koki me te waeine putu (tākiri rānei).</p>	<p>Tekau mā ono ngā WAE kei roto i te hurihangā kotahi. Ko te waeine mō te koki e whakamahia whānuitia ana puta noa i te ao, ko te putu. He tino iti ake te putu kotahi i te WAE kotahi. Arā, e 360 putu kei roto i te hurihangā kotahi.</p> <p>Ko te porowhita paku ($^{\circ}$) hei tohu mō te putu. Ka tuhia te tohu ki te taha matau whakarunga o te inenga. Hei tauira: 90°.</p> <p>Mēnā e 360 putu kei roto i te hurihangā kotahi, pēhea nei te rahi o te putu kotahi?</p> <p>He tino iti.</p> <p>He ine-koki tēnei taputapu. Ka whakamahia hei tuhi koki, hei ine koki hoki.</p>  <p>Tohua mai te 90° i te ine-koki. He aha tēnei koki? Ko te koki hāngai.</p> <p>E 90 putu kei te koki hāngai. E hia kei te koki rārangī? 180° kei te koki rārangī. E rua ngā koki hāngai.</p> <p>E hia putu te rahi o ēnei koki? Whakamāramatia mai te rautaki i whakamahia e koe.</p> <ul style="list-style-type: none"> • te huringa $\frac{1}{2}$ – 180° • te huringa $\frac{3}{4}$ – 270° • te huringa $\frac{5}{8}$ – 225° • te huringa $1\frac{2}{3}$ – 480° • te huringa $\frac{1}{8}$ – 45° • te huringa $\frac{3}{8}$ – 135°

E hia ngā hurihangā (hautanga hurihangā rānei) o ēnei koki? Whakamāramatia mai te rautaki i whakamahia e koe.

- 180° – $\frac{1}{2}$
- 225° – $\frac{5}{8}$
- 30° – $\frac{1}{12}$
- 22.5° – $\frac{1}{16}$
- 60° – $\frac{1}{6}$
- 120° – $\frac{1}{3}$
- 540° – $1\frac{1}{2}$

Hei whakawhānui

Whakaakona te whakamahinga o te ine-koki hei tuhi, hei ine koki. Koia nei ngā rauemi hei āwhina:

- Te Koki
<http://www.nzmaths.co.nz/resource/te-koki>
- He Pūtahi Pāngarau
Te Koki, Te Āwhata Me Te Taumaha. Te Pou Taki Kōrero, 2006.

Te Pānui Āwhata

1a 1e 2a 2e 3a 3e 4a 4e 5a

E ako ana ahau ki te pānui āwhata.

Rauemi

- Whārangi Tārua 12 & 13

Kupu matua

āwhata, hahae, tauwhata, waeine

Ngā tohutohu	He tauira kōrero mā te pouako
Tapahia ngā rūri kei te Whārangi Tārua 12, ka hoatu ai hei whakamahi mā ngā ākonga.	<p>Nā Himiona i hanga tana rūri hei ine i te roa o ētahi mea. Nāna anō i tapa tana waeine, ko te ‘pita’.</p> <p>Mēnā ko ia hahae roa o te rūri e tohu ana i te ‘pita’ kotahi:</p> <ul style="list-style-type: none">• He aha te tikanga o ia hahae poto?• Ko hea te hahae mō te 3 ‘pita’?• Ko hea te hahae mō te 3 me te haurua ‘pita’?• Ko hea te hahae mō te $2\frac{1}{10}$ ‘pita’?• Ko hea te hahae mō te 4.5 ‘pita’?• Ko hea te hahae mō te 7.4 ‘pita’?• Whakamahia te rūri hei tuhi i tētahi rārangī e 2.6 ‘pita’ te roa.• ...
	<p>Mēnā ko ia hahae roa o te rūri e tohu ana i ngā ‘pita’ e rua:</p> <ul style="list-style-type: none">• He aha te tikanga o ia hahae poto?• Ko hea te hahae mō te 1 ‘pita’?• Ko hea te hahae mō te haurua ‘pita’?• Ko hea te hahae mō te 2.4 ‘pita’?• Ko hea te hahae mō te 5.5 ‘pita’?• Ko hea te hahae mō te 7.8 ‘pita’?• Whakamahia te rūri hei tuhi i tētahi rārangī 11.2 ‘pita’ te roa.• ...
Kia pērā anō te mahi mō ngā āwhata kei te Whārangi Tārua 13.	



Whanaketanga 3e

Mātauranga Matua kua Mau kē

Te Tau

- ngā tau ā-ira (kia toru ngā mati ā-ira)
- te whakaawhiwhi tauoti me te whakatau tata i te otinga o tētahi paheko

Te Ine

- ngā hautanga ā-ira (hautekau) o tētahi waeine (pērā i te 1.3 mita me te 4.5kg)
- te rahinga āwhiwhi o tētahi koki (pēnei i te 45°, te 22.5°, te 180° me ētahi atu)
- te whakatau tata i ngā inenga koki i runga i te mōhio ki te rahi o ngā koki matua
- te whakamahi i ngā taputapu ine nei, te ine-koki me te wāti tū
- te tuhi me te whakahua tika i ngā hautanga ā-ira o tētahi waeine (kia kotahi te mati ā-ira)
- te tuhi me te whakahua tika i ngā inenga wā (pērā i te 1:42.7 – kotahi meneti whā tekau mā rua ira whitu hākona)

Mātauranga Matua hei Ako

- ngā hautanga ā-ira o tētahi waeine, tae atu kia toru ngā mati ā-ira
- te tuhi me te whakamāori wātaka māmā
- te whakamahi tukutuku hei whakatau tata i te horahanga o tētahi āhua hikuwaru me tētahi taparau
- te whakamahi tukutuku hei whiriwhiri i te horahanga o tētahi tapawhā hāngai
- te whakamahi mataono rite hei whiriwhiri i te rōrahi o tētahi poro tapawhā
- ngā kupu me ngā tohu mō ngā waeine horahanga (cm^2 , m^2 , ha) me te waeine rōrahi nei te cm^3

He Tūhuratanga Ine

- 3e.1 Te Paenga Taparau (wh. 155)
- 3e.2 Te Pakitara Pereki (wh. 156)
- 3e.3 Te Tākai Pouaka Tiakareti (wh. 157)

Rauemi kē atu e Hāngai ana

Ngā Kōwae Ako o nzmaths:

- Te Kītanga me te Papatipu
<http://www.nzmaths.co.nz/resource/te-k-tanga-me-te-papatipu>
- Inea
<http://www.nzmaths.co.nz/resource/inea>
- Te Tauira Āhuahanga
<http://www.nzmaths.co.nz/resource/te-tauira-huahanga>

He Pūtahi Pāngarau

- *Te Roa, Te Horahanga Me Te Rōrahi.* Te Pou Taki Kōrero, 2006.

Te Whiriwhiri Horahanga

1a 1e 2a 2e 3a 3e 4a 4e 5a

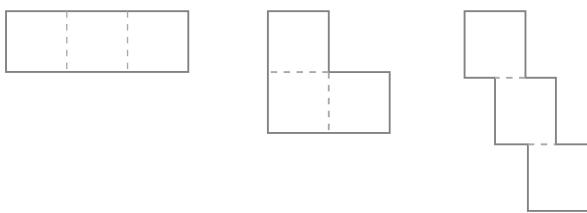
E ako ana ahau ki te whiriwhiri i te horahanga o tētahi papa.

Rauemi

- Whārangi Tārua 14
- He tapawhā hāngai, he tapawhā rite hoki kua tapahia i te kāri mārō

Kupu matua horahanga

Ngā tohutohu	He tauira kōrero mā te pouako																					
Hoatu he tapawhā hāngai kua tapahia i te pepa mārō. Aratakina ngā ākonga ki te whakamahi i te tapawhā hāngai hei ine i te horahanga o ētahi papa.	Anei tētahi tapawhā hāngai. Ko tā tātou mahi, he whakamahi i te tapawhā hāngai hei ine i te horahanga o te tēpu. He aha te tikanga o ngā kupu nei ‘te horahanga o te tēpu’. Koia ko te rahi o te papa o te tēpu. E hia ngā tapawhā hāngai nei ka rite ki te horahanga o te tēpu? Me whakatau tata i te tuatahi. E hia ki tō titiro? He aha ētahi tikanga ine mō te whakamahi i te tapawhā hāngai hei ine i te horahanga? Me āta whakatakoto ngā tapawhā hāngai, tapa ki tapa, kāore he āputa ki waenganui, kāore hoki e inaki. Me tīmata ki tētahi tapa o te tēpu. Whakamahia te tapawhā hāngai hei ine i ētahi atu papa. Tuhia ngā whakataunga tata me ngā inenga ki tētahi tūtohi:																					
Whakamāramatia te tikanga o te whakamahi tapawhā rite hei ine horahanga.	<table border="1"><thead><tr><th>Te papa e inea ana</th><th>Te whakataunga tata</th><th>Te inenga</th></tr></thead><tbody><tr><td>te papa o te tēpu</td><td></td><td></td></tr><tr><td>te papa o te tūru</td><td></td><td></td></tr><tr><td>tētahi tūranga pukapuka</td><td></td><td></td></tr><tr><td>te papa tuhituhi</td><td></td><td></td></tr><tr><td>te kūaha</td><td></td><td></td></tr><tr><td>tētahi matapihi</td><td></td><td></td></tr></tbody></table> <p>Ko tētahi tikanga pāngarau mō te ine horahanga, ko te whakamahi tapawhā rite. He māmā ake te whiriwhiri i te maha o ngā tapawhā rite i te whiriwhiri tapawhā hāngai, āhua kē atu rānei.</p>	Te papa e inea ana	Te whakataunga tata	Te inenga	te papa o te tēpu			te papa o te tūru			tētahi tūranga pukapuka			te papa tuhituhi			te kūaha			tētahi matapihi		
Te papa e inea ana	Te whakataunga tata	Te inenga																				
te papa o te tēpu																						
te papa o te tūru																						
tētahi tūranga pukapuka																						
te papa tuhituhi																						
te kūaha																						
tētahi matapihi																						

	<p>Titiro ki te Whārangi Tārua 14. Kua tuhia ētahi āhua ki te pepa tukutuku. He tapawhā rite te āhua o te pepa tukutuku. Whiriwhiria te horahanga o ia āhua. Arā, e hia ngā tapawhā rite o te tukutuku e rite ana ki te horahanga o te āhua. Whakamāramatia te rautaki i whakamahia e koe.</p> <p>He aha ngā āhua he māmā noa iho te whiriwhiri i te horahanga? He aha ai?</p> <p>He aha ngā āhua he uaua te whiriwhiri horahanga. He aha ai?</p>
Whakamāramatia te tikanga o te mitarau pūrua (cm^2) hei waeine mō te horahanga.	<p>Ko tētahi waeine matua e whakamahia whānuitia ana puta noa i te ao mō te horahanga, ko te mitarau pūrua. He aha ki ō whakaaro te mitarau pūrua?</p> <p>Koia ko te tapawhā rite, kotahi mitarau te roa o ia tapa.</p> <p>Ko te cm^2 te tohu mō te mitarau pūrua. Tuhia tētahi mitarau pūrua kotahi ki tō pukapuka.</p> <p>Titiro ki te maikuku o tō kōroa. He ūrite, he nui ake, he iti ake rānei te horahanga i te mitarau pūrua?</p> <p>He āhua ūrite, engari he paku iti ake pea.</p> <p>Tuhia tētahi āhua ki tō pukapuka e toru mitarau pūrua (3cm^2) te horahanga.</p>  <p>E hoki ki te tirotiro i ngā āhua kei te Whārangi Tārua 14. Mēnā ko te 1cm te roa o ia tapawhā rite o te tukutuku, e hia mitarau pūrua (cm^2) te horahanga o ngā āhua?</p>

Hei whakawhānui

Tūhuratia te rahi o te mita pūrua (m^2):

- Tuhia he mita pūrua ki te pepa mārō, ka tapahi ai.
- Whakamahia te mita pūrua hei ine i te horahanga o te papa o te akomanga.
- He aha ētahi mea e āhua pātata ana ki te mita pūrua te horahanga?
- E hia mitarau pūrua (cm^2) kei roto i te mita pūrua (m^2)?

Ko Tēhea te Horahanga Nui?

1a 1e 2a 2e 3a 3e 4a 4e 5a

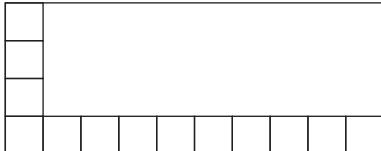
E ako ana ahau ki te ine i te horahanga o tētahi tapawhā hāngai.

Rauemi

- He tapawhā hāngai takirua (Whārangi Tārua 15)
- He mitarau pūrua (1cm^2) kua tapahia i te pepa mārō
- He rūri

Kupu matua

horahanga, tapawhā hāngai, whakatairite

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Hoatu he tapawhā hāngai takirua, ka tono ai i ngā ākonga ki te whakatairite i te horahanga o tēnā me tēnā.</p> <p>Kāore e whakaaetia kia tapahia ngā tapawhā hāngai, engari e pai ana te whakamahi rūri, te whakamahi mitarau pūrua, me te tuhi ki runga i ngā tapawhā hāngai.</p>	<p>Titiro ki te tapawhā hāngai takirua tuatahi o te Whārangi Tārua 15. Ki tō titiro, ko tēhea te tapawhā hāngai he nui rawa te horahanga? He aha tō whakatau tata?</p> <p>Me pēhea te āta whiriwhiri i te tapawhā hāngai nui rawa? Whakamāramatia mai tētahi rautaki. Kāore e whakaaetia kia tapahia ngā tapawhā hāngai, engari e pai ana te whakamahi rūri, te whakamahi mitarau pūrua, me te tuhi ki runga i ngā tapawhā hāngai. Hei tauira whakamārama:</p> <p>Tuatahi, i whakatakotoria te mitarau pūrua ki te tapa raro o tētahi o ngā tapawhā hāngai, hei whiriwhiri i te maha o ngā mitarau pūrua ki te kapa kotahi. Kātahi ka whakatakotoria te mitarau pūrua ki te tapa mauī, hei whiriwhiri i te maha o ngā kapa.</p>
<p>Kia pērā anō te mahi mō ērā atu o ngā tapawhā hāngai takirua kei te Whārangi Tārua 15. Ina taunga ngā ākonga ki te whakamahi i te mitarau pūrua hei whiriwhiri horahanga, tonoa rātou ki te whakamahi i te rūri anake. Mā konei e mārama ai rātou ki te ture mō te whiriwhiri horahanga o tētahi tapawhā hāngai.</p>	 <p>10 ngā mitarau pūrua ki ia kapa, e 4 ngā kapa, nō reira e 40cm^2 te horahanga.</p> <p>Mō te tapawhā hāngai tuarua, e 8 ngā mitarau pūrua ki ia kapa, ā, e 5 ngā kapa, nō reira e 40cm^2 te horahanga. He ōrite te horahanga o ēnei tapawhā hāngai.</p>

Te Horahanga Mata

1a	1e	2a	2e	3a	3e	4a	4e	5a
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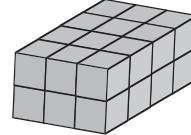
E ako ana ahau ki te hanga poro tapawhā hāngai mā te whakamahi mataono rite, me te whiriwhiri horahanga mata.

Rauemi

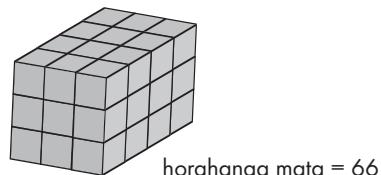
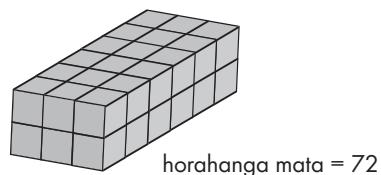
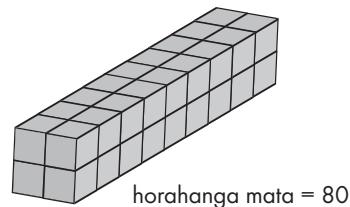
- He mataono rite (pēnei i te poraka honohono, i te rākau Ātaarangi mā)

Kupu matua

horahanga mata, mataono rite, poro tapawhā hāngai, rōrahi

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Hoatu he mataono rite ki ngā ākonga, ka tono ai i a rātou ki te hanga poro tapawhā hāngai.</p> <p>Ka hangaia ngā poro tapawhā hāngai katoa e taea ana mēnā e 36 ngā mataono rite. Ka whiriwhiria te horahanga mata o ia poro tapawhā hāngai.</p>	 <p>He aha te ingoa pāngarau mō tēnei āhua?</p> <p>Ko te mataono rite.</p> <p>Āe, e ono ngā mata, ā, he tapawhā rite ēnei mata e ono katoa.</p>  <p>He aha te ingoa pāngarau mō tēnei āhua kua hangaia ki te mataono rite?</p> <p>Ko te poro tapawhā hāngai.</p> <p>Āe, he poro, ā, ko te tapawhā hāngai te āhua o tōna pūtake.</p> <p>He aha ki tō whakaaro te tikanga o te horahanga mata?</p> <p>He aha te horahanga mata o tēnei poro tapawhā hāngai?</p> <p>Ko te horahanga o ngā mata katoa o te poro tapawhā hāngai. E 6 te horahanga o ia pito o te poro tapawhā hāngai (e 3 mā te 2). E 8 te horahanga o te mata mauī me te mata matau (e 2 mā te 4). 12 te horahanga o te mata runga me te mata raro (e 3 mā te 4). Hui katoa:</p> $(3 \times 2) \times 2 = 12$ $(2 \times 4) \times 2 = 16$ $(3 \times 4) \times 2 = 24$ $\text{tāpirihia} = 52$ <p>E 52 te horahanga mata o te poro tapawhā hāngai.</p>

E 36 ngā mataono rite hei hanga māu i ngā poro tapawhā hāngai katoa e taea ana. Whakamahia ngā mataono rite 36 katoa hei hanga i ia poro tapawhā hāngai. Tuhia he pikitia o ia poro tapawhā hāngai, ā, ka whiriwhiri ai i te horahanga mata. Tuhia te horahanga mata ki raro iho i te pikitia.



He aha te tauira e kitea mai ana i ngā horahanga mata?
Mēnā he roa, he tūpuhi te poro tapawhā hāngai, he nui ake tōna horahanga mata. Mēnā he mataono rite te āhua o te poro tapawhā hāngai, he iti ake tōna horahanga mata.

Hei whakawhānui

Kia pērā anō te mahi, engari ka whakamahia:

- kia 48 ngā mataono rite
- kia 24 ngā mataono rite
- kia 64 ngā mataono rite

Te Ine Rōrahi

1a	1e	2a	2e	3a	3e	4a	4e	5a
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E ako ana ahau ki te hanga poro tapawhā hāngai mā te whakamahi mataono rite, me te whiriwhiri anō i te rōrahi o te poro tapawhā hāngai.

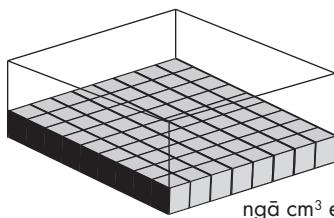
Rauemi

- He mataono rite (cm^3)
- He rūri
- He pouaka kua hangaia ki te pepa mārō

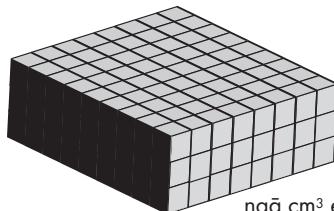
Kupu matua

mataono rite, mitarau pūtoru, poro tapawhā hāngai, rōrahi

Ngā tohutohu	He tauira kōrero mā te pouako
Whakawhitihiti kōrero mō te mitarau pūtoru, tōna tohu, me tōna whakamahinga hei ine rōrahi.	<p style="text-align: center;"></p> <p>He mataono rite tēnei. Kotahi mitarau (1cm) te roa o ia tapa. Ko tētahi o ōna ingoa pāngarau, ko te mitarau pūtoru. He aha ki tō whakaaro tōna tohu?</p> <p>Ko te cm^3.</p> <p>Ka whakamahia te mitarau pūtoru hei waeine mō te rōrahi. Ko te rōrahi o tētahi pouaka, koia ko te maha o ngā mitarau pūtoru ka taea te whakauru ki taua pouaka.</p> <p>Anei tētahi pouaka. E hia mitarau pūtoru ka taea ki roto i te pouaka? E hia mitarau pūtoru te rōrahi o te pouaka?</p> <p style="text-align: center;"></p> <p>He aha tētahi rautaki hei whiriwhiri i te rōrahi o te pouaka?</p> <p>Tuatahi, ka whiriwhiria te maha o ngā mitarau pūtoru e rite ana ki tētahi tapa. Tuarua, ko te whiriwhiri i te maha o ngā mitarau pūtoru e kapi katoa ai tētahi mata, pērā i te mata raro (te takere o te pouaka). Tuatoru, ko te whiriwhiri i te maha o aua mata raro hei whakakī i te katoa o te pouaka.</p> <p style="text-align: center;"></p> <p style="text-align: right;">ngā cm^3 e rite ana ki tētahi tapa</p>



ngā cm³ e rite ana ki tētahi mata



ngā cm³ e rite ana ki te katoa o te pouaka

Hangaia ēnei pouaka ki te pepa mārō, ka hoatu ai i ētahi pouaka e rua ki ngā ākonga. Tonoa rātou kia whiriwhiri i te pouaka he nui rawa te rōrahi.

I te tuatahi, e pai ana te whakamahi i te mitarau pūtoru, me te whakatakoto tāruarua ki roto i te pouaka.

Ina taunga ngā ākonga ki tēnei, me waiho te mitarau pūtoru ki rahaki, ā, ka whakamahi i te rūri anake. Mā konei e mārama ai rātou ki te ture hei tātai rōrahi pouaka.

Koia nei ngā inenga o ngā pouaka hei hanga māu, hei whiriwhiri rōrahi mā ngā ākonga:

6cm × 3cm × 4cm

4cm × 4cm × 5cm

3cm × 3cm × 9cm

6cm × 6cm × 2cm

5cm × 5cm × 3cm

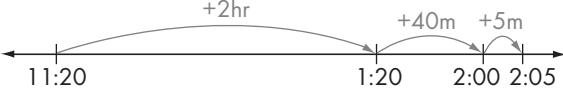
2cm × 9cm × 4cm

Te Tātai Takanga Wā 1

1a	1e	2a	2e	3a	3e	4a	4e	5a
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E ako ana ahau ki te whiriwhiri i te takanga o te wā.

Kupu matua
rārangī wā, takanga wā

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Hoatu he rapanga hei whiriwhiri mā ngā ākonga i te takanga wā. Whakawhitihitī kōrero mō ngā rautaki hei whakaoti i te rapanga. Hei tauira:</p> <p>Nā Hinetū āna tamariki i hari atu ki te whare pikitia. Ka tīmata te pikitia i te 11:20 i te ata, ā, e 2 haora 45 meneti te roa o te pikitia. He aha te tāima me hoki atu a Hinetū ki te tīki i āna tamariki?</p>	<p>Anei tētahi rapanga hei whiriwhiri mā tātou. He aha ngā kōrero matua kei roto i te rapanga hei tino aro mā tātou. Ko te tāima tīmata o te pikitia, arā, te 11:20 i te ata, me te roa o te pikitia, arā, te 2 haora 45 meneti.</p> <p>He aha tā tātou mahi. He tāpiri i te 2 haora 45 meneti ki te 11:20 i te ata.</p> <p>Whakamāramatia mai tētahi rautaki hei whakaoti i tēnei rapanga. Hei tauira:</p> <ol style="list-style-type: none"> Tāpiria te 2 haora ki te 11:20 i te ata, ko te 1:20 i te ahiahi. Kātahi ka tāpiri i te 40 meneti, kua tae atu ki te 2:00, me te 5 meneti anō, ko te 2:05 i te ahiahi.  Tāpiria te 3 haora ki te 11:20 i te ata, ko te 2:20 tērā. Kātahi ka tangohia te 15 meneti, kua hoki atu ki te 2:05 i te ahiahi.  <p>Kia pērā anō te mahi mō ētahi atu rapanga pēnei:</p> <ol style="list-style-type: none"> Ka tīmata te hākinatoru (triathlon) a Hinewai i te 10:35 i te ata. E 2 haora 51 meneti te roa ka oti i a ia. He aha tana tāima mutu? Ka tīmata te hākinatoru (triathlon) a Matiu i te 7:45 i te ata. E 3 haora 27 meneti te roa ka oti i a ia. He aha tana tāima mutu? Ka tīmata te kēmu kirikiti i te 10:05 i te ata, ka mutu i te 5:45 i te ahiahi. E hia nei te roa o te kēmu? Ka tīmata te kēmu kirikiti i te 11:15 i te ata, ka mutu i te 6:17 i te ahiahi. E hia nei te roa o te kēmu? E rima ngā rōpū kapa haka e whakataetae ana. E 20 meneti te roa mā ia rōpū, me te 5 meneti kei waenganui i tēnā me tēnā o ngā rōpū. Mēnā ka tīmata te whakataetae i te 7:35pm, he aha te tāima mutu?

Whanaketanga 4a

Mātauranga Matua kua Mau kē

Te Tau

- te whiriwhiri ōwehenga māmā hei whakaatu pānga rahinga
- ngā tikanga o te tau tōraro
- te whakaawhiwhi tauotī, tau ā-ira hoki
- ngā hautau ūrite (hautau noa, hautanga ā-ira, ūrau)

Te Ine

- ngā hautanga ā-ira o tētahi waeine, tae atu kia toru ngā mati ā-ira
- te tuhi me te whakamāori wātaka māmā
- te whakamahi tukutuku hei whakatau tata i te horahanga o tētahi āhua hikuwaru me tētahi taparau
- te whakamahi tukutuku hei whiriwhiri i te horahanga o tētahi tapawhā hāngai
- te whakamahi mataono rite hei whiriwhiri i te rōrahi o tētahi poro tapawhā
- ngā kupu me ngā tohu mō ngā waeine horahanga (cm^2 , m^2 , ha) me te waeine rōrahi nei te cm^3

Mātauranga Matua hei Ako

- te whakawhitiwhiti waeine ngahuru
- te pāpātanga hei ine i ētahi āhuatanga (pērā i te tere me te utu)
- te whakamahi i ngā inenga tapa me ngā ture e hāngai ana hei tātai i te paenga, te horahanga me te rōrahi o ngā āhua māmā (pērā i te tapatoru, te tapawhā hāngai, me te pouaka)
- te whakamahi rautaki whakarea hei tātai i ngā inenga tapa o ngā āhua whakarahi
- te tuhi me te whakahua tika i ngā inenga pāpātanga (pēnei i te km/h me te utu/kg)
- te tuhi me te whakahua i ngā whārite hei tātai horahanga māmā, rōrahi māmā hoki

He Tūhuratanga Ine

- 4a.1 Te Whakawhitiwhiti Waeine (wh. 158)
- 4a.2 Te Rōrahi Pouaka (wh. 159)
- 4a.3 Te Rōrahi Wairākau (wh. 160)
- 4a.4 Te Horahanga Matapihi (wh. 161)
- 4a.5 Te Taiapa Pāmu (wh. 162)
- 4a.6 Te Pouaka Wai Ārani (wh. 163)
- 4a.7 Te Whakatairite i te Tere (wh. 164)
- 4a.8 Te Horahanga me te Paenga Tapawhā Whakarara (wh. 165)
- 4a.9 Te Horahanga me te Paenga Tapawhā Hāngai (wh. 166)

Rauemi kē atu e Hāngai ana

Ngā Kōwae Ako o nzmaths

- Te Paemahana
<http://www.nzmaths.co.nz/resource/te-paemahana>
- Te Rōrahi
<http://www.nzmaths.co.nz/resource/te-r-rahi>
- Te Paenga Porowhita
<http://www.nzmaths.co.nz/resource/te-paenga-porowhita>

He Pūtahi Pāngarau

- *Te Roa, Te Horahanga Me Te Rōrahi.* Te Pou Taki Kōrero, 2006.

Te Whakawhitihiti Waeine Ngahuru mō te Roa

1a	1e	2a	2e	3a	3e	4a	4e	5a
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Te Ine: E ako ana ahau ki te whakawhitihiti i te mita, te mitarau me te mitamano.

Te Tau: E ako ana ahau ki te whakarea, ki te whakawehe hoki ki te 10, ki te 100, ki te 1,000.

Rauemi

- He rūri mita

Kupu matua

mita, mitamano, mitarau, waeine

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Hoatu he rūri mita hei tirotiro mā ngā ākonga, ka whakawhitihiti kōrero mō ngā waeine e whakaaturia ana.</p>	<p>Titiro ki te rūri mita. He aha ngā waeine e whakaaturia ana ki te rūri? He aha te tikanga o ia hahae o te rūri?</p> <p>Kotahi mita te roa o te rūri, nō reira koia tētahi o ngā waeine. Arā ētahi hahae roa, koia hei whakaatu i ngā mitarau (cm). Ko ngā hahae poto, koia ko ngā mitamano (mm).</p> <p>E hia katoa ngā mitamano me ngā mitarau kei roto i te mita kotahi? Whakaaturia mai ki te rūri mita.</p> <p>Kotahi mano ngā hahae poto, arā, ngā mitamano kei roto i te mita kotahi. Kotahi rau ngā mitarau.</p> <p>Tohua mai te haurua mita. E hia ngā mitamano me ngā mitarau?</p> <p>Anei te hahae mō te haurua mita. E 500 ngā mitamano, e 50 ngā mitarau.</p> <p>Tohua mai te hauwhā mita. E hia ngā mitamano me ngā mitarau?</p> <p>Ko te kauwhā te haurua o te 0.5. Nō reira, ko te 250mm me te 25cm e ūrite ana.</p>

Kia pērā tonu te arataki haere i ngā ākonga ki te whakawhitihiti waeine. E pai ana te whakaatu i ngā waeine ki te tūtohi. Hei tauira:

Ina taunga ngā ākonga ki te whakawhitihiti waeine mā te tirotiro i te rūri mita, me waiho te rūri ki rahaki. Whakawhitihiti kōrero mō te whakarea me te whakawehe hoki ki te 10, ki te 100 me te 1,000.

mita (m)	mitarau (cm)	mitamano (mm)
1	100	1,000
0.5	50	500
0.25	25	250
0.8		
2.35		
	65	
	130	
		751
		1,250

Hei whakawhānui

Tūhuratia te whakawhitihitinga inenga roa hei manomita (km).

Te Whakawhitihitī Waeine

1a	1e	2a	2e	3a	3e	4a	4e	5a
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Te Ine: E ako ana ahau ki te whakawhitihitī waeine ngahuru.

Te Tau: E ako ana ahau ki te whakarea, ki te whakawehe tau ā-ira ki tētahi tauotī.

Kupu matua

karamu, karamumano, mita, mitamano, mitarau, waeine

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Hoatu he rapanga e whai wāhi mai ana te whakawhitihitī waeine ngahuru. Tonoa ngā ākonga ki te whakamārama i ā rātou rautaki whakaoti i te rapanga. Hei tauira:</p> <p>Ko tā te hunga kāmura, he ine ki te mitamano (mm) e pātata ana. E hiahia ana a Kāmura Horowai ki te kani i ētahi papa rākau e 4, kia 1,125mm te roa o ia papa rākau. Kia hia mita te roa o te papa rākau hei hoko māna?</p>	<p>He aha ngā tino kōrero o roto i te rapanga hei aro mā tātou? Ko te roa o ngā papa rākau e hiahia ana, arā ko te 1,125mm. Ko te maha o ēnei papa rākau e hiahia ana, arā kia 4.</p> <p>He aha tā tātou mahi?</p> <p>He whakarea i te 1,125mm ki te 4, me te huri hei mita. Ko te huri rānei i te 1,125mm hei mita i te tuatahi, kātahi ko te whakarea ki te 4.</p> <p>Whakamāramatia mai ētahi rautaki hei tātai i te roa o te papa rākau hei hoko mā Kāmura Horowai.</p> <p>Hei tauira whakamārama:</p> <ol style="list-style-type: none"> 1. Rearuatia te 1,125mm, ko te 2,250mm. Rearuatia tērā, ka 4,500mm. Kotahi mano mitamano kei roto i te mita kotahi, nō reira e 4 mita ka rite ki te 4,000 mitamano, ko te 500 mitamano he rite ki te haurua mita. Hui katoa, ko te 4.5 mita. 2. Hurihia te 1,125 mitamano hei mita i te tuatahi. He rite te kotahi mita ki te kotahi mano mitamano (1m = 1,000mm). Ko te 125mm, koia ko te 0.125 mita. Nō reira he rite te 1,125mm ki te 1.125m. Wāwāhia te 1.125 ki ūna wāhangā, ā, ka whakarea i ia wāhangā ki te 4: $1 \times 4 = 4$ $0.1 \times 4 = 0.4$ $0.02 \times 4 = 0.08$ $0.005 \times 4 = 0.02$ Hui katoa ēnei whakareatanga ($4 + 0.4 + 0.08 + 0.02$), ka 4.5 mita.
<p>Kia pērā anō te whakaoti i ētahi atu rapanga me te āta whakamārama i ngā rautaki e hāngai ana. Hei tauira:</p> <ol style="list-style-type: none"> 1. E 750g te taumaha o te rango mīti kurī kotahi. E 5 ka hokona e Huriwai. E hia te taumaha o te mīti kurī i hokona e ia, hei manokaramu (kg)? 	

2. E 615ml te rōrahi wai ārani kei te ipu kotahi. E hia te rōrahi o ngā ipu e 6 hei rita?
3. E 3.6m te roa o te rīpene i hokona e Rongopai. Ka tapahia kia 8 ngā rīpene poto, he ūrite te roa o tēnā me tēnā. E hia mitarau te roa o ia rīpene poto?
4. 1.75kg te taumaha o te rango mīti kurī i hokona e Manahi hei whāngai i tana kurī. Ka tapahia te rango mīti nei kia 7 ngā wehenga ūrite, tētahi mō ia rā o te wiki. E hia karamu (g) te taumaha o ia wehenga mīti?

Te Horahanga Tapawhā Hāngai

1a 1e 2a 2e 3a 3e 4a 4e 5a

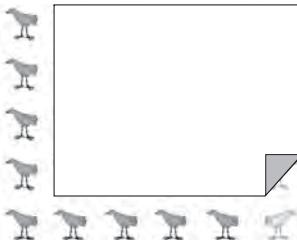
E ako ana ahau i te ture hei tātai i te horahanga tapawhā hāngai.

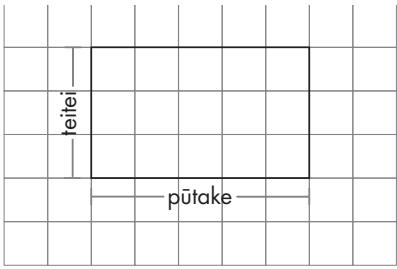
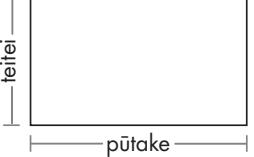
Rauemi

- Whārangi Tārua 16 & 17
- He rūri
- He mitarau pūrua kua tapahia i te pepa mārō
- He pepa tukutuku

Kupu matua

horahanga, kapa, mitarau pūrua, pou, pūtake, tapawhā hāngai, teitei, tūtohi tukutuku

Ngā tohutohu	He tauira kōrero mā te pouako
<p>E hoki ki te tirotiro i te tūtohi tukutuku, pēnei i te Papa Pūkeko (Whārangi Tārua 16), ka whakawhitiwhiti kōrero mō te whiriwhiri i te maha o ngā pūkeko kei tētahi wāhanga o te tūtohi tukutuku.</p>	 <p>Titiro ki tēnei wāhanga o te Papa Pūkeko. Me pēhea te whiriwhiri i te maha o ngā pūkeko e whakaaturia ana? He tauira whakautu:</p> <ol style="list-style-type: none">1. Mā te tatau māwhitiwhiti i ia kapa: 6, 12, 18, 242. Mā te tatau māwhitiwhiti i ia pou: 4, 8, 12, 16, 20, 243. E 6 ngā pūkeko kei ia kapa, e 4 ngā kapa, nō reira me whakarea te 6 ki te 4, ka 24.4. E 6 ngā pou o ngā pūkeko e 4, nō reira me whakarea te 4 ki te 6, ka 24.
<p>Kia pērā anō te mahi mō ētahi atu wāhanga o te Papa Pūkeko, kia taunga rā anō ngā ākonga ki te rautaki whakarea hei tātai i te maha o ngā pūkeko.</p>	
<p>Uhia tētahi wāhanga o te Papa Pūkeko kia kitea ko te kapa raro me te pou mauī anake. Whakawhitiwhiti kōrero mō te whiriwhiri i te maha o ngā pūkeko katoa i tērā wāhanga o te Papa Pūkeko.</p>	<p>Kua uhia ētahi o ngā pūkeko i konei. Me pēhea te whiriwhiri i te maha katoa o ngā pūkeko – ngā mea e kitea mai ana me ngā mea hoki kei raro i te pepa?</p>

	<p>E 6 ngā pūkeko kei te kapa raro. E kitea mai ana i te taha mauī te tīmatanga o ia kapa. E 5 katoa ngā kapa, nō reira me whakarea te 6 ki te 5, ka 30. Koirā te maha katoa o ngā pūkeko.</p>
	<p>Kia pērā anō te mahi mō ētahi atu wāhanga o te Papa Pūkeko, kia taunga rā anō ngā ākonga ki te rautaki whakarea hei tātai i te maha o ngā pūkeko.</p>
<p>Whakaaturia tētahi tapawhā hāngai kua tuhia ki te pepa tukutuku. Whakawhitihitī kōrero mō te whiriwhiri i te horahanga o te tapawhā hāngai.</p> <p>E pai ana te whakamahi i ngā kupu ‘pūtake’ me ‘teitei’ hei tohu i ngā tapa o te tapawhā hāngai.</p>	 <p>Titiro ki te tapawhā hāngai nei kua tuhia ki te pepa tukutuku. Kotahi mitarau (1cm) ngā tapa o ia tapawhā rite o te pepa tukutuku. Me pēhea te whiriwhiri i te horahanga o tēnei tapawhā hāngai?</p> <p>Ko te horahanga, koirā te maha katoa o ngā mitarau pūrua kei roto i te tapawhā hāngai. E 5 ngā mitarau pūrua kei te pūtake o te tapawhā hāngai, e 3 mitarau pūrua tōna teitei. Nō reira me whakarea te 5 ki te 3, ka 15.</p>
	<p>Kia taunga ngā ākonga ki tēnei mahi, me hoatu te Whārangī Tārua 17 hei whakaoti mā rātou.</p>
<p>Whakawhitihitī kōrero mō te ture hei tātai i te horahanga o tētahi tapawhā hāngai.</p>	 <p>Anei anō tētahi tapawhā hāngai, engari kāore i tuhia ki te pepa tukutuku. Me pēhea te whiriwhiri i tōna horahanga? Mā te ine i te pūtake e mōhiotia ai e hia mitarau kei ia kapa. Me ine anō te teitei kia mōhiotia ai te maha o ngā kapa. Kātahi ka whakarea.</p> <p>Nō reira kua kitea he ture hei tātai i te horahanga o tētahi tapawhā hāngai. Me whakarea te pūtake ki te teitei. He aha tētahi tuhinga poto mō tēnei ture?</p> <p>$H = p \times t.$</p>
<p>Hei whakawhānui</p> <p>Tūhuratia te ture mō te horahanga o tētahi tapawhā rite, arā, $H = t^2$ (H = horahanga, t = tapa), me tōna hononga ki te ture horahanga mō tētahi tapawhā hāngai.</p>	

Te Horahanga Tapatoru

1a 1e 2a 2e 3a 3e 4a 4e 5a

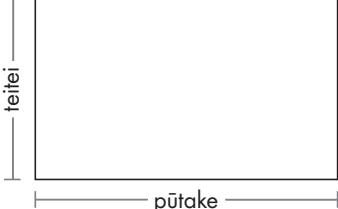
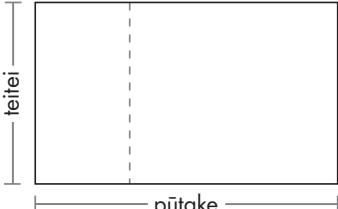
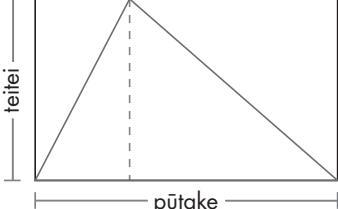
Te Ine: E ako ana ahau ki te whiriwhiri i te horahanga o tētahi tapatoru.

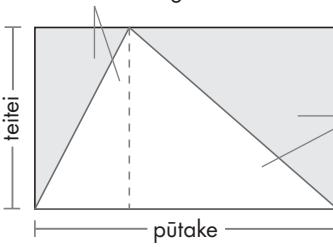
Rauemi

- Whārangi Tārua 18

Kupu matua

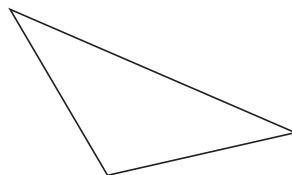
horahanga, mitarau pūrua, pūtake, teitei

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Tonoa ngā ākonga kia tuhia he tapawhā hāngai, me te tohu anō i tōna pūtake me tōna teitei.</p> <p>Wāwāhia te tapawhā hāngai kia hua mai tētahi tapatoru, ka tūhura ai i te whiriwhiringa o te horahanga o taua tapatoru.</p>	<p>Tuhia tētahi tapawhā hāngai ki tō pepa. Kei a koe anō te whiriwhiri i te rahi o te tapawhā hāngai. Tohua te pūtake me te teitei o tō tapawhā hāngai.</p> 
	<p>Tuhia he rārangi iraira poutū ki roto i te tapawhā hāngai, mai i tōna pūtake ki tōna tapa runga.</p> 
	<p>Tuhia he rārangi mai i te kokonga mauī raro ki te pito runga o te rārangi iraira. Tuhia he rārangi atu anō mai i te kokonga matau raro o te pūtake ki te pito runga o te rārangi iraira. He aha ngā āhua kua hua mai?</p> <p>E toru ngā tapatoru kua hua mai.</p> 

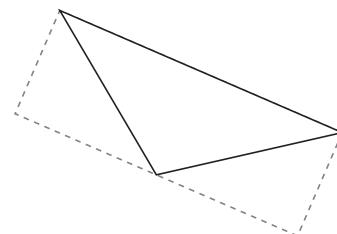
	<p>Tapahia ngā tapatoru e toru. Whakatakotoria ngā tapatoru iti e rua ki runga i te tapatoru nui. He aha te mea e kitea mai ana?</p> <p>He ūrite te rahi o ngā tapatoru iti e rua ki te tapatoru nui.</p> <p>He pērā ā koutou tapatoru katoa, ahakoa he rerekē te rahi o te tapawhā hāngai a tēnā me tēnā?</p> <p>Āe he pērā te katoa.</p> <p>Nō reira e tohu ana tērā, ko te horahanga o te tapatoru nui, he haurua o te horahanga o te tapawhā hāngai. Whakamāramatia he aha ai.</p> <p style="text-align: center;"> he ūrite te rahi (horahanga) o ēnei wāhangā e rua  he ūrite te rahi (horahanga) o ēnei wāhangā e rua teitei pūtake </p>
<p>Whakawhitihiti kōrero mō te ture hei tātai i te horahanga tapawhā hāngai me te whakaputa i te ture mō te tātai horahanga tapatoru.</p>	<p>Kia hoki tātou ki te tirotiro i te tapawhā hāngai i tuhia tuatahitia. Me pēhea te tātai i te horahanga o taua tapawhā hāngai?</p> <p>Ka inea te pūtake me te teitei o te tapawhā hāngai, kātahi ka whakareatia.</p> <p>Āe rā, koia rā te ture mō te tātai i te horahanga o tētahi tapawhā hāngai, me whakarea tōna pūtake ki tōna teitei, tōna roa ki tōna whānui rānei. Me pēhea te tuhi hei whārite?</p> <p>$H = p \times t$ (H = horahanga, p = pūtake, t = teitei)</p> <p>$H = r \times wh$ (H = horahanga, r = roa, wh = whānui)</p> <p>Nō reira he aha te ture hei tātai i te horahanga o tētahi tapatoru?</p> <p>He haurua te horahanga o tētahi tapatoru i te horahanga o te tapawhā i hua mai ai taua tapatoru. Nō reira, ko te ture:</p> <p>$H = \frac{1}{2} \times p \times t$</p> <p>Inea ngā tapa o te tapawhā hāngai, ka tātai ai i tōna horahanga, me te horahanga o te tapatoru.</p>

Tonoa ngā ākonga kia tuhi i tētahi tapatoru me te whakaatu anō i te tapawhā hāngai hei karapoti i taua tapatoru. Tūhuratia te pānga o te horahanga o te tapawhā hāngai me te horahanga o te tapatoru.

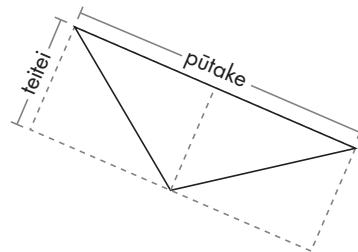
Ināianei, tuhia tētahi tapatoru ki tō pepa. Kei a koe te whiriwhiri i te āhua me te rahi o te tapatoru.



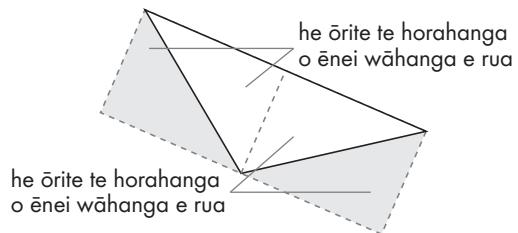
Tuhia he tapawhā hāngai hei karapoti i tō tapatoru.



Tohua te pūtake me te teitei o te tapawhā hāngai.



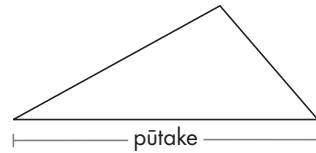
He tika anō te ture, he haurua te horahanga o te tapatoru i te horahanga o te tapawhā hāngai e karapoti ana i a ia? Āe rā, he mārama te kitea atu i te pikitia.



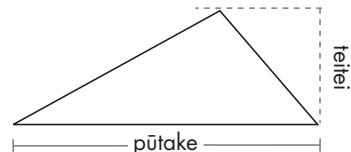
Inea te pūtake me te teitei o te tapatoru, ka tātai ai i tōna horahanga.

Whakawhitihiti kōrero mō te tautohu i te pūtake me te teitei o tētahi tapatoru.

Tuhia tētahi tapatoru ki te papa tuhituhi, me te whakaatu anō i tōna pūtake.



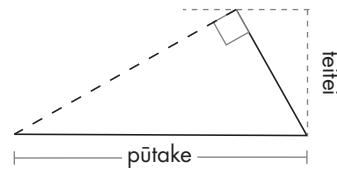
Ko hea tōna teitei? Tohua mai te teitei o te tapatoru nei.



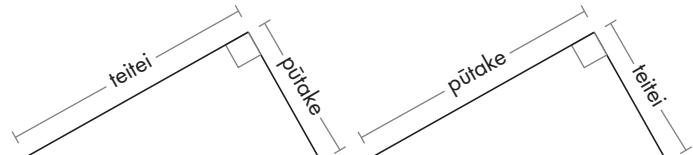
Titiro ki te hononga o te pūtake me te teitei o te tapatoru.
He aha tētahi mea e kitea mai ana?

He koki hāngai te pūtahitanga o te pūtake me te teitei.

Āe rā. I pērā nā te mea he koki hāngai ngā kokonga katoa o te tapawhā hāngai hei karapoti i te tapatoru.



E taea ana ērā atu tapa o te tapatoru hei pūtake, engari ka rerekē anō te teitei:



Tēnā, māu e tuhi tētahi tapatoru ki tō pepa, ā, kia toru ngā tātaitanga o tōna horahanga. Mō ia tātaitanga, kia rerekē ngā tapa o te tapatoru hei pūtake mōna, hei teitei anō hoki.

Ko te tikanga kia ōrite te horahanga ka puta i ia tātaitanga.

Kei te Whārangī Tārua 18 ētahi tapatoru hei ine mā ngā ākonga, hei tātai i te horahanga. Āta tirohia mēnā i tika te tautohu i te pūtake me te teitei o te tapatoru i mua i te inenga me te tātaitanga.

Te Horahanga Tapawhā Whakarara

1a	1e	2a	2e	3a	3e	4a	4e	5a
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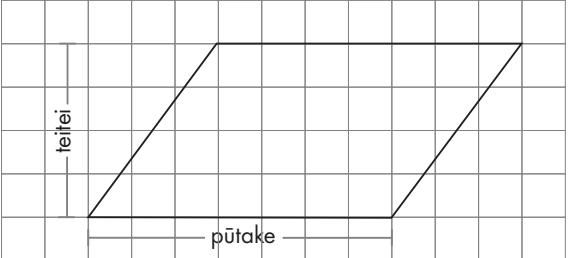
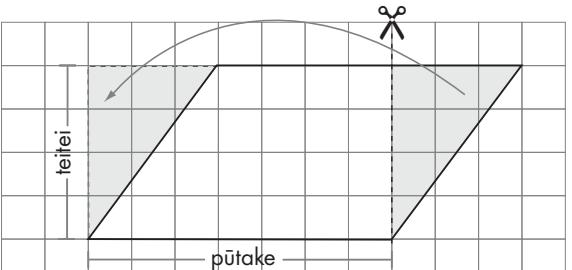
E ako ana ahau i te ture hei tātai i te horahanga tapawhā whakarara.

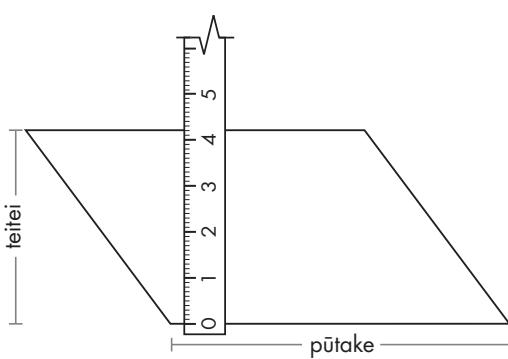
Rauemi

- Whārangī Tārua 19
- He pepa tukutuku
- He rūri

Kupu matua

horahanga, mitarau pūrua, pūtake, tapawhā hāngai, tapawhā whakarara, teitei

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Hoatu he tapawhā whakarara kua tuhia ki te pepa tukutuku, ka tūhura i te ture hei tātai i tōna horahanga.</p>	 <p>Titiro ki te āhua nei kua tuhia ki te pepa tukutuku. He aha tōna ingoa pāngarau? Ko te tapawhā whakarara.</p> <p>He tapawhā nā te mea e whā ūna tapa, ā, ka tāpiria atu te kupu whakarara nā te mea e whakarara ana te tapa runga me te tapa raro, e whakarara ana hoki te tapa mauī me te tapa matau.</p> <p>Me pēhea te whiriwhiri i te horahanga o tēnei tapawhā whakarara? E hia mitarau pūrua tōna horahanga?</p>  <p>Mēnā ka tapahia te tapatoru kei te taha matau, ā, ka honoa atu tērā ki te taha mauī, ka puta tētahi tapawhā hāngai. Kua wāwāhia te tapawhā whakarara, engari e noho pūmau ana tōna horahanga. Kāore i tangohia, i tāpirihia rānei tētahi wāhanga. He māmā noa iho ināianei te tātai i te horahanga o te tapawhā hāngai, arā, mā te whakarea i te pūtake ki te teitei.</p>

<p>Tonoa ngā ākonga kia tuhi i ētahi atu tapawhā whakarara ki te pepa tukutuku, me te tātai anō i te horahanga. Me tono kia āta tohua te pūtake me te teitei o ngā tapawhā whakarara.</p> <p>Whakawhitihiti kōrero mō te huarahi poto hei tātai i te horahanga.</p>	<p>Māu e tuhi tētahi tapawhā whakarara ki te pepa tukutuku, ka tohu ai i tōna pūtake me tōna teitei. Tātaihia tōna horahanga.</p> <p>He aha te rautaki hei tātai i te horahanga?</p> <p>Mēnā ka tapahia te tapatoru kei te taha matau, ā, ka honoa atu tērā ki te taha mauī hei hanga tapawhā hāngai, ka noho pūmau tonu te pūtake me te teitei. He mahi roa tonu te wāwāhi i te tapawhā whakarara hei hanga i tētahi tapawhā hāngai, nō reira he tika tonu te whakarea i te pūtake o te tapawhā whakarara ki tōna teitei hei tātai i tōna horahanga.</p> <p>He aha te tuhinga poto o tēnei ture?</p> <p>He ūrite ki te ture hei tātai i te horahanga tapawhā hāngai. Arā, $H = p \times t$.</p>
<p>Hoatu he tapawhā whakarara kua tuhia ki te pepa noa (kāore te pepa tukutuku), ka whakawhitihiti kōrero ai mō te tātai i tōna horahanga.</p> <p>Me āta tohu te teitei o te tapawhā whakarara, arā, kia hāngai tonu ki te pūtake.</p>	<p>Mēnā kāore te tapawhā whakarara i tuhia ki te pepa tukutuku, me pēhea te tātai i tōna horahanga?</p> <p>Me ine te pūtake me te teitei, kātahi ka whakarea.</p> <p>Tohua mai te pūtake me te teitei o te tapawhā whakarara. Ko hea ngā wāhi hei ine?</p> 
<p>Ina taunga ngā ākonga ki te tātai horahanga tapawhā whakarara, kei te Whārangi Tārua 19 ētahi rapanga hei whakaoti.</p>	

Te Whakatairite i te Utu

1a	1e	2a	2e	3a	3e	4a	4e	5a
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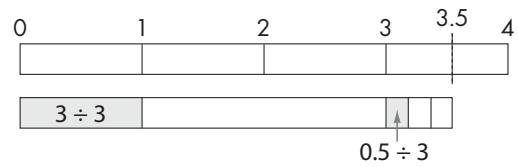
Te Ine: E ako ana ahau ki te whakawhitihiti waeine mō te utu.

Te Tau: E ako ana ahau ki te whakatairite pāpātanga.

Kupu matua

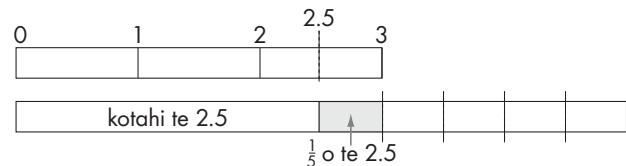
utu ā-manokaramu (\$/kg), utu ā-rita (\$/l)

Ngā tohutohu	He tauira kōrero mā te pouako									
<p>Tuhia te rapanga nei ki te papa tuhituhi, ka whakawhitihiti kōrero ai mō ngā rautaki hei whakaoti. Hei tauira:</p> <p>I tētahi hokomaha, ko te \$3.50 te utu mō tētahi ipu wai ārani, e 3 rita te rōrahi. I tētahi atu hokomaha, ko te \$3.00 te utu mō tētahi ipu wai ārani e 2.5 rita te rōrahi. Ko tēhea o ēnei wai ārani he māmā ake te utu?</p>	<p>Me āta pānui tēnei rapanga. He aha te mea hei whiriwhiri mā tātou?</p> <p>Ko tēhea te wai ārani he māmā ake te utu?</p> <p>Engari he māmā noa iho tēnā. Ko te \$3.00 te utu mō tētahi, ko te \$3.50 te utu mō tētahi.</p> <p>Engari he iti iho te rōrahi o te ipu e \$3.00 te utu.</p> <p>Nō reira, me aha?</p> <p>Ko tētahi rautaki, he tātai i te utu ā-rita o tēnā me tēnā, kātahi ka āta kitea te mea he māmā ake te utu.</p> <p>He aha ngā tino kōrero hei aro mā tātou? Me pēhea te whakarāpopoto i ēnei tino kōrero?</p> <p>E pai ana te whakaatu ki tētahi tūtohi:</p> <table border="1"> <thead> <tr> <th></th> <th>Wai ārani 1</th> <th>Wai ārani 2</th> </tr> </thead> <tbody> <tr> <td>rōrahi (rita)</td> <td>3</td> <td>2.5</td> </tr> <tr> <td>utu (\$)</td> <td>3.50</td> <td>3.00</td> </tr> </tbody> </table> <p>Me pēhea te tātai i te utu ā-rita mō ia wai ārani?</p> <p><u>Mō te wai ārani 1:</u></p> <ul style="list-style-type: none"> Whakawehea te \$3.50 ki te 3. Wāwāhia te \$3.50 ki ōna wāhangā e rua, te \$3.00 me te 0.50. Whakawehea te \$3.00 ki te 3, ka \$1.00. Hei whakawehē i te 0.50 ki te 3, ka whiriwhiri i te haurua o te whakawehenga o te \$1.00 ki te 3. Ko te 0.33 te utu e tino pātata ana ki te whakawehenga o te 1.00 ki te 3. Ko te 0.165 te haurua o tērā. Me whakaawhiwhi ki te 0.17. Hui katoa ko te 1.17 te utu ā-rita mō te wai ārani 1. 		Wai ārani 1	Wai ārani 2	rōrahi (rita)	3	2.5	utu (\$)	3.50	3.00
	Wai ārani 1	Wai ārani 2								
rōrahi (rita)	3	2.5								
utu (\$)	3.50	3.00								



Mō te wai ārani 2:

- Whakaweheha te \$3.00 ki te 2.5, arā e kimihi ana e hia ngā 2.5 kei roto i te 3.00.
- Kotahi te 2.5, ā, e toe ana te 0.5. Ko te 0.5 te haurima o te 2.5 ($5 \times 0.5 = 2.5$).
- He ūrite te haurima ki te 0.2.
- Hui katoa, 1.2 ngā 2.5 kei roto i te 3.00.
- Nō reira ko te \$1.20 te utu ā-rita mō te wai ārani 2.



He tauira rapanga atu anō hei whakaoti:

He āhua māmā ngā tau:

- I tētahi toa, ko te \$5.00 te utu mō te tētahi mīti kurī, e 2.5kg te taumaha. I tētahi atu toa, ko te \$3.00 te utu mō te mīti kurī 1.55kg te taumaha. Ko tēhea o ēnei mīti kurī he māmā ake te utu?
- I tētahi toa, ko te \$4.50 te utu mō te tiakareti, e 750g te taumaha. I tētahi atu toa, ko te \$5.50 te utu mō te tiakareti 1kg te taumaha. Ko tēhea o ēnei tiakareti he māmā ake te utu?

He āhua uaua ake ngā tau:

- I tētahi toa, ko te \$24.00 te utu mō te ika, e 800g te taumaha. I tētahi atu toa, ko te \$21.00 te utu mō te ika e 700g te taumaha. Ko tēhea o ēnei ika he māmā ake te utu?
- I tētahi toa, ko te \$76.50 te utu mō te peita, e 9 rita te rōrahi o te ipu. I tētahi atu toa, ko te \$52.50 te utu mō te peita e 6 rita te rōrahi o te ipu. Ko tēhea o ēnei peita he māmā ake te utu?

Whanaketanga 4e

Mātauranga Matua kua Mau kē

Te Tau

- ngā tau tōpū
- te taupū (pēnei i te pūrua me te pūtakerua)
- ngā rautaki wāwāhi tau e hāngai ana hei whakaotī rapanga e whai wāhi mai ana te ōwehenga me te pāpātanga
- te tōtika me te whaitakenga o ngā whakataunga tata me ngā tātaitanga

Te Ine

- te whakawhitiwhiti waeine ngahuru
- te pāpātanga hei ine i ētahi āhuatanga (pērā i te tere me te utu)
- te whakamahi i ngā inenga tapa me ngā ture e hāngai ana hei tātai i te paenga, te horahanga me te rōrahi o ngā āhua māmā (pērā i te tapatoru, te tapawhā hāngai me te pouaka)
- te whakamahi rautaki whakarea hei tātai i ngā inenga tapa o ngā āhua whakarahi
- te tuhi me te whakahua tika i ngā inenga pāpātanga (pēnei i te km/h me te utu/kg)
- te tuhi me te whakahua hoki i ngā whārite hei tātai horahanga māmā, rōrahi māmā hoki

Mātauranga Matua hei Ako

- ngā inenga tōraro mō te paemahana me ngā tātaitanga e hāngai ana
- te tuhi me te whakamāori wātaka e whakaatu ana i ngā āhuatanga matatini
- ngā tikanga o te wā-24
- te tātai takanga wā
- te whakamahi i ngā inenga me ngā ture hei tātai i te paenga me te horahanga o ngā āhua ahu-2 (pērā i te porowhita me te tapaono rite)
- te whakamahi i ngā inenga me ngā ture hei tātai i te rōrahi o ngā āhua ahu-3 (pērā i te rango me te poro tapatoru)
- te waihanga rautaki hei tātai i te horahanga me te rōrahi o ngā āhua whīwhiwhi

Rauemi kē atu e Hāngai ana

Ngā Kōwae Ako o nzmaths

- Te Wā me te Wātaka
<http://www.nzmaths.co.nz/resource/te-w-me-te-w-taka>
- Horahanga Tapatoru
<http://www.nzmaths.co.nz/resource/horahanga-tapatoru>
- He Tau Nui
<http://www.nzmaths.co.nz/resource/ng-tau-nui>

He Pūtahi Pāngarau

- *Te Roa, Te Horahanga Me Te Rōrabi.* Te Pou Taki Kōrero, 2006.
- *Te Wā.* Te Pou Taki Kōrero, 2006.

Te Whiriwhiri Koki

1a	1e	2a	2e	3a	3e	4a	4e	5a
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Te Ine: E ako ana ahau ki te whiriwhiri i te rahi o tētahi koki.

Te Tau: E ako ana ahau ki te kōwhiri i te rautaki e tino whaihua ana hei whakaotī tāpiritanga, tangohanga hoki.

Rauemi

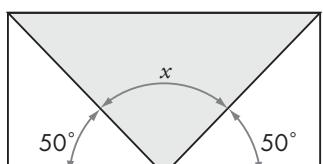
- Whārangi Tārua 20 & 21

Kupu matua

koki whakahāngai, koki whakahuripū, koki whakarārangī, putu (tākiri)

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Tuhia te rapanga nei ki te papa tuhituhi, ka whakawhitiwhiti kōrero ai mō te whiriwhiri koki whakahāngai:</p> <p>Kei te tapahi papariki tapatoru a Miere hei hanga i tētahi tapawhā hāngai. Ko te wāhangā kauruku i te pikitia nei te tapatoru e tapahia ana e Miere. E hia putu te koki e tohua ana ki te x hei tapahi māna?</p>	<p>Me pēhea te whiriwhiri i te rahi o te koki x?</p> <p>He koki hāngai te kokonga o te tapawhā hāngai, nō reira ko te 90 putu te tapeke o te x me te 38°. Arā, $38 + x = 90$. E 52° te koki x ($38 + 2 + 50 = 90$).</p> <p>Ka kīia ēnei koki he koki whakahāngai nā te mea ko te 90 putu te tapeke.</p> 

Kia pērā anō te arataki i ngā ākonga i ētahi atu rapanga pēnei. Ina taunga ngā ākonga ki te whiriwhiri koki whakahāngai, kei te Whārangi Tārua 20 ētahi anō hei whakaotī mā rātou.

<p>Tuhia te rapanga nei ki te papa tuhituhi, ka whakawhitiwhiti kōrero ai mō te whiriwhiri koki whakarārangī:</p> <p>Kei te tapahi papariki tapatoru a Miere hei hanga i tētahi tapawhā hāngai. Ko te wāhangā kauruku i te pikitia nei te tapatoru e tapahia ana e Miere. E hia putu te koki e tohua ana ki te x hei tapahi māna?</p>	<p>Me pēhea te whiriwhiri i te rahi o te koki x?</p> <p>E toru ngā koki nei e rite ana ki te rārangī torotika, arā, te 50 putu, te x, me te 50 putu anō. 180 putu i te koki rārangī, nō reira ko te 180 putu te tapeke o ēnei koki e toru. Arā, $50 + x + 50 = 180$. Mā te tango i te 100 i te 180 e hua mai ai te rahi o te koki 'x'. Arā, ko te 80°.</p> <p>Ka kīia ēnei koki he koki whakarārangī nā te mea ko te 180 putu te tapeke. Ina whakapiria ētahi koki whakarārangī kia noho tahi, he rārangī torotika ka hua mai.</p> 
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Kia pērā anō te arataki i ngā ākonga i ētahi atu rapanga pēnei. Ina taunga ngā ākonga ki te whiriwhiri koki whakarārangī, kei te Whārangi Tārua 21 ētahi anō hei whakaotī mā rātou.

Hei whakawhānui

Kia pēnei anō te tūhura i te whiriwhiri koki whakahuripū (arā, ko te 360 putu te tapeke).

Te Pānui Wātaka me te Tātai Takanga Wā

1a 1e 2a 2e 3a 3e 4a 4e 5a

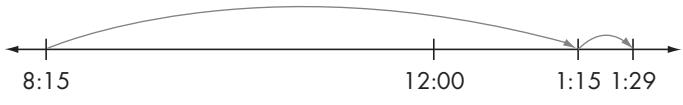
E ako ana ahau ki te pānui wātaka, ki te tātai takanga wā.

Rauemi

- Whārangi Tārua 22

Kupu matua

takanga wā, wātaka

Ngā tohutohu	He tauira kōrero mā te pouako
Whakaaturia tētahi wātaka, ka whakawhitiwhiti kōrero mō te kimi wā i taua wātaka me te tātai takanga wā. Kei te Whārangi Tārua 22 ētahi tauira wātaka.	<p>Titiro ki te wātaka pahi mai i Ngāmotu ki Tāmakimakaurau. He aha te wā ka tae atu te pahi ki Piopio? Ko te 9:39 i te ata.</p> <p>Pēhea nei te roa o te wā e tū ana te pahi ki Te Kuiti? He haurua haora.</p> <p>E haere ana a Hirini mai i Urenui ki Manukau. E hia haora te roa o tana haere?</p> <p>Mai i te 8:15 i te ata ki te 1:29 i te ahiahi. Ko te 5 haora mai i te 8:15 i te ata ki te 1:15 i te ahiahi. Tāpiria ki tērā ko te 14 meneti kia tae atu ki te 1:29.</p> 

Kia pērā anō te tuku pātai mō ētahi atu wātaka. E pai ana kia tonoa mā te ākonga e tuhi pātai hei whakautu mā tana hoa.

Hei whakawhānui

Tirohia he wātaka e whakaatu ana i ngā tāima hei wā-24

Te Tātai Takanga Wā 2

1a	1e	2a	2e	3a	3e	4a	4e	5a
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E ako ana ahau ki te tātai i te takanga o te wā roa.

Kupu matua takanga wā

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Hoatu he rapanga hei whiriwhiri mā ngā ākonga i te takanga wā roa. Whakawhitiwhiti kōrero mō ngā rautaki hei whakaoti i te rapanga. Hei tauira: E ai ki tana māmā, i whānau mai a Hohepa i te 10:15 i te ata i te 12 o Huitanguru i te tau 1998. E tātai ana a Hohepa i tana pakeke hei meneti. E hia meneti e ora ana ia?</p>	<p>He aha tātou mahi hei whakaoti i tēnei rapanga? He whiriwhiri i ngā meneti mai i te wā i whānau mai ai a Hohepa ki nāianei tonu.</p> <p>He aha tētahi rautaki hei whakaoti i tēnei rapanga? Tuatahi, he tātai i te maha o ngā meneti i te takanga o ia tau. Kua hoki e wareware ki te tāpiri i ngā meneti mō tētahi anō rangi i ia tau kuhurangi: Ngā meneti i te haora = 60 Ngā meneti i te rā = $60 \times 24 = 1,440$ Ngā meneti i te tau noa = $1,440 \times 365 = 525,600$ Ngā meneti i te tau kuhurangi = $525,600 + 1,440 = 527,040$</p>
<p>Tuarua, he tātai i te wā e ora ana a Hohepa:</p>	
<p>E 9 ngā tau noa = $525,600 \times 9 = 4,730,400$ meneti E 3 ngā tau kuhurangi = $527,040 \times 3 = 1,581,120$ meneti E 37 ngā rā mai i te 12/02 ki te 21/03 = $37 \times 1,440 = 53,280$ E 75 meneti mai i te 10:15 ki te 11:30 Hui katoa = 636,4875 meneti e ora ana a Hohepa</p>	
<p>Tonoa ngā ākonga kia tātai i ō rātou pakeke hei meneti.</p> <p>Ētahi atu horopaki mō te tātai takanga wā roa:</p> <ul style="list-style-type: none"> E hia hākona te roa o tētahi haerenga mā runga waka rererangi mai i Tāmakimakaurau ki Rānana? Ka tīmata te omanga roa a Hinewai i te 10:53 i te ata, ka mutu i te 2:17 i te ahiahi. E hia hākona te roa o tana omanga? 13,345 hākona te roa o te omanga a Riria. Mēnā ka tīmata ia i te 10:53 i te ata, he aha tana tāima mutu? Mēnā e 80km/h te tere toharite o te motukā, e hia hākona te roa o te haere mai i Papaioea ki Ahuriri? 	

Te Paemahana

Te Ine: E ako ana ahau ki te tātai paemahana.
Te Tau: E ako ana ahau i ngā rautaki tātai tau tōraro.

Rauemi

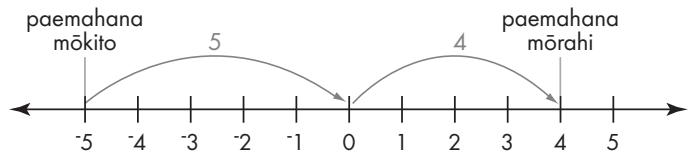
- Whārangi Tārua 23 & 24

Kupu matua

āwhata tohurau, pae koropupū, pae rewā, pae whakatio, tōraro

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Whakawhitiwhiti kōrero mō te paemahana o ētahi āhuatanga o ia rā, kia mārama ai ngā ākonga ki te āwhata tohurau (Celsius). Kei te Whārangi Tārua 23 te pikitia o tētahi ine-mahana hei tīmata i ngā whakawhitiwhitinga kōrero.</p>	<p>He pikitia tēnei o tētahi ine-mahana. He aha te tikanga o ia hahae roa o te āwhata.</p> <p>E toru ngā hahae roa kei waenganui i te 0 putu me te 30 putu o te āwhata, nō reira ko ēnei hahae roa e whakaatu ana i ia 10 putu.</p> <p>Tuhia ngā paemahana e tika ana mō ia hahae roa o te āwhata.</p> <p>He aha te paemahana e huri ai te wai hei tio? Ko te kore putu tērā.</p> <p>He aha te paemahana koropupū o te wai – e huri ai te wai hei wairehu? Ko te 100 putu.</p> <p>He aha te ingoa o tēnei āwhata mō te paemahana? Ko te tohurau, arā ko te Celsius i te reo Pākehā. Kotahi rau ngā wehenga mai i te pae whakatio ki te pae koropupū.</p> <p>Kei raro i te ine-mahana ētahi āhuatanga o ia rā, hei tohu māu ki te ine-mahana. Kei te takiwā o te hia putu te paemahana o ēnei āhuatanga?</p>
<p>Tirohia te tūtohi kei te Whārangi Tārua 24, ka whakawhitiwhiti kōrero ai mō te tikanga o ia pou o te tūtohi.</p> <p>Tukuna he pātai hei tātai mā ngā ākonga i ngā paemahana, me te āta tirotiro i ngā rautaki mō te tau tōraro.</p>	<p>He aha e whakaaturia ana ki ngā pou o te tūtohi? Ko te paemahana mōrahi, koia te teiteitanga o ngā paemahana i taua rā. Ko te paemahana mōkito, koia te hahaka o ngā paemahana. Ko te inenga whānui, te huatango o te mōrahi me te mōkito, arā, ko te pikinga o te paemahana i taua rā, mai i te mōkito me te mōrahi.</p> <p>Me pēhea te tātai i te inenga whānui mō Waiouru? Ina whakaaturia te mōrahi me te mōkito mō Waiouru ki tētahi āwhata, he māmā noa iho te tātai. Arā, e 5 putu mai</p>

i te 5 tōraro ki te kore, e 4 putu mai i te kore ki te 4. Hui katoa ko te iwa putu.



Kia pērā anō te mahi hei tātai i ngā paemahana e ngaro ana i te tūtohi. He pātai atu anō hoki kei te **Whārangi Tārua 24** hei tātai tau tōraro mā ngā ākonga.

Te Horahanga Porowhita

1a 1e 2a 2e 3a 3e 4a 4e 5a

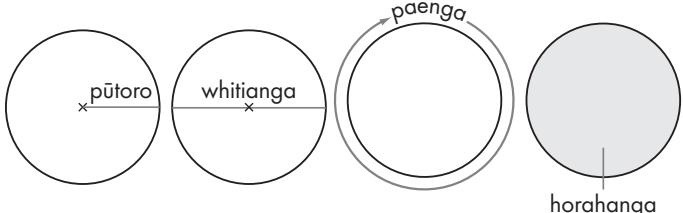
E ako ana ahau ki te whiriwhiri i te horahanga o tētahi porowhita.

Rauemi

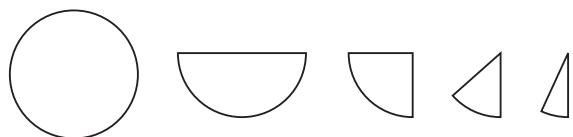
- Whārangī Tārua 25
- He tātaitai
- He pepa me te kutikuti

Kupu matua

horahanga, pae (π), paenga, pūtoro, whitianga

Ngā tohutohu	He tauira kōrero mā te pouako
<p>E hoki ki te whakawhitihiti kōrero mō ngā wāhanga o tētahi porowhita me ngā pānga o tētahi wāhanga ki tētahi.</p> <p>E tika ana kia mōhio ngā ākonga ki te tātai paenga porowhita i mua i te tūhura i te tātai horahanga. Arā kia mōhio rātou ki te tau motuhake nei, te pae (π). Kei te pukapuka <i>Hei Tautoko i te Marautanga Pāngarau: Te Hanga</i> (Taumata 4e) tētahi ngohe hei tūhura i te tātaitanga paenga porowhita.</p>	<p>Kia titiro anō tātou ki te porowhita. Tuhia he porowhita ki tō pukapuka, ka tohu mai ai i ēnei wāhanga:</p> <ul style="list-style-type: none"> • te pūtoro • te whitianga • te paenga • te horahanga  <p>He aha te pānga o te pūtoro me te whitianga?</p> <p>He rearua te whitianga o te pūtoro, he haurua te pūtoro o te whitianga. Ko te whitianga he rārangī torotika mai i tētahi taha o te porowhita ki tētahi me te pā anō ki te pū. Ko te pūtoro, he rārangī mai i te pū ki te tapa. Nō reira he haurua tētahi i tētahi.</p> <p>He aha te pānga o te whitianga me te paenga o te porowhita?</p> <p>Kei te takiwā o te 3 te whakareatanga ake o te paenga i te whitianga. He paku nui ake i te 3, arā, te tau motuhake nei te pae (π).</p> <p>Āe rā, ahakoa te rahi o te porowhita, mā te whakarea i tōna whitianga ki te pae (π), ka tātaihia ai te paenga.</p>
<p>Aratakina ngā ākonga ki te tūhura i te ture hei tātai i te horahanga porowhita.</p>	<p>Ko tā tātou mahi i konei, he tirotiro i te horahanga o te porowhita. Tuhia he porowhita ki te pepa, kia tapahi ai.</p>

Whētuia te porowhita kia haurua. Whētuia kia haurua anō, kia haurua anō, kia haurua anō. Arā, kia whā ngā whakahauruatanga o te porowhita:



Mārohatia te porowhita, ka tapahi ai i ngā wāhanga tekau mā ono.

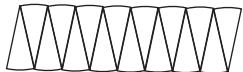


He pēhea nei te āhua o ngā wāhanga porowhita kua tapahia e koe?

Ko te rite ki te tapatoru, engari he paku kōpiko te tapa poto nā te mea koirā tētahi wāhanga o te paenga o te porowhita.

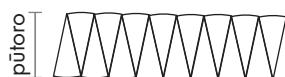


Whakatakotoria ngā wāhanga 16 o te porowhita tapa ki te tapa, kia hua mai ai te āhua e pātata ana ki te tapawhā hāngai.



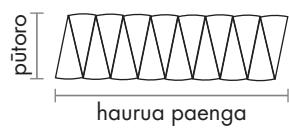
E pātata ana te teitei o tēnei āhua ki te aha?

E pātata ana ki te pūtoro o te porowhita, koia tētahi rārangi mai i te pū o te porowhita ki te tapa.

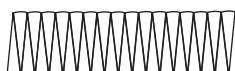


Pēhea te pūtake, te tapa roa rānei o tēnei āhua? E pātata ana ki te aha?

Koia te haurua o te paenga o te porowhita. Ko ērā tapa paku kōpiko nei, koia ngā wāhanga o te paenga o te porowhita. He haurua o ēnei wāhanga kei te tapa raro (pūtake) o te āhua, he haurua kei te tapa runga o te āhua.



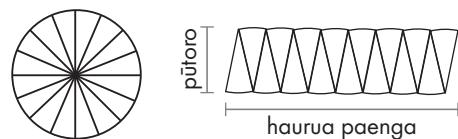
Mēnā i tapahia te porowhita ki ētahi wāhanga iti ake i te hau tekau mā ono ($\frac{1}{16}$), kātahi ka tino pātata ake te āhua nei ki te tapawhā hāngai.



Pēhea nei te tātai i te horahanga o tētahi tapawhā hāngai?

Mā te whakarea i tōna pūtake ki tōna teitei.

Nō reira hei tātai i te horahanga o tēnei āhua e pātata nei ki te tapawhā hāngai, ka whakareatia te haurua o te paenga o te porowhita ki tōna pūtoro:



$$\text{Arā te whārite: } H = \frac{1}{2} \text{paenga} \times \text{pūtoro}$$

He aha te ture hei tātai i te paenga o tētahi porowhita?

Ko te whakarea i te whitianga ki te pae (π). Arā, $P = \pi \times \text{whitianga}$.

Engari ko te whitianga, he rite ki te rearua o te pūtoro. Nō reira ka taea te ture mō te paenga porowhita te tuhi pēnei: $P = \pi \times 2 \times \text{pūtoro}$

Nō reira kia hoki tātou ki te whārite hei tātai i te horahanga o te porowhita:

$$H = \frac{1}{2} \text{paenga} \times \text{pūtoro}$$

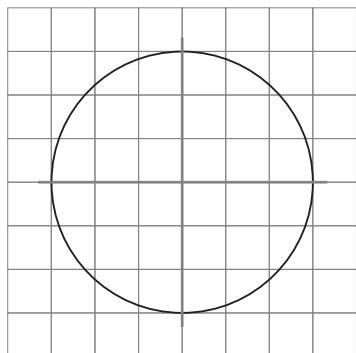
$$H = \frac{1}{2} \times (\pi \times 2 \times \text{pūtoro}) \times \text{pūtoro}$$

$$H = \pi \times \text{pūtoro} \times \text{pūtoro}$$

$$H = \pi p^2$$

Kua hua mai te ture hei tātai i te horahanga porowhita. Arā, whakareatia te pae (π) ki te pūruatanga o te pūtoro.

Aratakina ngā ākonga ki te whakamātau i te ture nei mō te tātai horahanga porowhita, kia kitea ai tōna tika.



Kia āta tirotiro mēnā e tika ana tēnei ture. Tuhia he porowhita ki te pepa tukutuku, kia 3cm te pūtoro.

Tatauria te maha o ngā mitarau pūrua kei tētahi hauwhā o te porowhita. Me āta whakatau tata ngā wāhangā mitarau pūrua. Whakareatia ki te whā, koia te whakataunga tata mō te horahanga o te porowhita.

Ināianei me whakamahi te ture hei tātai i te horahanga o te porowhita:

$$H = \pi p^2$$

$$H = \pi \times 3 \times 3$$

$$H = 28.3\text{cm}^2$$

Pēhea nei te pātata o te whakataunga tata o te horahanga me te tātaitanga?

Hoatu ētahi rapanga hei whakamahi mā ngā ākonga i te ture nei, hei tātai horahanga porowhita. Kei te Whārangī Tārua 25 ētahi hei tauira.

Te Ture hei Tātai Rōrahi Poro

1a	1e	2a	2e	3a	3e	4a	4e	5a
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E ako ana ahau ki te tikanga o te ture hei tātai i te rōrahi o tētahi poro, me te whakamahi i te ture e hāngai ana.

Rauemi

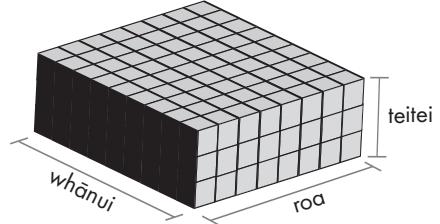
- He mitarau pūtoru
- He rūri
- Ētahi pouaka

Kupu matua

āhua ahu-3, mata, mitarau pūtoru, pūtake, roa, rōrahi, teitei, whānui

Ngā tohutohu	He tauira kōrero mā te pouako
E hoki ki te tirotiro i te tikanga o te rōrahi o tētahi pouaka.	<p>Titiro ki tēnei pouaka. He aha te ingoa pāngarau mō tōna āhua?</p> <p>Ko te poro tapawhā hāngai.</p> <p>Āe, he poro nā te mea he ūrite te āhua o ngā pito e rua, ā, he tapawhā hāngai te āhua o aua mata.</p> <p>He aha te tikanga o te rōrahi o te pouaka?</p> <p>Ko te maha o ngā mitarau pūtoru ka taea te whakauru ki te pouaka.</p>
Whakawhitihiti kōrero mō te ture hei tātai i te rōrahi o tētahi poro tapawhā hāngai.	<p>Mēnā karekau ā tātou mitarau pūtoru hei whakatakoto ki roto i te pouaka, me pēhea te tatai i tōna rōrahi?</p> <p>Mā te ine i ngā tapa.</p> <p>Āe. Mēnā ka inea te roa me te whānui o te pūtake o te pouaka, ā, ka whakareatia, koirā te horahanga o te pūtake. Koia te maha o ngā mitarau pūtoru ka taea te whakatakoto ki te paparanga tuatahi o te pouaka.</p>

Kātahi ka ineia te teitei o te pouaka, koia te maha o ngā paparanga mitarau pūtoru ka taea ki roto i te pouaka. Ka whakareatia tēnā ki te horahanga o te pūtake hei tātai i te maha katoa o ngā mitarau pūtoru ka taea te whakauru ki te pouaka.



He aha ngā mea e toru i whakareatia?

I whakareatia te roa ki te whānui hei tātai i te horahanga o te pūtake. Kātahi ka whakareatia tērā ki te teitei o te pouaka hei tātai i tōna rōrahi.

He aha tētahi tuhinga poto mō tēnā whakareatanga?

$$R = r \times wh \times t$$

Koīrā te ture hei tātai i te rōrahi o tētahi poro tapawhā hāngai.

Mēnā ka pēnei taku tuhi i te ture, e pai ana tērā?

$$R = H(p) \times t.$$

He aha ki tō whakaaro te tikanga o ngā pū i tēnei ture?

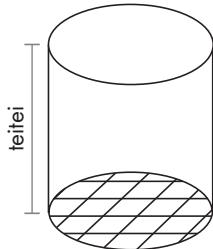
Ko te 'R' hei tohu i te rōrahi, ko te 'H(p)' mō te horahanga o te pūtake, ko te 't' mō te teitei.

Hoatu he rapanga tātai rōrahi hei whakamahi mā ngā ākonga i te ture nei. Hei tauira:

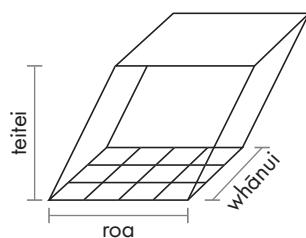
- E hia te rōrahi o tētahi pouaka wai ārani, ko te 10cm, te 8cm me te 15cm ūna tapa?
- E hia mitarau pūtoru (cm^3) te rōrahi o tētahi pouaka māti? E hia mitamano pūtoru (mm^3) te rōrahi?
- Mēnā kotahi rita te rōrahi o tētahi pouaka miraka, he ūrite tēnā ki te $1,000\text{cm}^3$. Mēnā 10cm te roa o te pūtake o te pouaka, e 6cm te whānui, e hia mitarau tōna teitei?

Hei whakawhānui

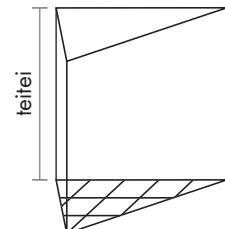
Tūhuratia ngā ture hei tātai i te rōrahi o tētahi rango me ētahi atu momo poro. Arā, ka tātaihia te horahanga o te pūtake, me te whakarea anō i tērā ki te teitei:



$$R = H(p) \times t$$



$$R = H(p) \times t$$



$$R = H(p) \times t$$

Whanaketanga 5a

Mātauranga Matua kua Mau kē

Te Tau

- te kōwhiri i te rautaki paheko tau e tino hāngai ana ki te horopaki
- te whakaawhiwhi

Te Ine

- ngā inenga tōraro mō te paemahana me ngā tātaitanga e hāngai ana
- te tuhi me te whakamāori wātaka e whakaatu ana i ngā āhuatanga matatini
- ngā tikanga o te wā-24
- te tātai takanga wā
- te whakamahi i ngā inenga me ngā ture hei tātai i te paenga me te horahanga o ngā āhua ahu-2 (pērā i te porowhita me te tapaono rite)
- te whakamahi i ngā inenga me ngā ture hei tātai i te rōrahi o ngā āhua ahu-3 (pērā i te rango me te poro tapatoru)
- te waihanga rautaki hei tātai i te horahanga me te rōrahi o ngā āhua whīwhiwhi

Mātauranga Matua hei Ako

- ngā tepe tōtika o tētahi inenga
- te ture a Pythagoras hei tātai i te tapa o tētahi tapatoru hāngai
- te waihanga rautaki whaihua, me te whakamahi ture hei tātai i ngā tapa, te horahanga, te rōrahi, ngā koki me te horahanga mata o ngā āhua whānui

He Tūhuratanga Ine

5a.1 He Papa Omaoma (wh. 167)

5a.2 Te Tawhiti o te Omaoma (wh. 168)

Rauemi kē atu e Hāngai ana

Ngā Kōwae Ako o nzmaths

- Te Whakaawhiwhi
<http://www.nzmaths.co.nz/resource/te-whakaawhiwhi>

Pukapuka

- *Te Whakamahi i te Pāngarau*, Te Pou Taki Kōrero, 1997. (wh. 79 – 88)

He Koki Tauaro

1a	1e	2a	2e	3a	3e	4a	4e	5a
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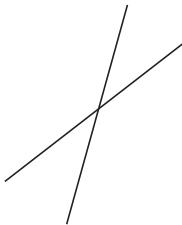
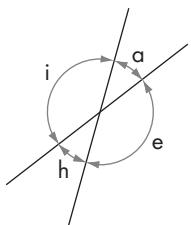
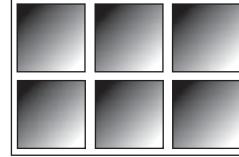
E ako ana ahau i te āhua me ngā tikanga o te koki tauaro.

Rauemi

- Whārangi Tārua 26

Kupu matua

koki tauaro, koki whakarārangī, rārangī pūtahi

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Hoatu te Whārangi Tārua 26, ka whakawhitiwhiti kōrero ai mō ngā koki ka hua mai i ētahi rārangī pūtahi.</p>  <p>E hia ngā koki ka hua mai i ngā rārangī pūtahi e rua nei? E whā.</p> <p>Tuhia ētahi rārangī pūtahi e rua ki tō pukapuka, ka tohu ai i ngā koki e whā.</p>  <p>He aha ētahi kōrero mō ngā koki e whā nei?</p> <p>Ko te 360 putu te tapeke o ngā koki e whā, nā te mea he hurihangā kotahi. He koki whakarārangī te 'a' me te 'e' nā te mea e noho ana ki te rārangī torotika. E whā katoa ngā koki whakarārangī takirua: te 'a' me te 'e', te 'e' me te 'h', te 'h' me te 'i', te 'i' me te 'a'.</p>	<p>Titiro ki te Whārangi Tārua 26. E rua ngā rārangī e whakaaturia ana, ko te pū 'X' te āhua. He aha te kupu pāngarau mō ētahi rārangī pēnei?</p> <p>He rārangī pūtahi.</p> <p>Āe, e rua ngā rārangī torotika, ā, e tūtaki ana ngā rārangī ki te pūwāhi kotahi, koia i kīa ai he rārangī pūtahi. Kimihia he rārangī pūtahi i te taiao o te akomanga. He aha ētahi tauira? Ko ngā paetapa o ngā matapihi tētahi.</p> 

Ki tō titiro, he aha ētahi koki ūrite?

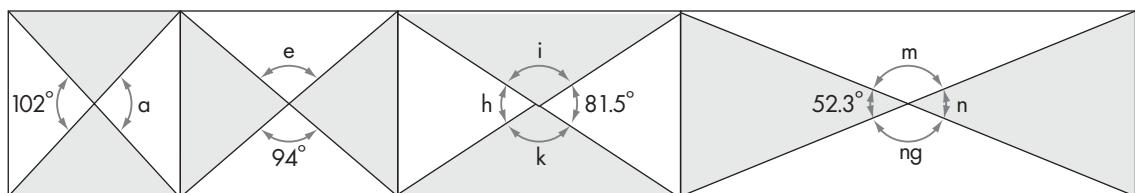
Ki tā te karu titiro, he ūrite te ‘a’ me te ‘h’. He ūrite hoki te ‘i’ me te ‘e’.

Me pēhea te whakamātau i tā te karu titiro?

Mā te tapahi i tētahi o ngā koki, me te whakatakoto i te tapahanga ki runga i te koki tuarua. Kātahi ka kitea mēnā he ūrite pū.

Kei te Whārangi Tārua 26 ētahi koki tauaro hei whiriwhiri mā ngā ākonga.

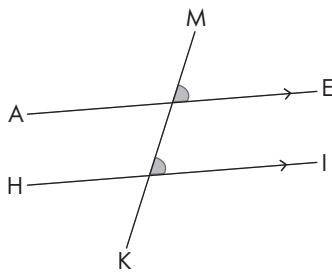
Kei te hanga papariki a Rangiora, he tapatoru te āhua. Ina whakaemia ngā papariki tapatoru nei, he tapawhā hāngai ka hua mai. E hia putu te rahi o ngā koki e tohua ana?



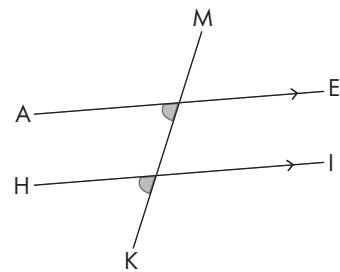
Hei whakawhānui

Kia pēnei anō te arataki i ngā ākonga ki te tūhura i ēnei momo koki takirua ka hua mai i ngā rārangī whakarara me te rārangī whakawhiti:

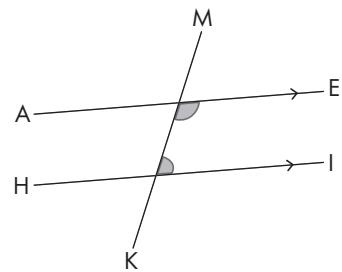
He ūrite te rahi o ngā koki taurite:



He ūrite te rahi o ngā koki tauwhiti:



Ko te 180 putu te tapeke o ngā koki tauroto:



Te Ture a Pythagoras

1a	1e	2a	2e	3a	3e	4a	4e	5a
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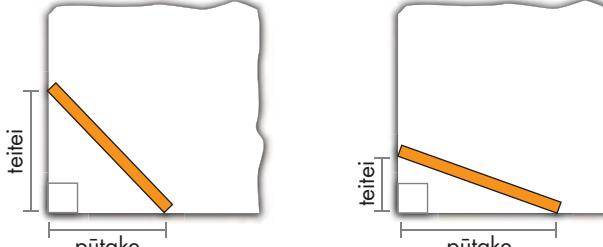
E ako ana ahau ki te whakamahi i te ture a Pythagoras hei tātai i ngā tapa o tētahi tapatoru.

Rauemi

- Whārangi Tārua 27

Kupu matua

pūrua, pūtake, tapa poto, tapatoru hāngai, tāroa, teitei

Ngā tohutohu	He tauira kōrero mā te pouako																								
<p>Aratakina ngā ākonga kia tūhura i te ture a Pythagoras.</p> <p>Ka whakamahia te koki hāngai o tētahi whārangi, me ētahi rākau Ātaarangi mō te tāroa hei hanga tapatoru.</p> <p>Ka tuhia ngā inenga ki tētahi tūtohi, me te whakawhitiwhiti kōrero mō te tauira e kitea mai ana.</p>	<p>Whakatakotoria tētahi rākau karaka ki te kokonga o tō whārangi hei hanga i tētahi tapatoru hāngai. Ko te kokonga o te whārangi te koki hāngai. Ko tēhea te tapa roa?</p> <p>Ko te rākau karaka te tapa roa o te tapatoru.</p> <p>Āe, ka kīia tērā ko te tāroa o te tapatoru. Tohua mai te pūtake me te teitei o te tapatoru. Ka kīia ērā ko ngā tapa poto. I ētahi o ngā tapatoru, he roa ake te teitei i te pūtake. I ētahi anō, he roa ake te pūtake.</p>  <p>He rerekē te āhua o ā koutou tapatoru hāngai, engari katoa ngā tapatoru, ko te 10 mitarau te tāroa. He rerekē te roa o ngā tapa poto, arā te pūtake me te teitei. Inea ngā tapa poto o tō tapatoru hāngai, ka tuhi ai.</p> <p>Kia tuhia ngā inenga o ngā tapatoru katoa ki tētahi tūtohi i te papa tuhutuhi.</p> <table border="1"> <thead> <tr> <th>Te tapatoru a ...</th> <th>pūtake</th> <th>teitei</th> <th>tāroa</th> </tr> </thead> <tbody> <tr> <td>Hinewai</td> <td></td> <td></td> <td>10cm</td> </tr> <tr> <td>Manahi</td> <td></td> <td></td> <td>10cm</td> </tr> <tr> <td>Rongopai</td> <td></td> <td></td> <td>10cm</td> </tr> <tr> <td>Raukura</td> <td></td> <td></td> <td>10cm</td> </tr> <tr> <td>...</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Te tapatoru a ...	pūtake	teitei	tāroa	Hinewai			10cm	Manahi			10cm	Rongopai			10cm	Raukura			10cm	...			
Te tapatoru a ...	pūtake	teitei	tāroa																						
Hinewai			10cm																						
Manahi			10cm																						
Rongopai			10cm																						
Raukura			10cm																						
...																									

Ko tā tātou mahi ināianei, he tāpiri atu i ētahi anō pou ki te tūtohi. E tūhuratia ana te hononga o ngā tapa poto me te tāroa. Ko tētahi o ngā pou hei tuhi i te pūruatanga o te pūtake, ko tētahi ko te pūruatanga o te teitei, ko tētahi ko te tapeke o ēnei pou e rua (whakaawhiwhia ki te kotahi e pātata ana), ā, ko tētahi ko te pūruatanga o te tāroa.

Te tapatoru a ...	pūtake	teitei	tāroa	$pūtake^2$	$teitei^2$	$pūtake^2 + teitei^2$	$tāroa^2$
Hinewai			10cm				100
Manahi			10cm				100
Rongopai			10cm				100
Raukura			10cm				100
...							100

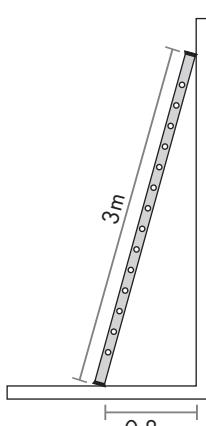
He aha te tauira e kitea mai ana i te tūtohi?

He ūrite ngā pou whakamutunga e rua, arā te tapeke o te pūruatanga o te pūtake me te teitei o te tapatoru, me te pūruatanga o te tāroa.

Koia. Koia rā te ture i kitea tuatahitia e Pythagoras, tētahi tohunga pāngarau nō te whenua o Kiriki, i mua i te whānautanga o Ihu Karaiti (570 – 495 BC).

Ko tā tana ture e mea ana, ahakoa te āhua o tētahi tapatoru hāngai, he ūrite te tapeke o te pūruatanga o ngā tapa poto me te pūruatanga o te tāroa. Hei tuhinga poto mō te ture:

$$tp^2 + tp^2 = tr^2 \quad (tp = \text{tapa poto}, tr = \text{tāroa})$$

Kia pērā anō te mahi mō ētahi atu tāroa, kia kitea ai te pono o te ture.	Ināianei me whakamahi tētahi atu o ngā rākau Ātaarangi hei hanga tapatoru hāngai. Tuhia ngā inenga me ngā pūruatanga ki tētahi tūtohi. Kei te tika te ture a Pythagoras?
Tuhia te rapanga nei ki te papa tuhituhi, ka whakawhitiwhiti kōrero ai mō te rautaki hei whakaoti:	<p>He aha te mahi tuatahi hei whakaoti i tēnei rapanga?</p> <p>Me tuhi pikitia i te tuatahi, me te whakaatu anō i ngā kōrero e whaitake ana ki te pikitia.</p> 

E whiriwhiri ana tātou i te teitei o te arawhata i te pakitara. He aha te mahi?

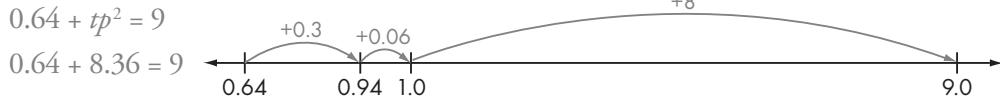
Nā te mea he tapatoru hāngai, e tika ana kia whakamahia te ture a Pythagoras. Arā, $tp^2 + tp^2 = tr^2$. Ko te 0.8 tētahi o ngā tapa poto, ko te 3 te tāroa. Me whakauru ērā ki te ture:

$$tp^2 + tp^2 = tr^2$$

$$0.8^2 + tp^2 = 3^2$$

$$0.64 + tp^2 = 9$$

$$0.64 + 8.36 = 9$$



$$\text{Nō reira, } tp^2 = 8.36$$

$$tp = \sqrt{8.36} = 2.89 \text{ (mā te tātaitai, kia 2 ngā mati ā-ira)}$$

Kei te Whārangī Tārua 27 ētahi atu rapanga hei whakaoti.

Ngā Tepe o te Tōtika

1a	1e	2a	2e	3a	3e	4a	4e	5a
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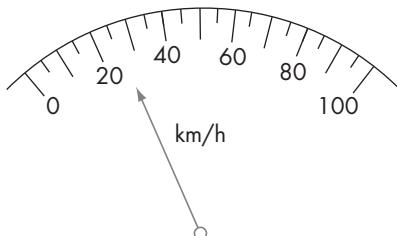
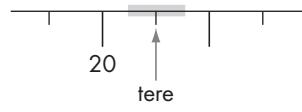
E ako ana ahau ki te whakaatu i ngā tepe o te tōtika o tētahi inenga.

Rauemi

- Whārangi Tārua 28

Kupu matua

tepe o te tōtika

Ngā tohutohu	He tauira kōrero mā te pouako
<p>Tirohia te āwhata tuatahi kei te Whārangi Tārua 28, ka arataki ai i ngā ākonga kia mārama ki tēnei mea, ngā tepe o te tōtika.</p>  <p>Ko te 25km/h.</p>	<p>Titiro ki te āwhata tuatahi e whakaaturia ana ki te Whārangi Tārua 28. He ine-tere tēnei o roto i tētahi motukā. He aha te tikanga o ngā hahae roa o te āwhata?</p> <p>E whakaatu ana i ia tekau manomita i te haora (ia 10km/h).</p> <p>He aha te tikanga o ngā hahae poto o te āwhata?</p> <p>Kei waenganui pū ērā i ia tekau manomita i te haora, nō reira e whakaatu ana ērā i ia rima manomita i te haora (ia 5km/h).</p> <p>He aha te inenga e whakaaturia ana?</p> <p>Ko te 25km/h.</p> <p>Kia whakawhitihiti kōrero tātou mō te tōtika o te inenga 25km/h. Kia tuhia te whakarahinga o tērā wāhangā o te āwhata o te ine-tere ki te papa tuhuhu. He aha te tikanga o ngā hahae e whakaaturia ana?</p> <p>Ko te 15km/h te hahae poto tuatahi, ko te 20km/h te hahae roa tuatahi, ko te 25km/h te hahae poto tuarua, ko te 30km/h te hahae roa tuarua, ko te 35km/h te hahae poto whakamutunga.</p>  <p>Ko te 20km/h me te 30km/h ngā inenga kei ia taha o te 25km/h. Kua kaurukutia tētahi rohe ki ia taha o te 25km/h. He aha ki ō whakaaro te tikanga o tēnā rohe?</p> <p>Koia rā ngā inenga e pātata ake ana ki te 25, i ngā inenga kei ia taha (arā, te 20 me te 30).</p> <p>He aha ngā inenga e hāngai ana ki ia pito o te rohe kauruku?</p> <p>Ko te 22.5 me te 27.5. Koia rā ngā inenga kei waenganui pū i te 20 me te 25, kei waenganui pū hoki i te 25 me te 30.</p>

	<p>Ka kīia ērā ko ngā tepe o te tōtika o tēnei inenga. Mō tēnei āwhata, mēnā ka kīia ko te 25km/h te tere e whakaaturia ana, ko te tikanga, kei waenganui i te 22.5km/h me te 27.5km/h. E ai ki tēnei āwhata, kāore he take o tētahi inenga tōtika atu i tērā. Ko te inenga pū kei waenganui i ngā tepe o te tōtika (arā, kei waenganui i te 22.5 me te 27.5), ā, ka whakaawhiwhia ki te 25km/h.</p>
Whakawhitihiti kōrero mō te tohu hei whakaatu i te tōtika o tētahi inenga.	<p>Mēnā ka pēnei taku tuhi i te inenga nei: $25\text{km/h} \pm 2.5\text{km/h}$, he aha ki tōu whakaaro te tikanga o te tohu?</p> <p>Koirā ngā pito, ngā tepe, ngā paenga rānei o te rohe kauruku i te āwhata whakarahi. Ko te tikanga e mea ana ko te inenga pū kei waenganui i te $25 - 2.5$, me te $25 + 2.5$, arā, te 22.5 me te 27.5.</p> <p>Koia nei te whakahua tika i te inenga $25\text{km/h} \pm 2.5\text{km/h}$: Ko te rua tekau mā rima manomita i te haora, rua ira rima ki runga, ki raro rānei.</p>
Kia pērā anō te whiriwhiri i ētahi atu inenga. Kei te Whārangi Tārua 28 ētahi atu āwhata hei tirotiro.	
<p>Hei whakawhānui</p> <p>Whakawhitihiti kōrero mō te tōtika o ētahi inenga tau nui, pēnei i ēnei:</p> <ul style="list-style-type: none"> • 17,100,000km² te horahanga o te whenua o Rūhia • 384,000km te tawhiti mai i a Papatūānuku ki te Marama • 18,300km te tawhiti mai i Tāmakimakaurau ki Rānana • Kei te takiwā o te 36,000kg te taumaha o tētahi taraka nui. 	

Wāhanga 4

Ngā Whārangi Tārua*



Koinei ngā Whārangi Tārua e hāngai ana ki ngā ngohe whakaako o roto i te Wahanga 3 o tēnei pukapuka. Whakamahia he kutikuti hei tapahi i ngā rārangi iraira o ngā Whārangi Tārua.

Mata ki te Mata 1

Te Ine
Whārangi Tārua 1



te roa o tētahi pene

**te whānui
o te rākau karaka**

**te mātotoru
o te rākau kōwhai**

Te Ine

Whārangi Tārua 1

Te Ine

Whārangi Tārua 1

Te Ine

Whārangi Tārua 1

**te roa o te
rākau kahurangi**

**te whānui
o te mata rorohiko**

**te whānui
o te matapihi**

Te Ine

Whārangi Tārua 1

Te Ine

Whārangi Tārua 1

Te Ine

Whārangi Tārua 1

**te roa
o te akomanga**

**te teitei
o te akomanga**

**te whānui
o te akomanga**

Te Ine

Whārangi Tārua 1

Te Ine

Whārangi Tārua 1

Te Ine

Whārangi Tārua 1

te roa o te tēpu

te teitei o te tēpu

te whānui o te tēpu

Te Ine

Whārangi Tārua 1

Te Ine

Whārangi Tārua 1

Te Ine

Whārangi Tārua 1

**te mātotoru
o tētahi pouaka**

**te whānui
o tētahi pouaka**

**te roa o tētahi
pānui whakaahua**

Te Ine

Whārangi Tārua 1

Te Ine

Whārangi Tārua 1

Te Ine

Whārangi Tārua 1

te roa o te kāpata

**te whānui
o te kāpata**

**te mātotoru o tētahi
kōpae rorohiko**

Te Ine

Whārangi Tārua 1

Te Ine

Whārangi Tārua 1

Te Ine

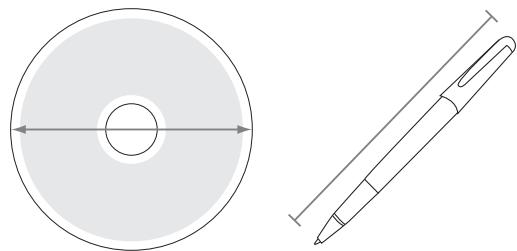
Whārangi Tārua 1

Mata ki te Mata 2

Te Ine
Whārangi Tārua 2



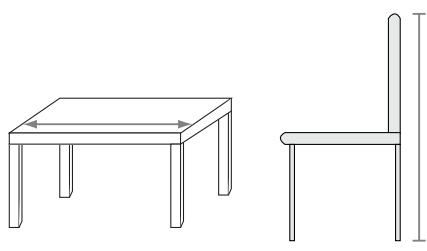
Ko tēhea te mea roa rawa?



Te Ine

Whārangi Tārua 2

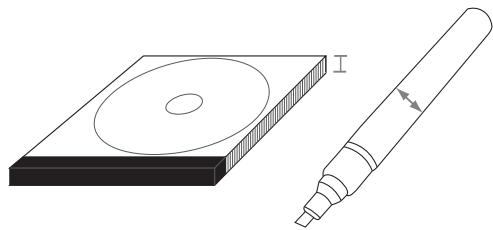
Ko tēhea te mea roa rawa?



Te Ine

Whārangi Tārua 2

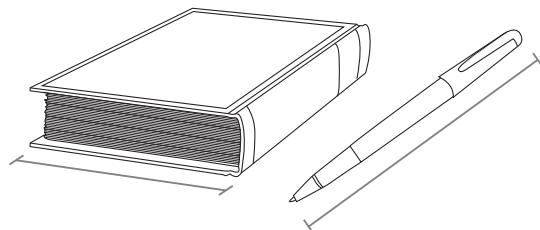
Ko tēhea te mea roa rawa?



Te Ine

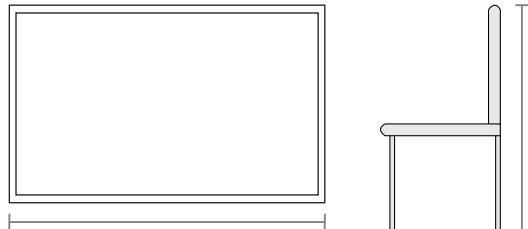
Whārangi Tārua 2

Ko tēhea te mea roa rawa?



Whārangi Tārua 2

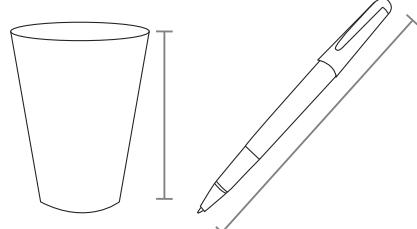
Ko tēhea te mea roa rawa?



Te Ine

Whārangi Tārua 2

Ko tēhea te mea roa rawa?



Whārangi Tārua 2

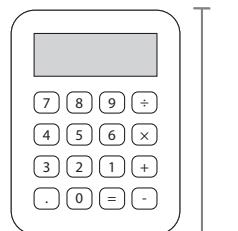
Ko tēhea te mea roa rawa?



Te Ine

Whārangi Tārua 2

Ko tēhea te mea roa rawa?



Te Ine

Whārangi Tārua 2

Te Aho hei Whakatairite i te Roa

Te Ine
Whārangī Tārua 3



Ko tēhea te mea roa rawa?

- te whānui o te akomanga
- te roa o tētahi motukā

Ko tēhea te mea roa rawa?

- te whānui o te matapihi
- te teitei o te tūru

Te Ine

Whārangī Tārua 3

Te Ine

Whārangī Tārua 3

Ko tēhea te mea roa rawa?

- te roa o te tēpu
- te roa o te pouako

Ko tēhea te mea roa rawa?

- te roa o te tēpu
- te teitei o te kūaha

Te Ine

Whārangī Tārua 3

Te Ine

Whārangī Tārua 3

Ko tēhea te mea roa rawa?

- te teitei o te tēpu
- te whānui o te matapihi

Ko tēhea te mea roa rawa?

- te teitei o te kapu
- te paenga huri amio i te kapu

Te Ine

Whārangī Tārua 3

Te Ine

Whārangī Tārua 3

Ko tēhea te mea roa rawa?

- huri amio i te poiwhana
- te teitei o te tūru

Ko tēhea te mea roa rawa?

- huri amio i te poi tēnehi
- te whānui o tētahi pukapuka

Te Ine

Whārangī Tārua 3

Te Ine

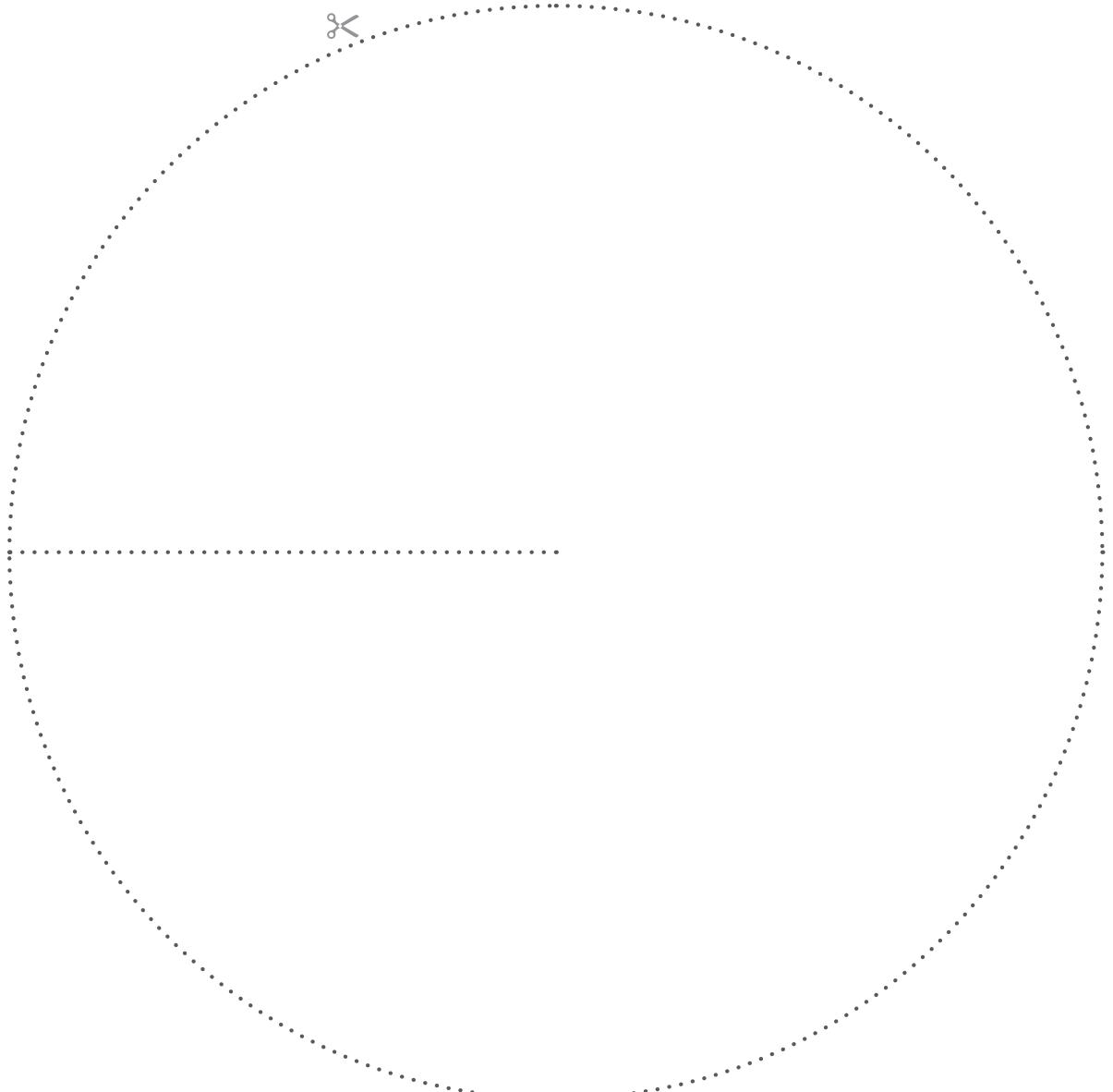
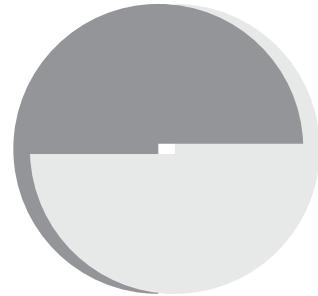
Whārangī Tārua 3

1. Whakamahia he rākau māwhero hei ine i ngā ngaku takirua nei.
 - E hia rākau māwhero te roa ake o tētahi ngaku i tētahi?
 - Tuhia he whārite tāpiritanga hei whakaatu i te roa ake o tētahi ngaku i tētahi.

2. E hoki ki te ine anō i ngā ngaku takirua o runga nei.
 - E hia rākau whero te roa ake o tētahi ngaku i tētahi?
 - Tuhia he whārite tāpiritanga hei whakaatu i te roa ake o tētahi ngaku i tētahi.
3. Whakamahia he rākau maota hei ine i te roa me te whānui o tō pukapuka.
 - E hia rākau maota te roa ake o tō pukapuka i te whānui?
 - Tuhia he whārite tāpiritanga hei whakaatu i te nui ake o te roa i te whānui.
4. Whakamahia he rākau karaka hei ine i te roa me te whānui o tō tēpu.
 - E hia rākau karaka te roa ake o te tēpu i tōna whānui?
 - Tuhia he whārite tāpiritanga hei whakaatu i te nui ake o te roa i te whānui.
5. Tirohia tō akomanga, ka whakaaro ai i ētahi mea e rua hei ine māu.
 - Whakamahia he rākau hei ine i te roa o ēnei mea e rua.
 - E hia te roa ake o tētahi i tētahi?
 - Tuhia he pikitia me te whārite tāpiritanga hei whakaatu i tō mahi.

He Porowhitia Hurihuri

Whakaahuangia kia rua o ēnei porowhitia ki te pepa mārō, ka tapahi ai (me te tapahi anō i te rārangī pūtoro). Kia rerekē te tae o tēnā porowhitia o tēnā. Kuhuna te rārangī pūtoro o tētahi ki te rārangī pūtoro o tētahi hei hanga i te taputapu nei, te Porowhitia Hurihuri.



Te Whakatairite Waeine

Te Ine
Whārangī Tārua 6

Whakamahia he rākau Ātaarangi hei ine i te roa o ēnei ngaku kiwikiwi. Me whakatau tata i te tuatahi. Tuhia ngā inenga ki te tūtohi.

--

Te pātai	Te whakataunga tata	Te inenga
E hia rākau whero te roa o te ngaku?		
E hia rākau māwhero te roa o te ngaku?		
E hia rākau kākāriki te roa o te ngaku?		
E hia rākau parauri te roa o te ngaku?		

--

Te pātai	Te whakataunga tata	Te inenga
E hia rākau whero te roa o te ngaku?		
E hia rākau māwhero te roa o te ngaku?		
E hia rākau kākāriki te roa o te ngaku?		

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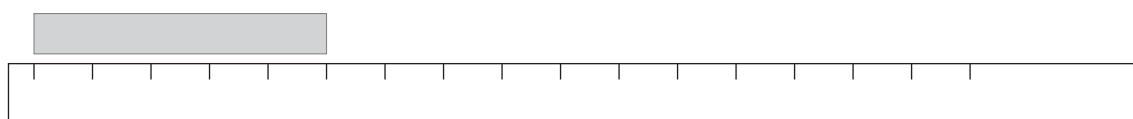
Te pātai	Te whakataunga tata	Te inenga
E hia rākau karaka te roa o te ngaku?		
E hia rākau kōwhai te roa o te ngaku?		
E hia rākau whero te roa o te ngaku?		

--

Te pātai	Te whakataunga tata	Te inenga
E hia rākau māwhero te roa o te ngaku?		
E hia rākau whero te roa o te ngaku?		
E hia rākau parauri te roa o te ngaku?		

Kua whakatakotoria he rūri ki te taha o ēnei ngaku kiwikiwi. Māu e tuhi te roa e tika ana.

1.



2.



3.



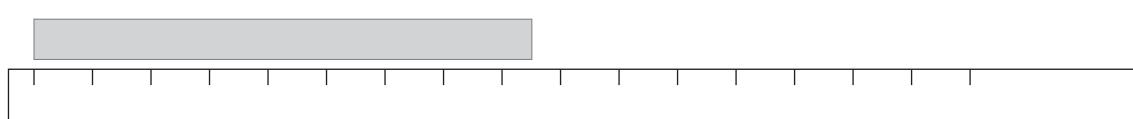
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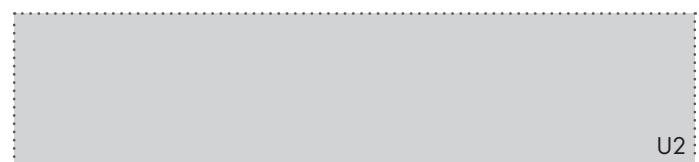
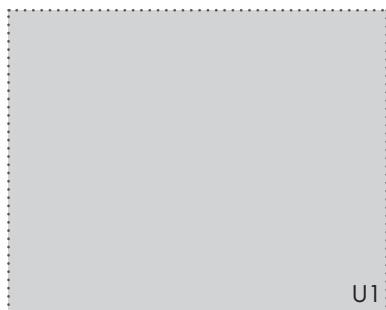
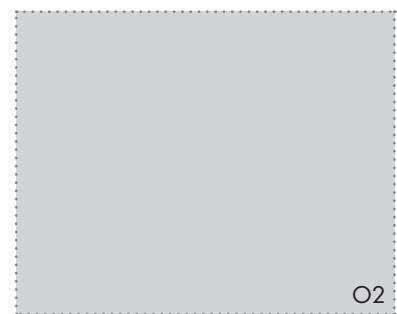
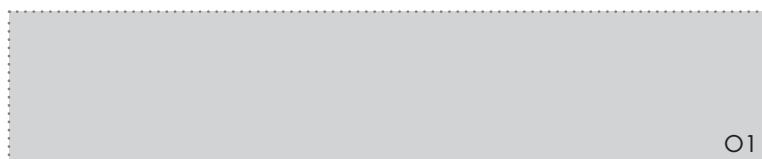
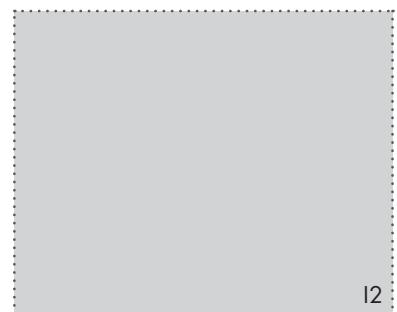
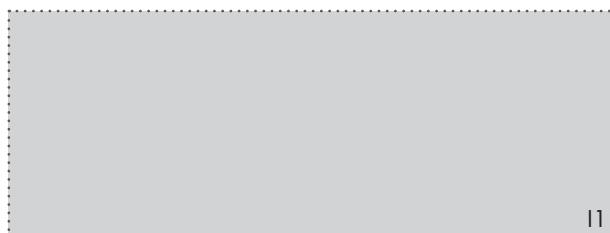
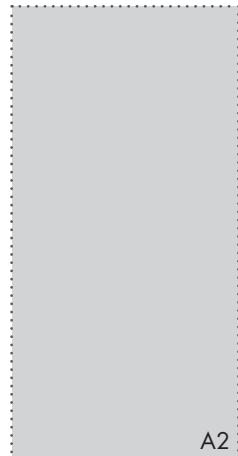


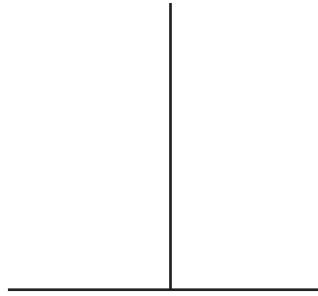
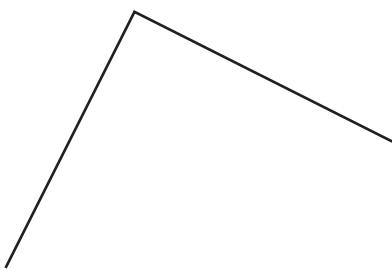
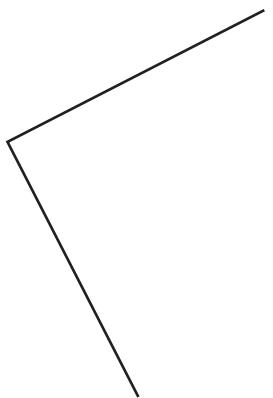
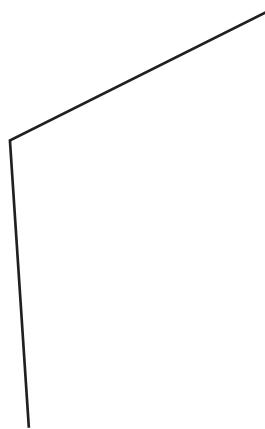
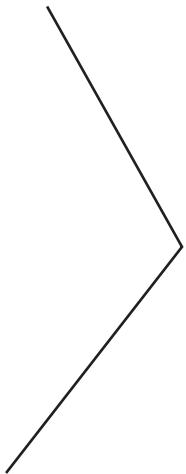
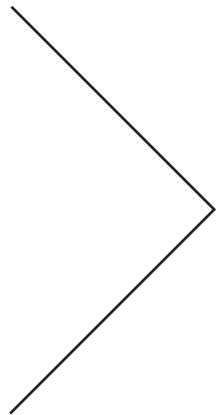
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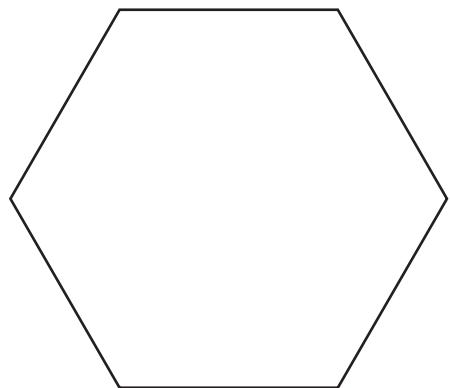
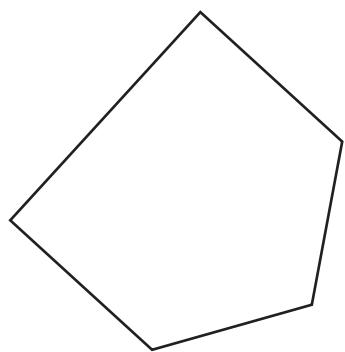
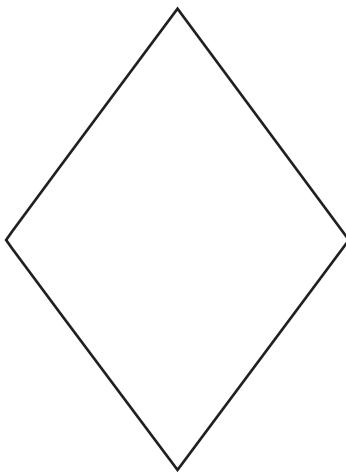
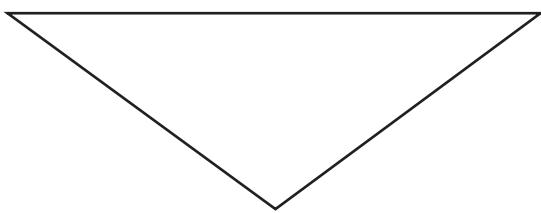
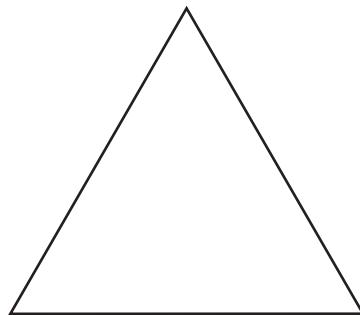
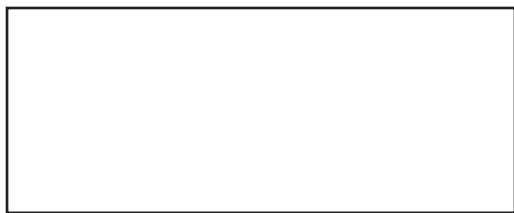


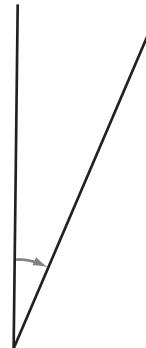
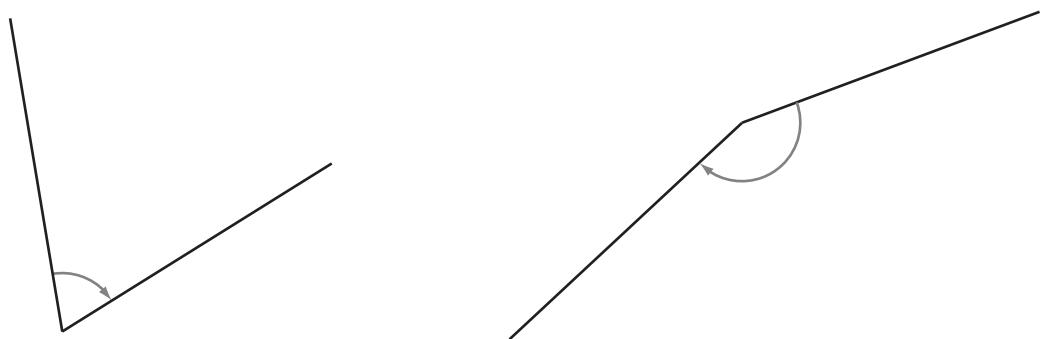
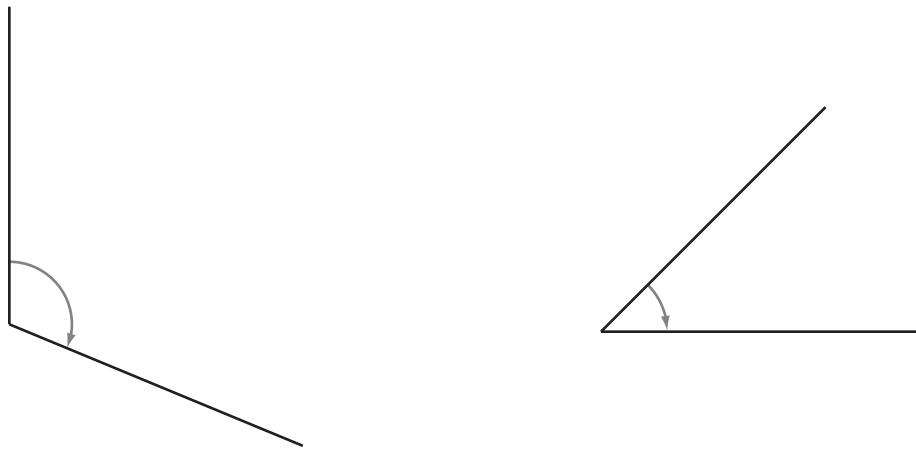
6.







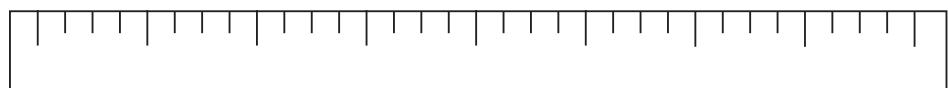
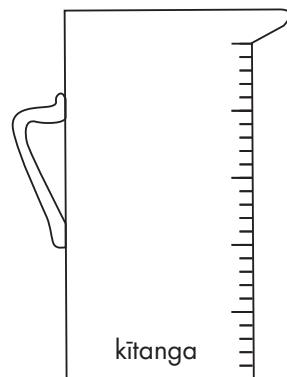
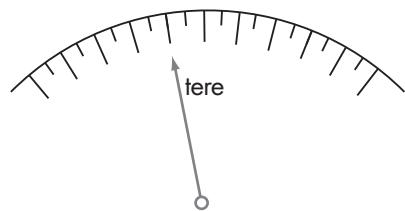
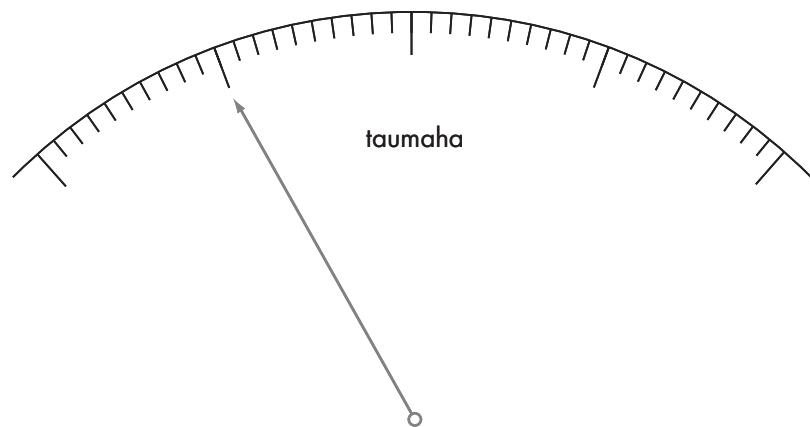


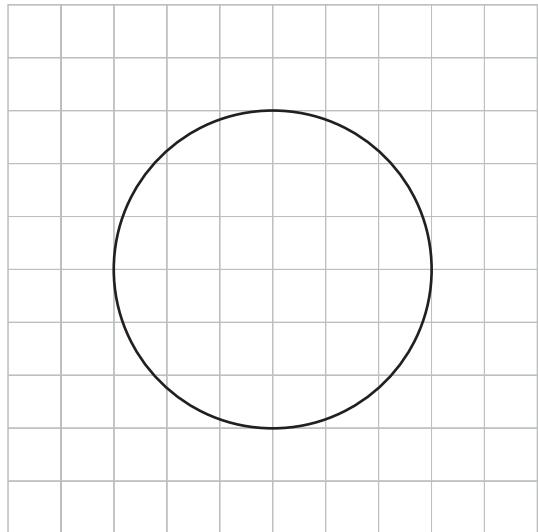
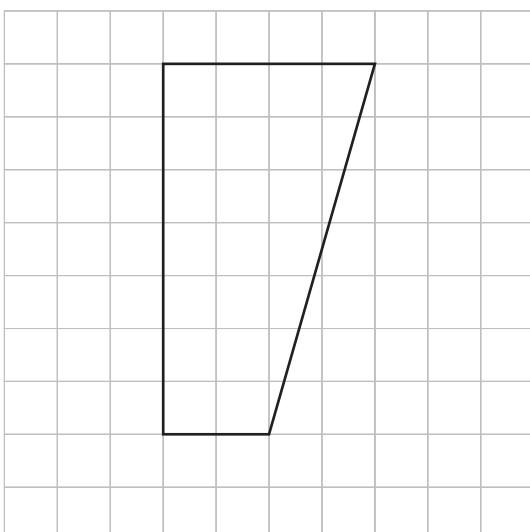
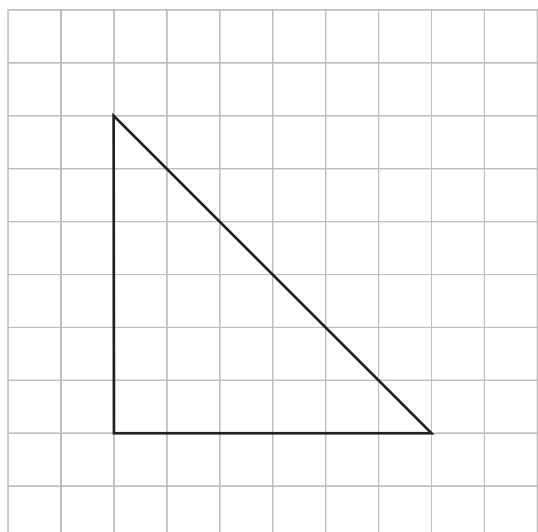
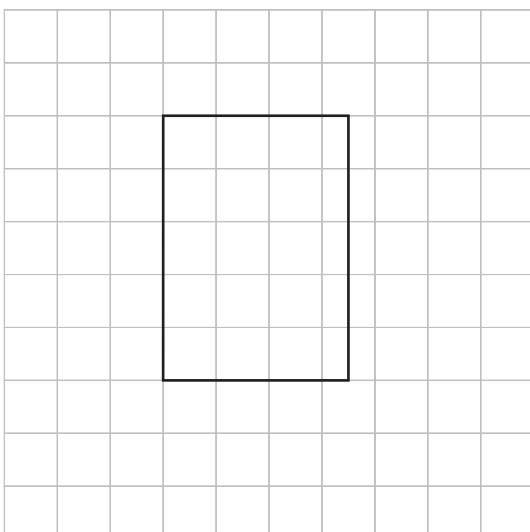
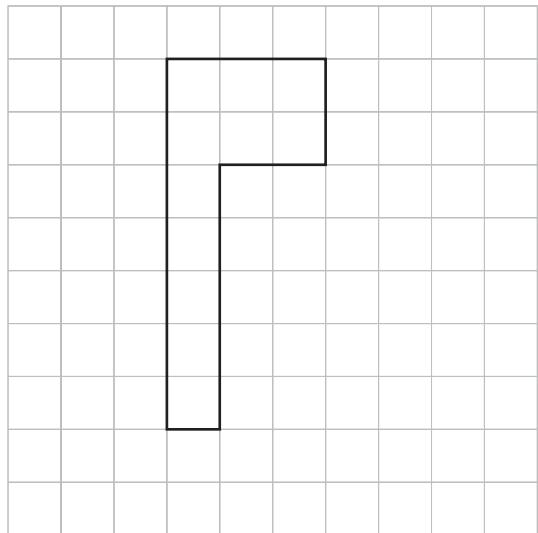
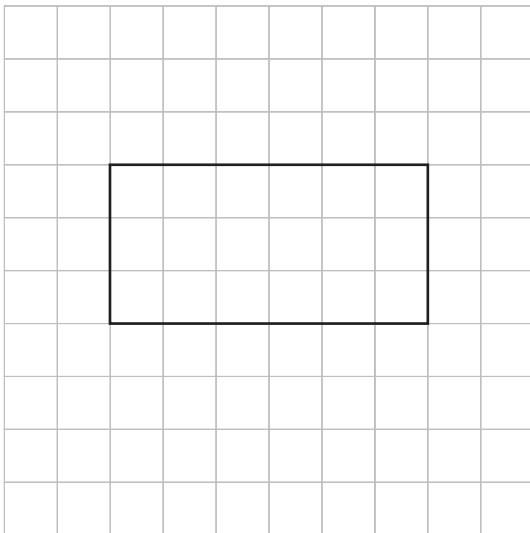


Te Pānui Āwhata 1

Te Ine
Whārangi Tārua 12

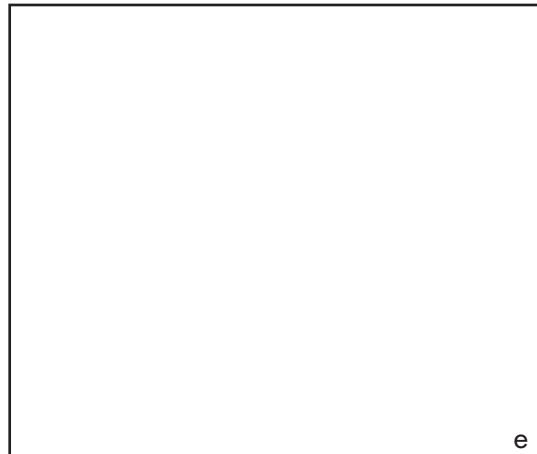
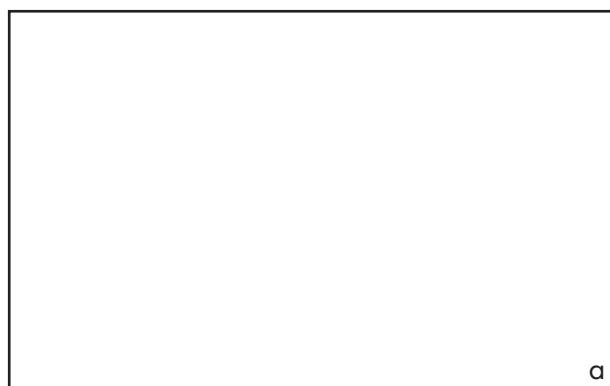
A large rectangular frame with a dotted border, designed for handwriting practice. It contains a series of vertical lines and horizontal dashed lines for letter height and placement.A large rectangular frame with a dotted border, designed for handwriting practice. It contains a series of vertical lines and horizontal dashed lines for letter height and placement.A large rectangular frame with a dotted border, designed for handwriting practice. It contains a series of vertical lines and horizontal dashed lines for letter height and placement.A large rectangular frame with a dotted border, designed for handwriting practice. It contains a series of vertical lines and horizontal dashed lines for letter height and placement.A large rectangular frame with a dotted border, designed for handwriting practice. It contains a series of vertical lines and horizontal dashed lines for letter height and placement.A large rectangular frame with a dotted border, designed for handwriting practice. It contains a series of vertical lines and horizontal dashed lines for letter height and placement.A large rectangular frame with a dotted border, designed for handwriting practice. It contains a series of vertical lines and horizontal dashed lines for letter height and placement.

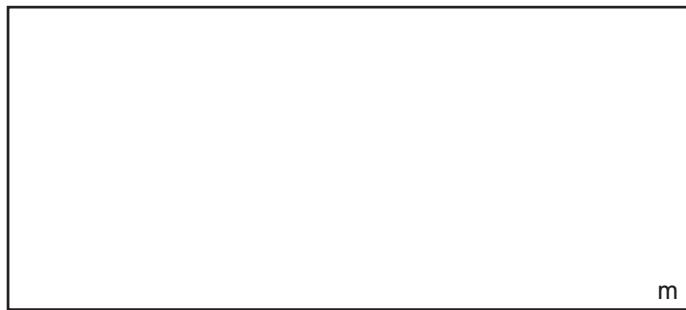
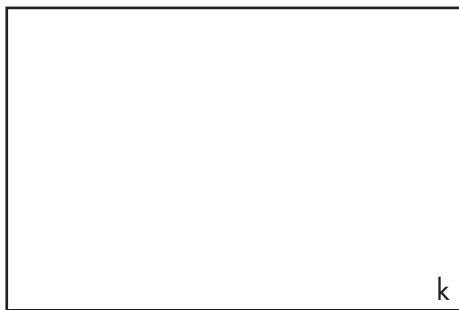
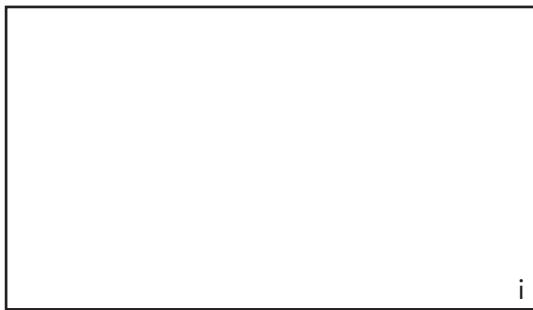
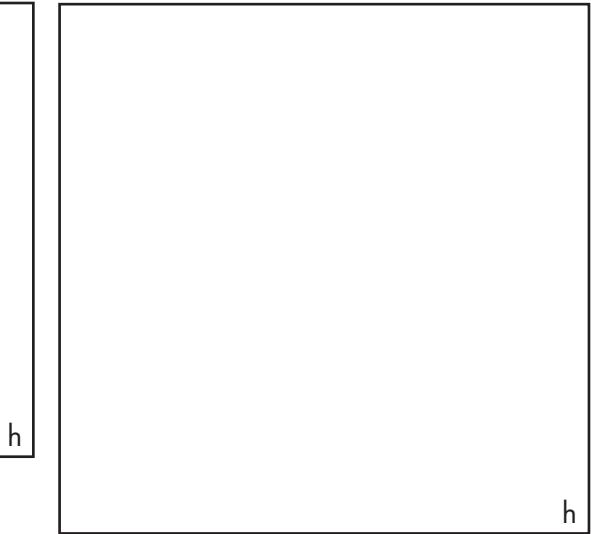
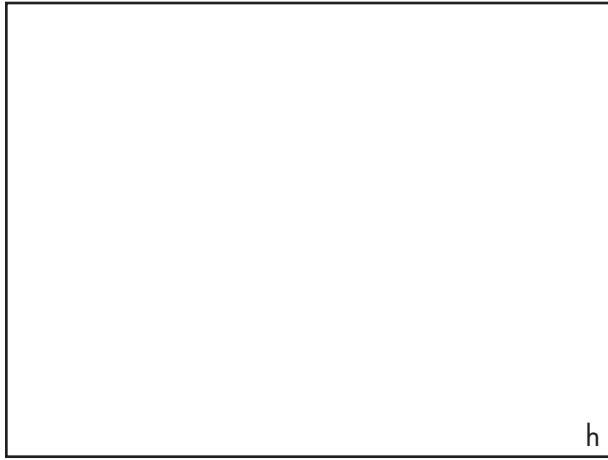


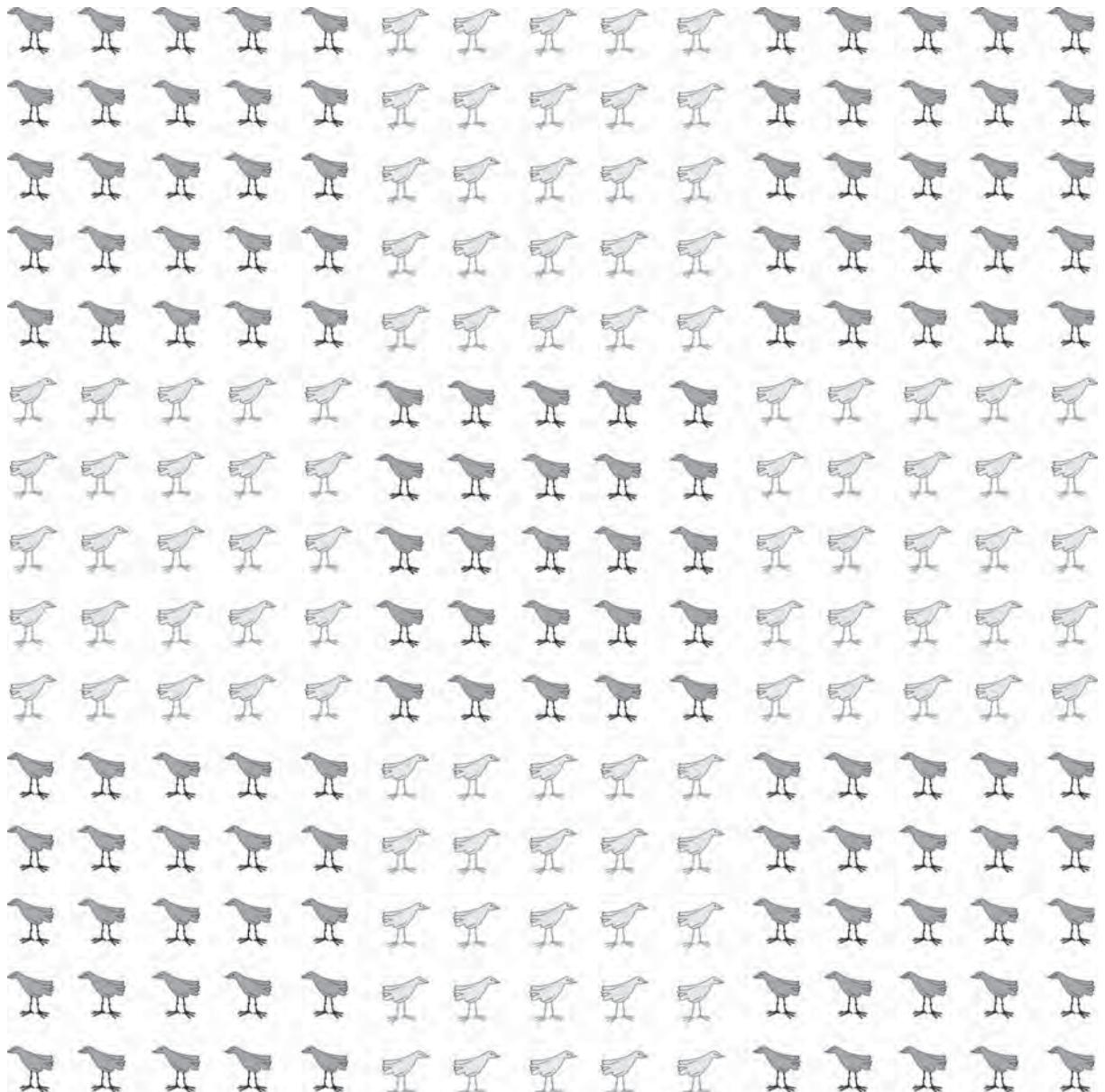


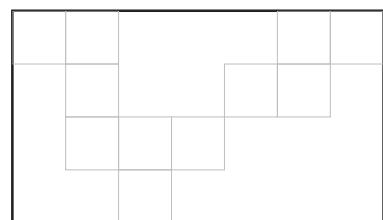
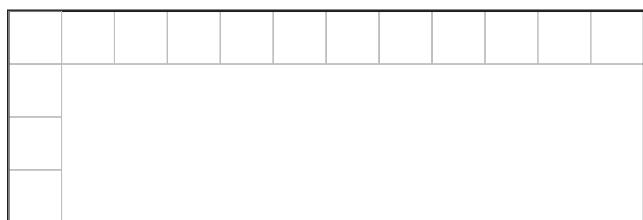
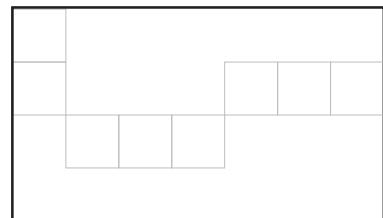
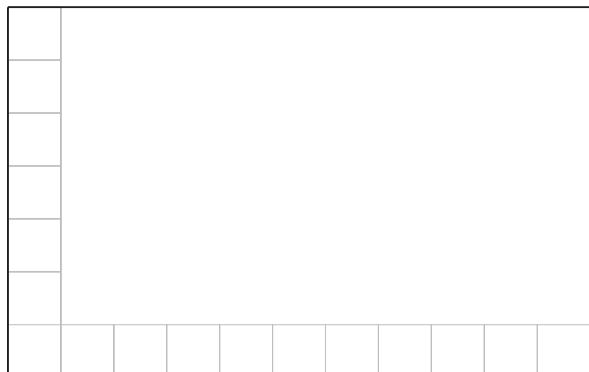
Ko Tēhea te Horahanga Nui?

Te Ihe
Whārangī Tārua 15





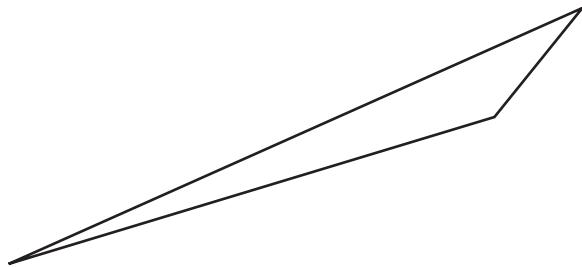
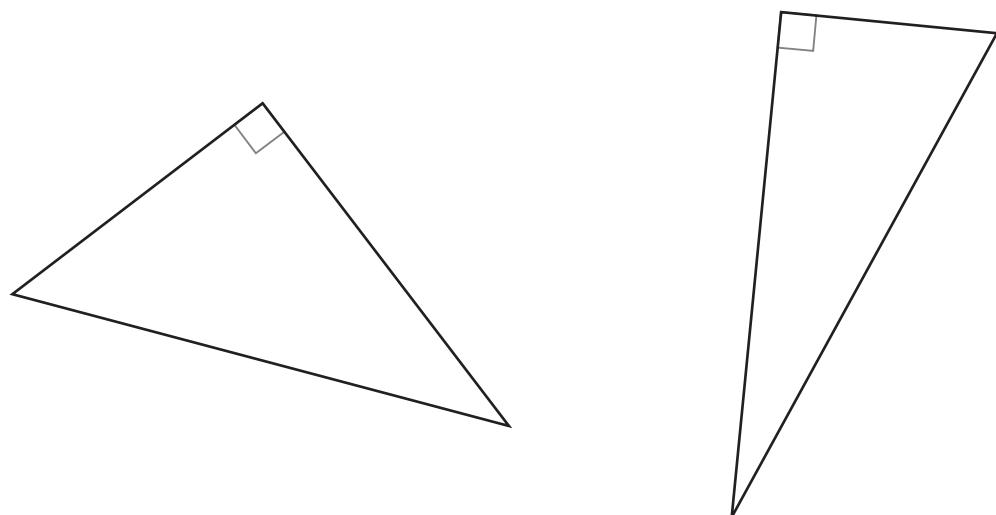
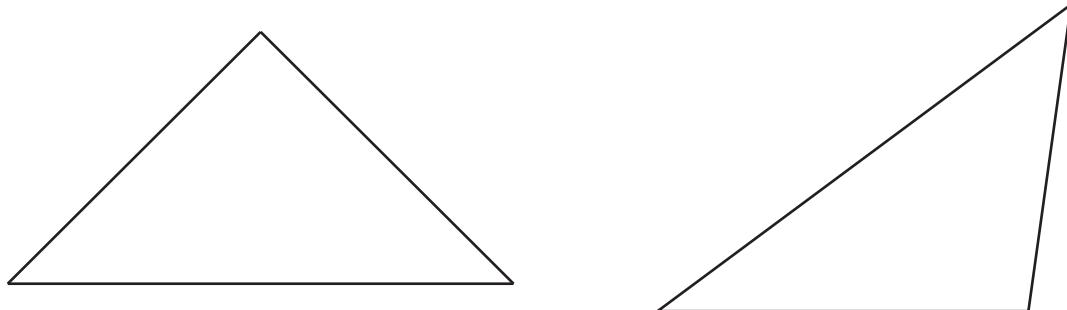




Tautohua te pūtake me te teitei o ēnei tapatoru.

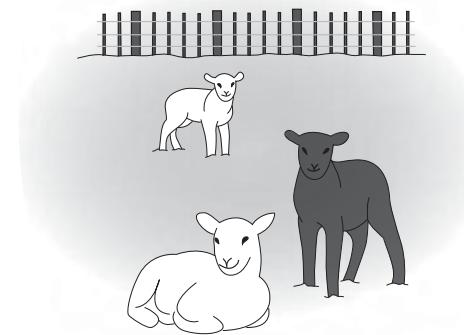
Inea te pūtake me te teitei o ngā tapatoru, ka tuhi ai ki te tapatoru.

Tātaihia te horahanga o ngā tapatoru.

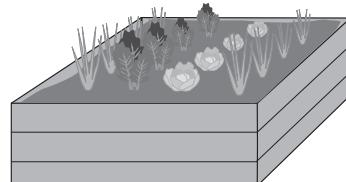


He Rapanga Tapawhā Whakarara

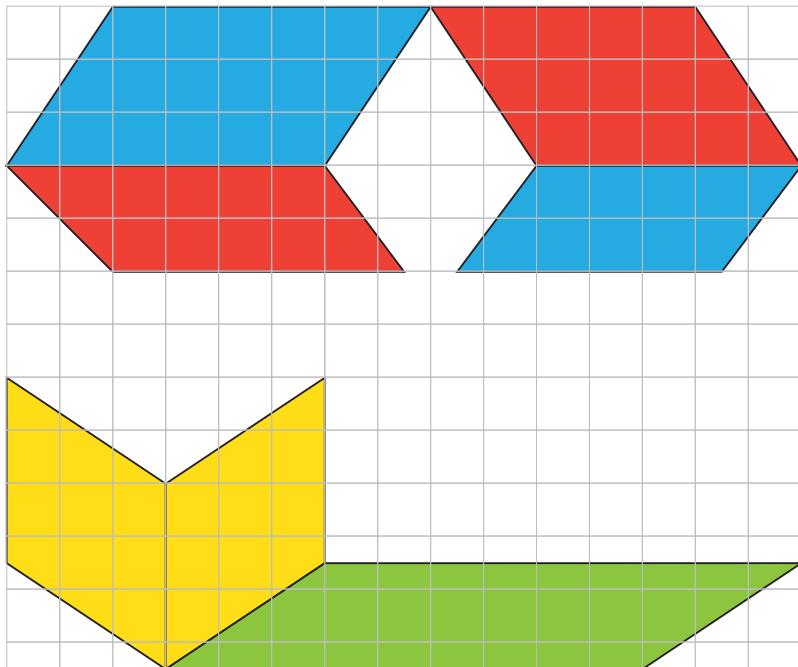
1. He tapawhā whakarara tētahi o ngā pātiki i te pāmu o Horomona. E 30 mita te roa o tētahi o ngā tapa roa. 15 mita te tawhiti mai i tētahi o ngā tapa roa ki tētahi.
 - a. Tuhia te āhua o te pātiki me ngā inenga.
 - e. E hia mita pūrua te horahanga o te pātiki?
 - h. E ai ki ngā tohutohu me ruirui te 750g whakahaumako ki ia mita pūrua o te pātiki.
E hia te whakahaumako hei ruirui mā Horomona ki tēnei o āna pātiki?



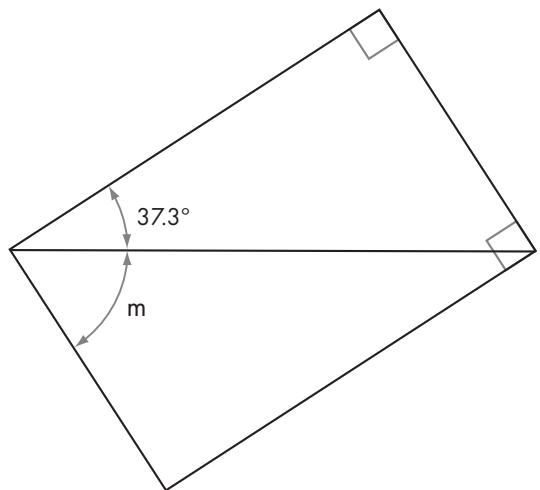
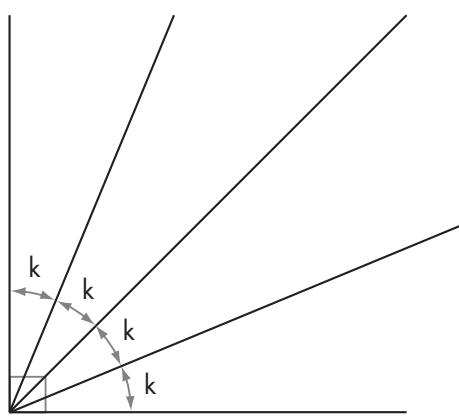
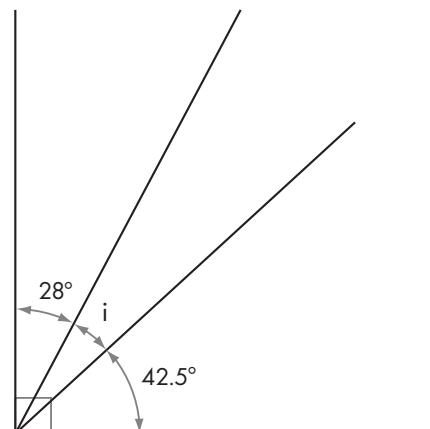
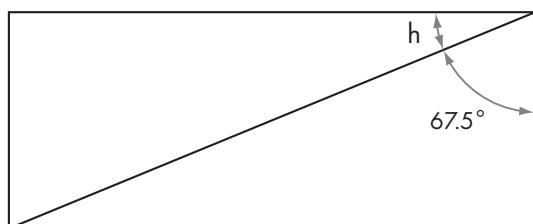
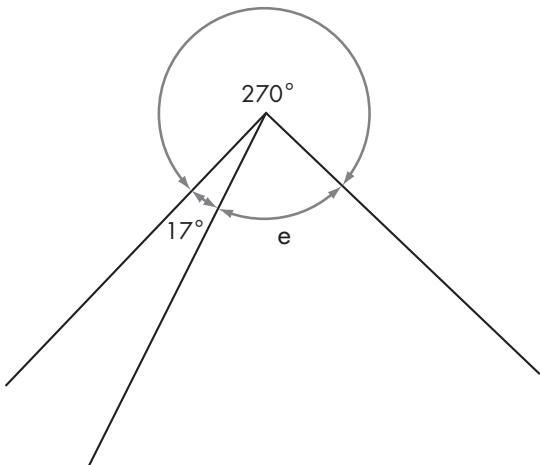
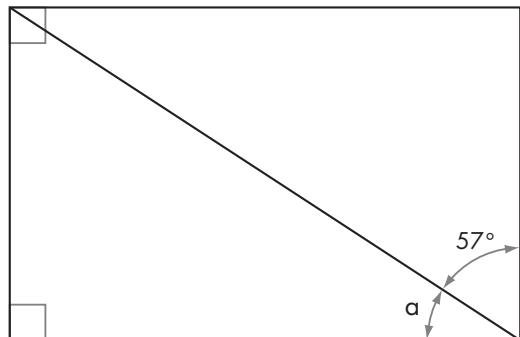
2. He tapawhā whakarara te āhua o ngā matapihi o tētahi whare. 1.5 mita te roa o te pūtake o ēnei matapihi, 0.75 mita te teitei.
 - a. Tuhia te āhua o tētahi o ngā matapihi me ngā inenga.
 - e. E hia mita pūrua te horahanga o te matapihi?
 - h. Mēnā e 5 ngā matapihi pēnei, e hia te horahanga o te kōata (karāhe) hei whakauru ki ēnei matapihi katoa?
 - i. Mēnā \$150 te utu ā-mita pūrua mō te kōata, e hia te utu hei hoko i te kōata mō ēnei matapihi e rima?
3. He tapawhā whakarara te āhua o te māra rewa e hangaia ana e Maioha mā. E 36m² te horahanga o te māra, ā, e 4.5m te roa o te pūtake.
 - a. E hia mita te teitei o te tapawhā whakarara o te māra?
 - e. Tuhia te āhua o te māra me ngā inenga.

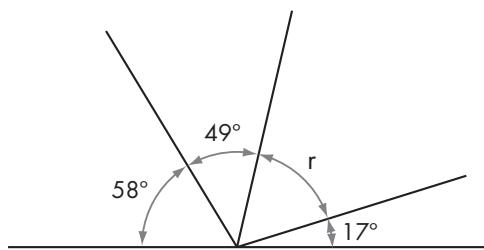
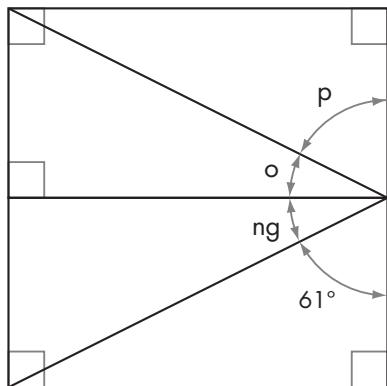
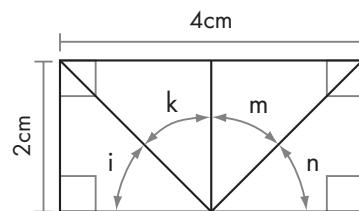
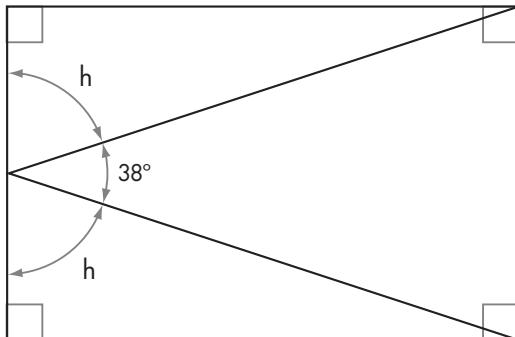
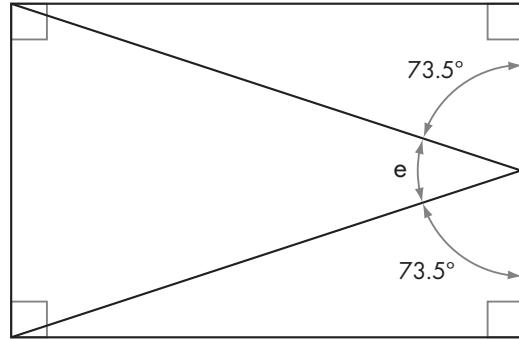
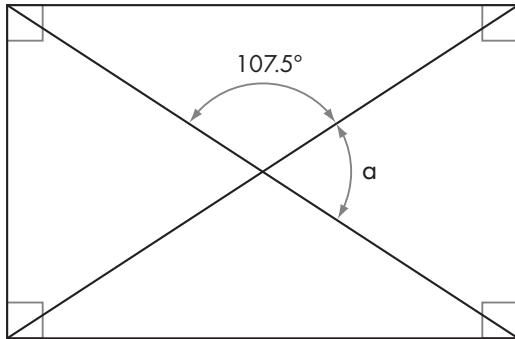


4. E pēnei ana te tauira o ngā papariki kua whakatakotoria ki tētahi papa:



- a. Tātaihia te horahanga o te wāhanga kōwhai o te papa.
- e. Tātaihia te horahanga o te wāhanga kākāriki o te papa.
- h. Tātaihia te horahanga o te wāhanga whero o te papa.
- i. Tātaihia te horahanga o te wāhanga kahurangi o te papa.





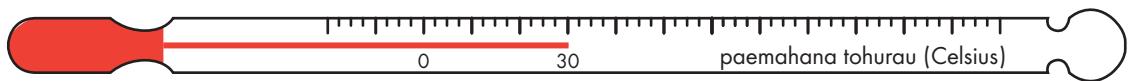
Wātaka Pahi – Ngāmotu ki Tāmakimakaurau

	Taenga	Wehenga
Ngāmotu		7:40 am
Waitara	7:59 am	8:00 am
Urenui	8:14 am	8:15 am
Tongaporutu	8:29 am	8:30 am
Mōkau	8:59 am	9:00 am
Awakino	9:09 am	9:10 am
Piopio	9:39 am	9:40 am
Te Kuiti	10:00 am	10:30 am
Otorohanga	10:49 am	10:50 am
Kihikihi	10:59 am	11:00 am
Te Awamutu	11:09 am	11:10 am
Kirikiriroa	11:45 am	11:55 am
Ngāruawahia	12:14 pm	12:15 pm
Rāhui Pōkeka	12:24 pm	12:25 pm
Rangiriri	12:34 pm	12:35 pm
Manukau	1:29 pm	1:30 pm
Tāmakimakaurau	1:50 pm	

Wātaka Waka Whakawhiti i Te Moana o Raukawa

Te Whanganui-a-Tara ki Waikawa	
Wehenga	Taenga
2.25am	5.25am
8.25am	11.35am
10.25am	1.35pm
2.05pm	5.10pm
6.25pm	9.25pm

Waikawa ki Te Whanganui-a-Tara	
Wehenga	Taenga
6.25am	9.25am
10.05am	1.15pm
1.10pm	4.20pm
2.25pm	5.25pm
6.05pm	9.15pm
10.25pm	1.25am



Tohua ngā paemahana o ēnei āhuatanga ki te wāhi tika i te ine-mahana i runga nei:

- a. he kapu tī e whai miraka ana
- e. he kapu tī kore miraka
- h. he toka hāngi
- i. te wai wera o te whare
- k. he rangi tino makariri i te papa reti huka o Maunga Ruapehu
- m. he rangi mahana i Tūranga-nui-a-Kiwa
- n. te wai mātao o te whare
- ng. te wai i te puna kaukau o te kura/tāone

Koia nei ngā paemahana o ētahi tāone o Aotearoa i tētahi rangi i te marama o Hōngongoi:

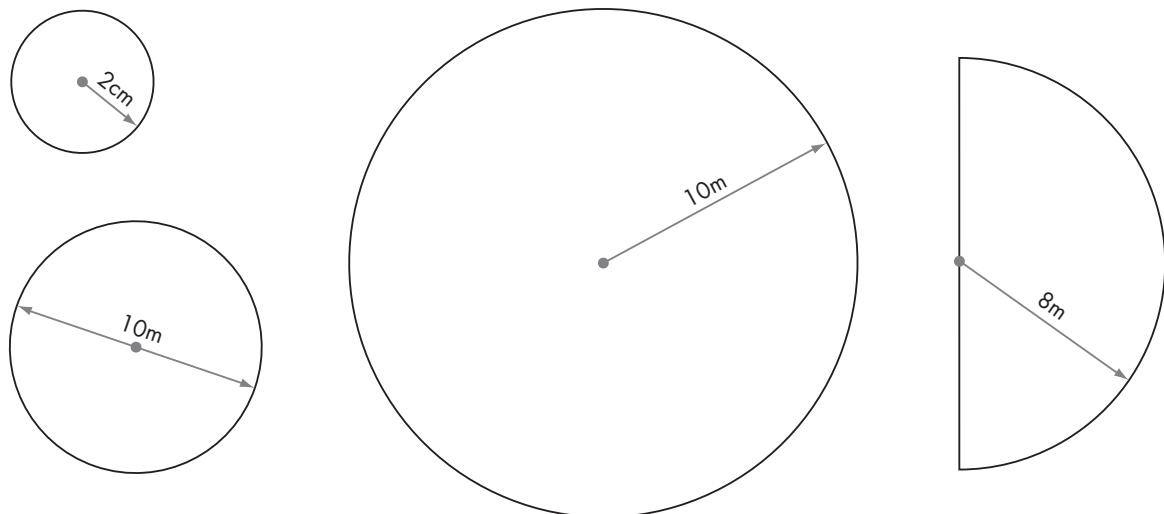
Tāone	Paemahana mōrahi	Paemahana mōkito	Te inenga whānui o ngā paemahana
Kaikohe	23°	12°	11°
Whakatāne	19°	7°	12°
Papaioea	12°	2°	
Waiouru	4°	-5°	
Whakaoriori		-5°	16°
Te Anau		-8.5°	11°
Murihiku	4°		9.25°
Rakiura	2.7°		13°

Ētahi Paemahana

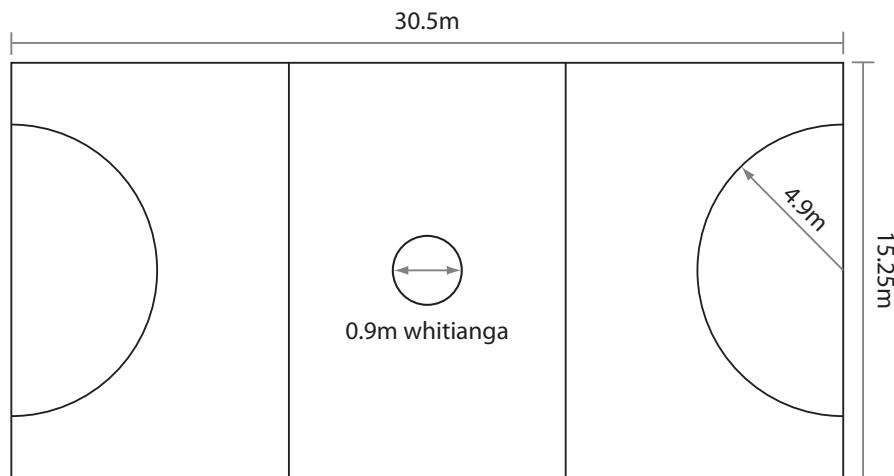
Te paemahana o te wāhi wera rawa atu i te mata o Papatūānuku	57°
Te paemahana o te wāhi mātao rawa atu i te mata o Papatūānuku	-88°
Te pae rewā o te kōura (Au)	1,064°
Te pae rewā o te rino (Fe)	1,811°
Te pae rewā o te haumāmā (He)	-259.14°
Te pae rewā o te hauota (N)	-209.86°

- E hia putu te rerekē o te paemahana o te wāhi wera rawa atu i te mata o Papatūānuku me te paemahana o te wāhi mātao rawa atu?
- E hia putu te rerekē o te pae rewā o te haumāmā (He) me te kōura (Au)?
- E hia putu te rerekē o te pae rewā o te hauota (N) me te rino (Fe)?
- E hia putu te rerekē o te pae rewā o te haumāmā (He) me te hauota (N)?
- Mēnā 14.07° te rerekē o te pae rewā me te pae koropupū o te hauota (N), tātaihia te pae koropupū.

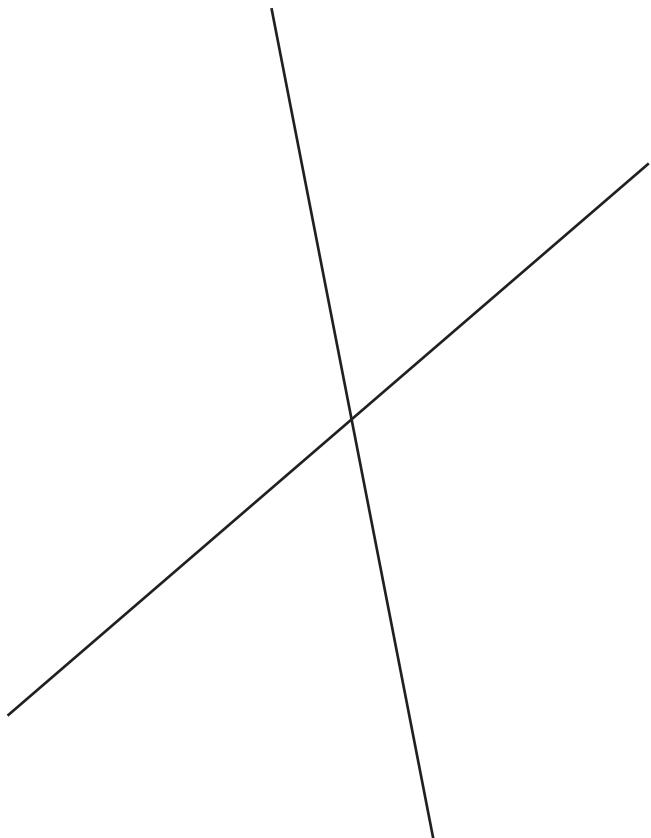
1. Tātaihia te horahanga o ēnei porowhita.



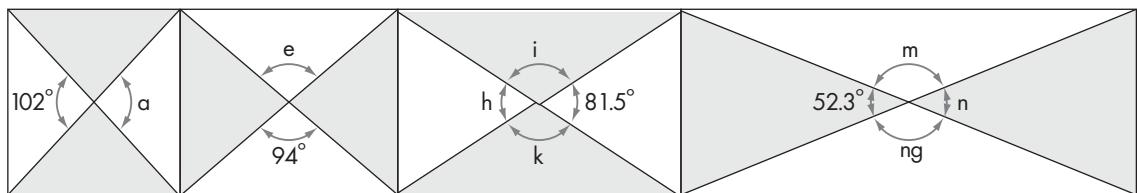
2. Ko te 4.9m te pūtoro o te porowhita tuku ūhangā o te papa tākaro poitarawhiti. Ko te whitianga o te porowhita pū, ko te 0.9 mita. Tātaihia te horahahanga o ēnei wāhi e rua o te papa tākaro poitarawhiti.



3. Ko te 3.6m te whitianga o te porowhita pū o te papa tākaro poutūkohu. Tātaihia te horahanga o tēnei porowhita.
4. Ko te 9.15 mita te pūtoro o te porowhita pū o te papa tākaro poiwhana. Tātaihia te horahanga.

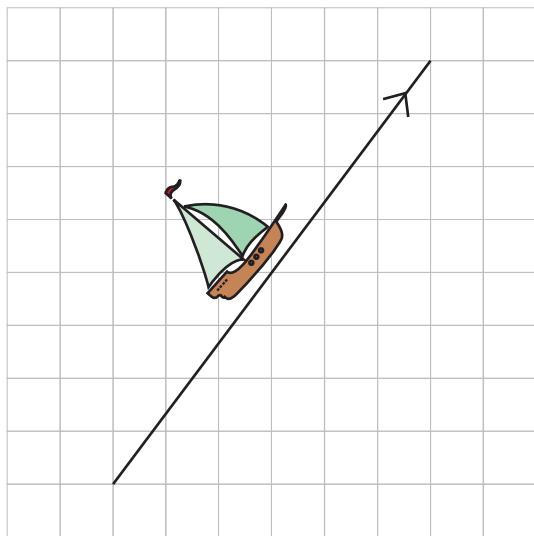


Whiriwhiria te rahi o ngā koki e tohua ana:

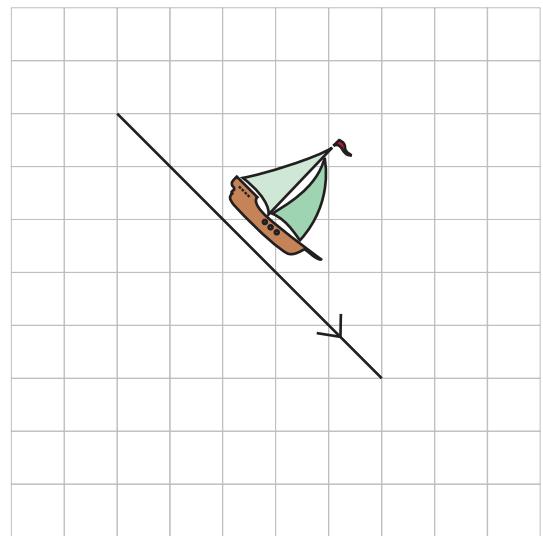


E whakaaturia ana ki te pepa tukutuku nei ētahi haerenga torotika o tētahi waka. Kotahi manomita (1km) te tawhiti e tohua ana e ia wāhanga o te pepa tukutuku. Tātaihia te tawhiti o te haere o ngā waka.

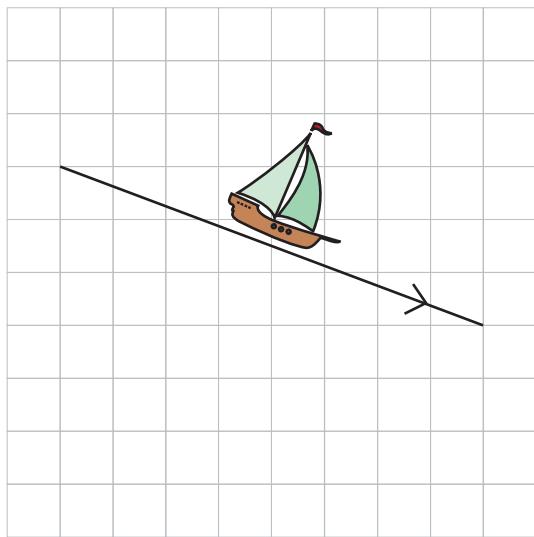
1.



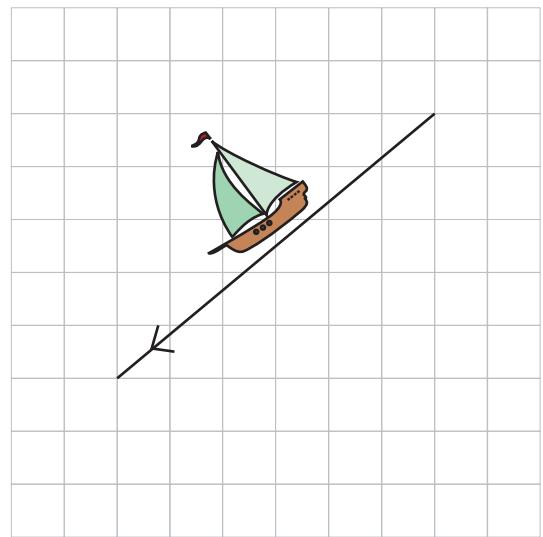
2.



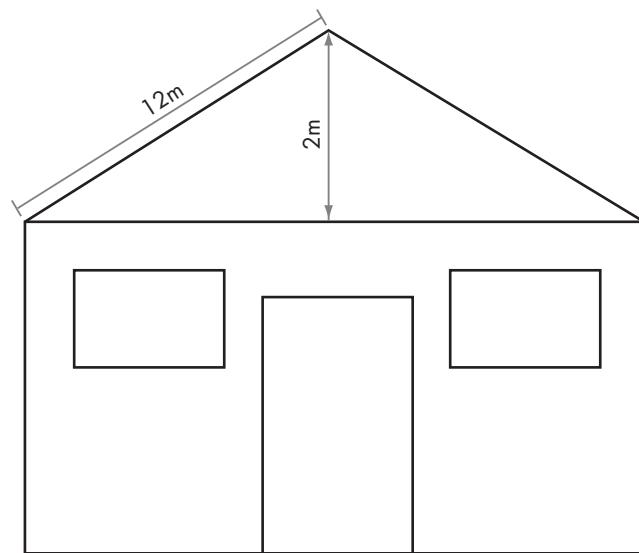
3.



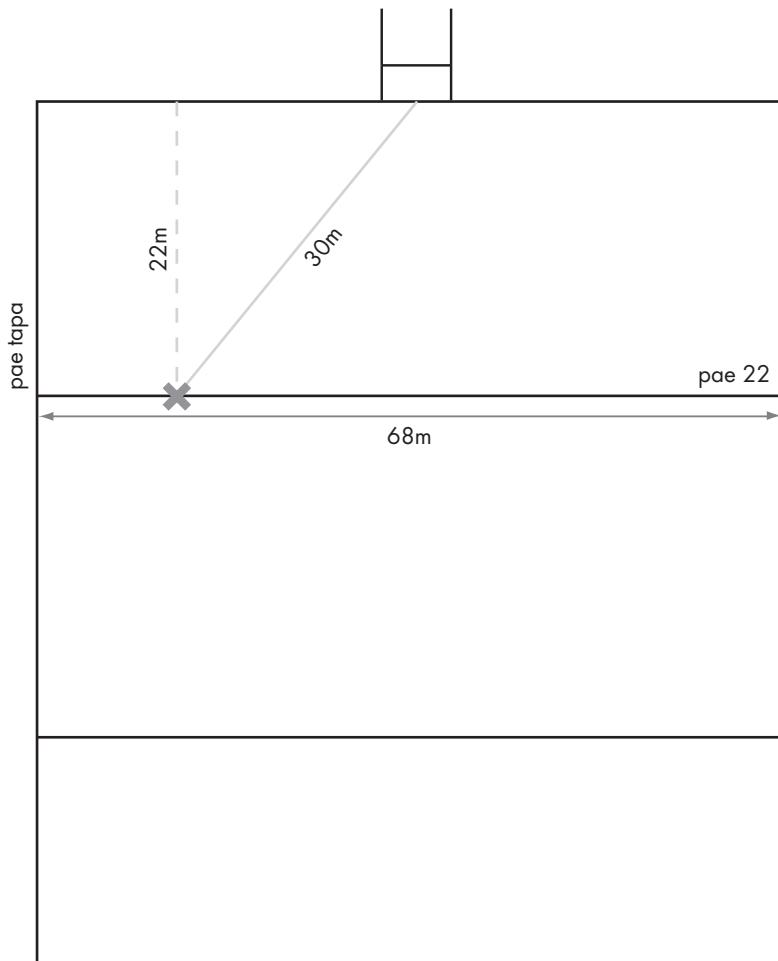
4.

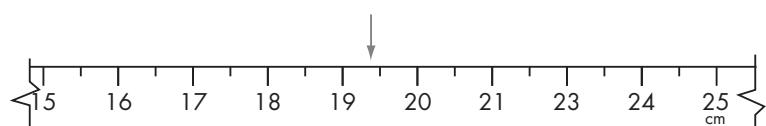
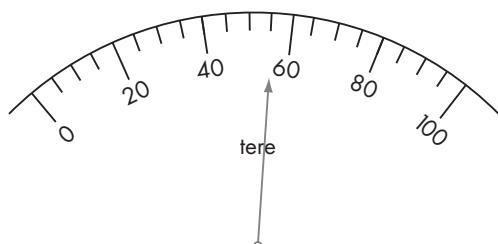
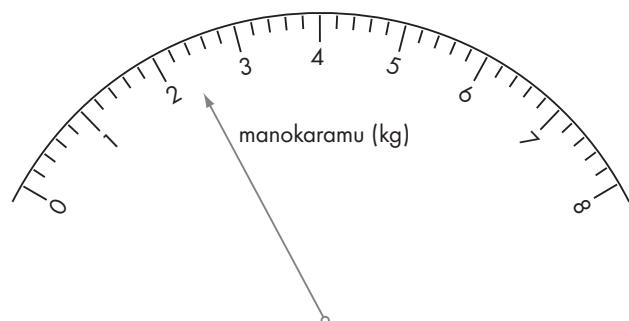
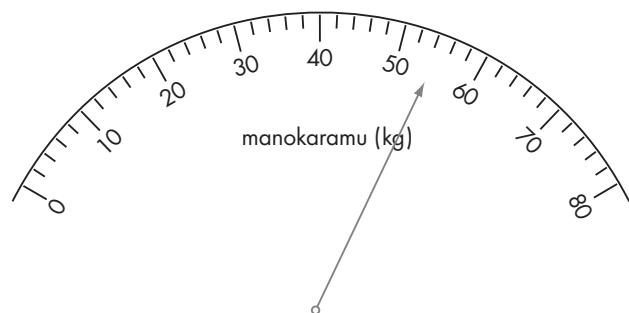
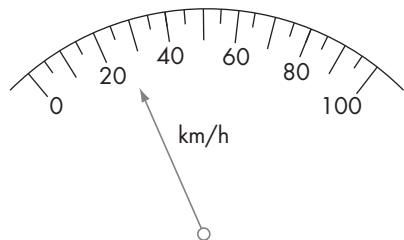


5. He hoahoa tēnei o tētahi whare me tōna tuanui. Tātaihia te whānui o te whare.



6. He hoahoa tēnei o tētahi papa tākaro whutupōro me te wāhi i whanaia ai tētahi whana piro. Tātaihia te tawhiti o te wāhi o te whana, mai i te paetapa o te papa tākaro.





Wāhanga 5

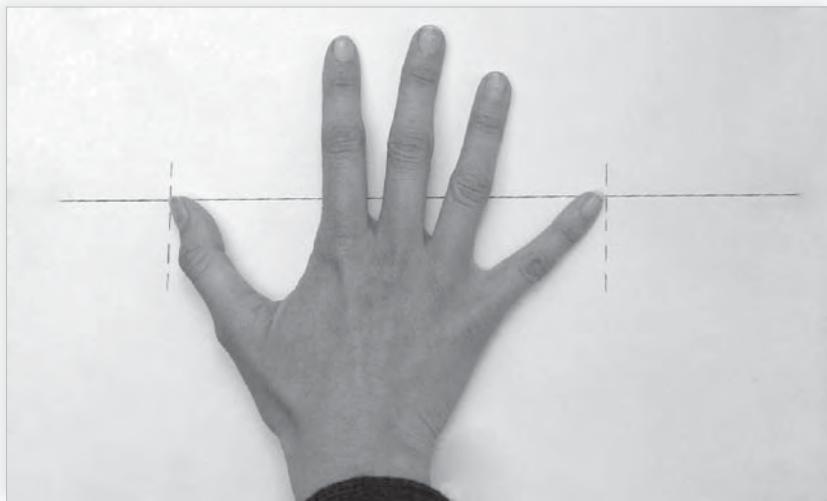
He Tūhuratanga Ine



He tūhuratanga ēnei ngohe i ētahi āhuatanga ine, me te whai wāhi anō o te mātauranga me ngā rautaki tau. E āhua huaki ana ēnei ngohe, mā te ākonga (te rōpū ākonga rānei) e āta whiriwhiri ngā mahi me ngā rautaki hei whakaoti i ngā ngohe.

He pai tonu te tono kia whakawhitihiti kōrero mō ngā mahi me ngā rautaki i whāia, me ngā otinga i puta.

E hāngai ana ētahi o ngā ngohe ki ngā kaupae maha o Te Mahere Tau. Arā, mā te whakamahi tau māmā, ka hāngai ki ngā kaupae māmā, ā, mā te whakamahi tau uaua, ka hāngai ki ngā kaupae o runga me ngā rautaki o reira.

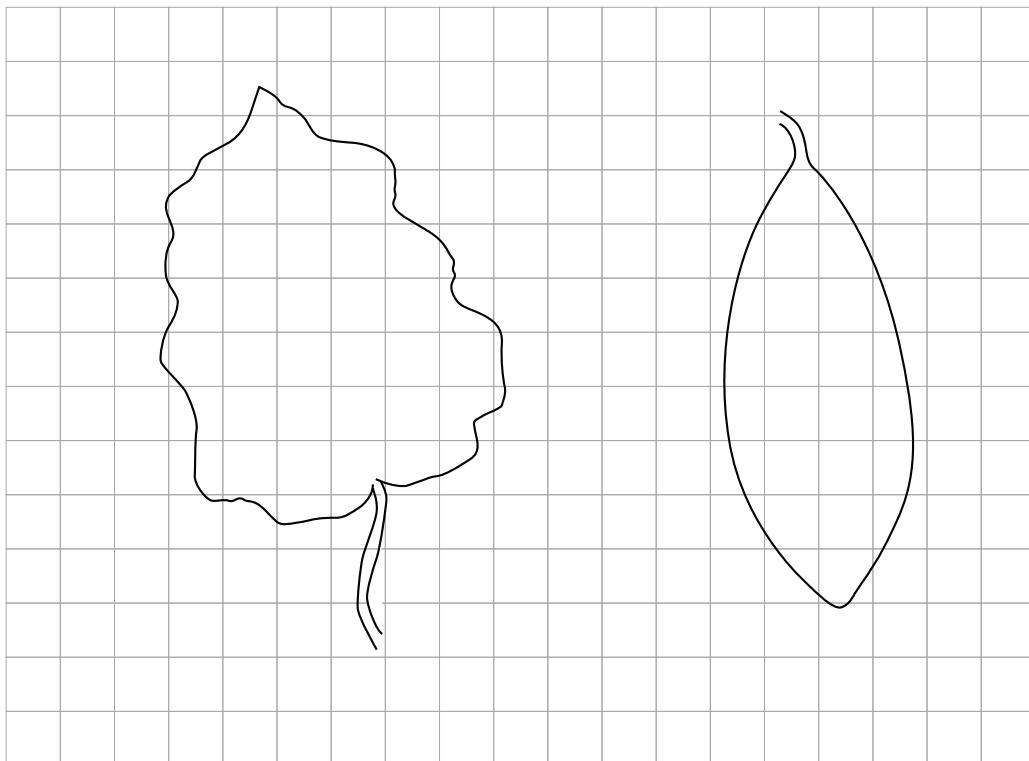


1. Tirohia te rūma, ka kimi ai i ētahi mea e toru e hāngai ana ki ngā tohutohu nei:
 - He āhua ūrite ki te roa o tō matikara.
 - He āhua ūrite ki te haurua o tō matikara.
 - He āhua ūrite ki ētahi matikara e rua.
2. Kimihia ētahi mea he roa ake i tō matikara. Pēhea nei te roa ake?
3. Kimihia ētahi mea he poto ake i tō matikara. Pēhea nei te poto ake?

Ngā Rauemi

- He pepa tukutuku
- He rau rākau

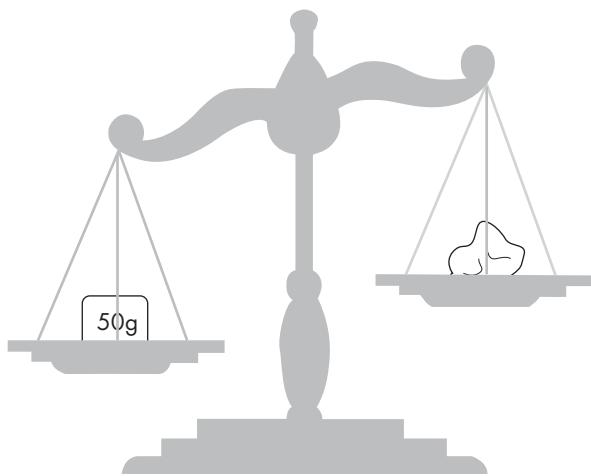
1. Tīkina ētahi rau mai i ētahi rākau rerekē e rua.
2. Tuhia te paenga o ia rau ki te pepa tukutuku.



3. Raupapahia ngā rau mai i te mea he iti rawa te horahanga ki te mea he nui rawa te horahanga.
4. Whakamāramahia te rautaki i whāia e koe.
5. Tuhia ngā ingoa o ngā rākau ki raro i ia rau.

Ngā Rauemi

- He whārite ine-taumaha
- He maihea 50g me te 20g
- He kerepeti



1. Whakatau tatahia tētahi wehenga kerepeti kia 50g te taumaha. Whakamahia te maihea 50g me te whārite ine-taumaha hei ine i tō wehenga kerepeti. Pēhea nei te pātata o tō whakataunga tata ki te 50g?
2. Whakamahia te maihea 50g, te maihea 20g me te whārite ine-taumaha, hei hanga i tētahi wehenga kerepeti kia 30g te taumaha. Whakamāramahia tō mahi.
3. Hangai he kerepeti kia 60g te taumaha. Whakamāramahia tō mahi. Āta whakaaro hia tētahi rautaki atu anō hei hanga i tētahi wehenga kerepeti kia 60g te taumaha.

Ngā Rauemi

- He wāti tū

1. Whakatau tatahia te wā ka oti i a koe ngā mahi, ka tuhi ai ki te tūtohi:

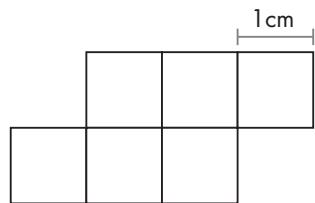
Te mahi	Te whakatau tata i te wā	Te ine i te wā
kia 5 ngā tuhinga o tō ingoa		
te here i tētahi hū		
kia 50 ngā pakipaki ringaringa		
ngā peke 50		
te tatau mawhiti-5 ki te 50		
te omaoma i te 20 mita		

2. Me mahi tahi kōrua ko tētahi hoa, ka ine ai i te wā ka oti i a koe ngā mahi. Tuhia ki te tūtohi. Pēhea nei te pai o ō whakataunga tata?

3. Kia pērā anō tō whakatau tata me te ine i te wā ka oti i a koe ngā mahi kei te tūtohi nei:

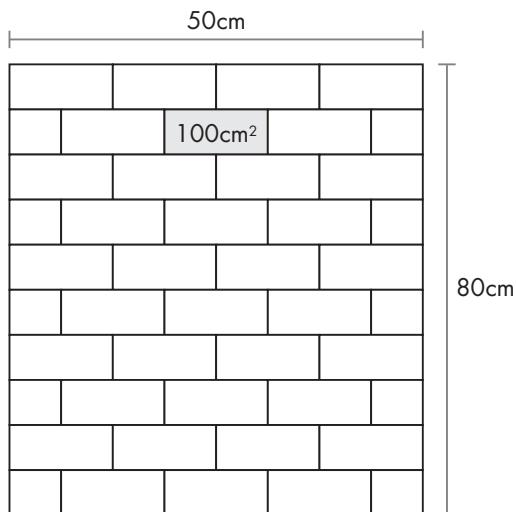
Te mahi	Te whakatau tata i te wā	Te ine i te wā
kia 10 ngā tuhinga o tō ingoa		
te here i ētahi hū e rua		
kia 25 ngā pakipaki ringaringa		
ngā peke 20		
te tatau mawhiti-5 ki te 70		
te omaoma i te 15 mita		

Kotahi mitarau (1cm) te roa o ia tapa o ngā tapawhā rite o tēnei āhua.



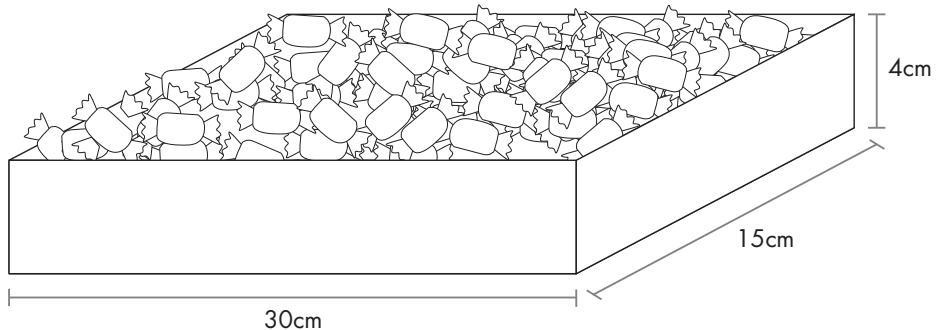
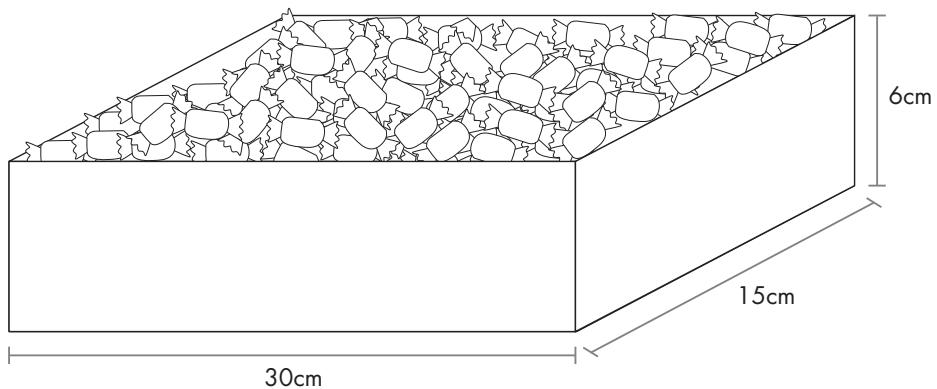
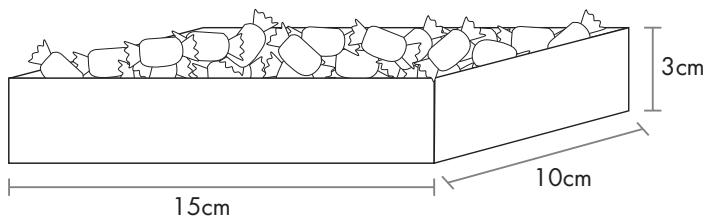
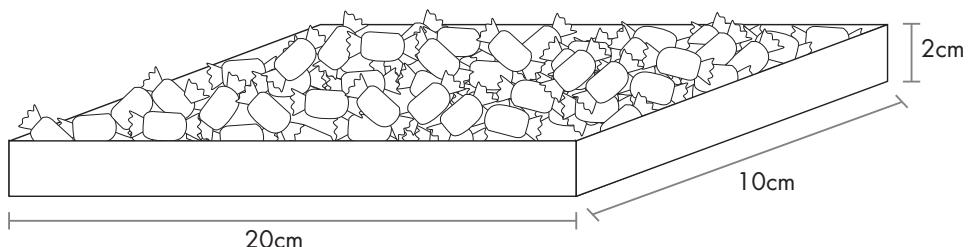
1. Tāpiria ētahi anō tapawhā rite kia eke te paenga o te āhua ki te 18cm.
2. He aha te horahanga o te āhua i hangaia e koe?
3. Hangai te āhua he iti rawa te horahanga engari ko te 18cm tonu te paenga.

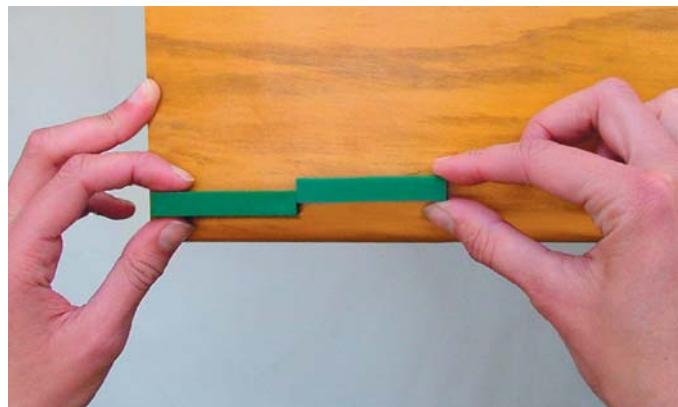
Kua hangaia te pakitara nei ki te pereki. Ko te 100cm^2 te horahanga o ia pereki.



1. Whiriwhiria te horahanga o te pakitara.
2. Whāia tētahi atu rautaki hei whiriwhiri i te horahanga o te pakitara, hei whakamātau i tō otinga ki te pātai nama tahi i runga nei.
3. He aha ētahi rautaki e rua hei whiriwhiri i te horahanga o te pakitara mēnā ka rearuatia te teitei me te whānui?

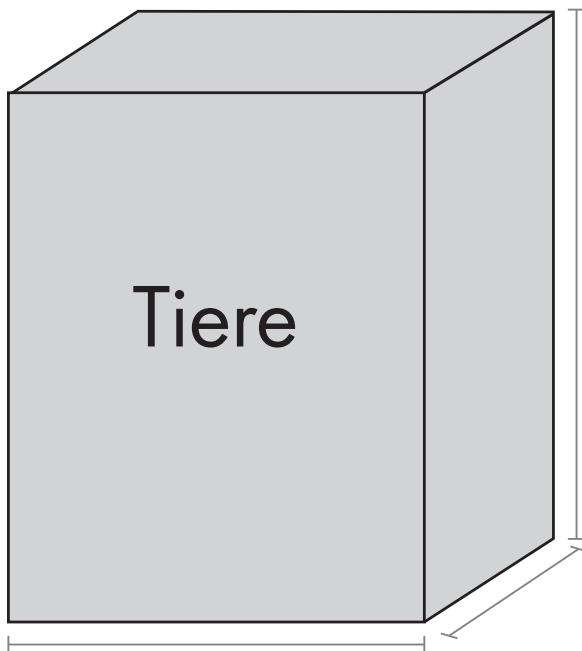
Whiriwhiria te rahi o te pepa hei tākai i ngā pouaka tiakareti nei:



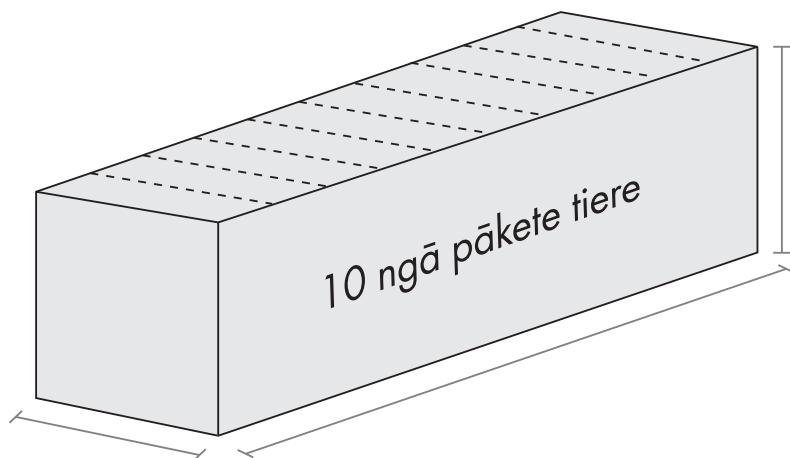


1. Whakamahia he rākau kākāriki, ka ine ai i te whānui o te tēpu. E hia rākau kākāriki te whānui o te tēpu?
2. Kaua e ine, engari me āta whiriwhiri ngā inenga nei. Whakamāramatia te rautaki i whāia e koe hei whiriwhiri i ngā inenga:
 - E hia rākau maota te whānui o te tēpu?
 - E hia rākau whero te whānui o te tēpu?
 - E hia rākau pūwhero te whānui o te tēpu?
 - E hia rākau kahurangi te whānui o te tēpu?
 - E hia rākau pango te whānui o te tēpu?
3. Hangaia he tūtohi hei whakaatu i ngā inenga.

1. Tirohia te pākete tiere. Whakamahia te rūri whawhati hei ine i te roa, te whānui me te teitei o te pākete. Tuhia ngā inenga ki te pikitia i raro nei:



2. Whiriwhiria te rōrahi o te pākete tiere.
3. Tekau ngā pākete tiere ka uru ki tētahi pouaka kotahi. Tuhia ngā inenga o te roa, te whānui, me te teitei o te pouaka ki te pikitia nei.



4. Whiriwhiria te rōrahi o te pouaka.



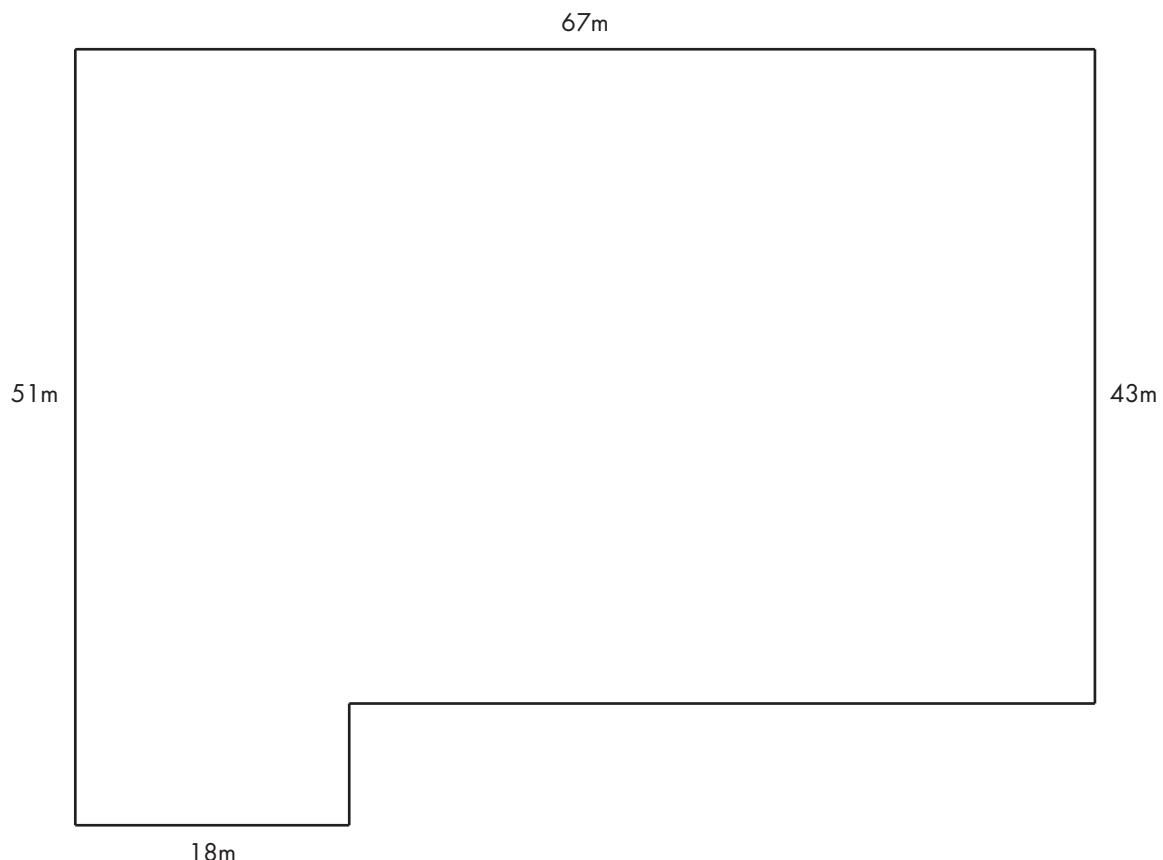
E 20 rita te rōrahi o tētahi pēke wairākau.

1. Māu e hoahoa tētahi pouaka e taea ai te katoa o te wairākau o tētahi pēke te whakauru ki roto. He pēhea nei te roa, te whānui me te teitei o te pouaka?
2. Hauruatia ia taha o tō pouaka. E hia ngā rita wairākau ka taea ki roto ināianei?



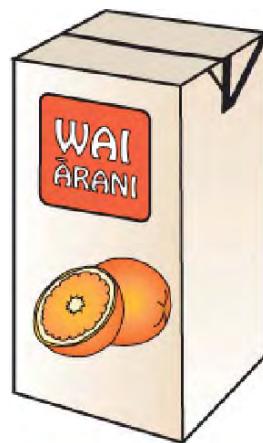
Kua pakaru i a Hoani tētahi matapihi, e 90cm te roa, e 55cm te whānui. Mēnā \$15.00 te utu ā-mita pūrua (m^2) mō te kōata, e hia te utu mō te kōata hou mō tēnei matapihi?

E pēnei ana te āhua o tētahi pātiki i te pāmu a Horomona:



1. E hia mita te roa o te taiapa huri noa i te pātiki?
2. Mēnā e rima ngā waea o te taiapa, e hia ngā mita waea e otī ai te taiapa?
3. \$1.20 te utu ā-mita mō te waea. E hia te utu hei hoko i te waea mō te taiapa nei?
4. Tātaihia te horahanga o tēnei pātiki.

E 240ml te rōrahi wai ārani e hokona ana e te kamupene Ārani Ake Ltd. Nō reira, e 240cm³ te rōrahi o te pouaka hei ipu mō te wai ārani.



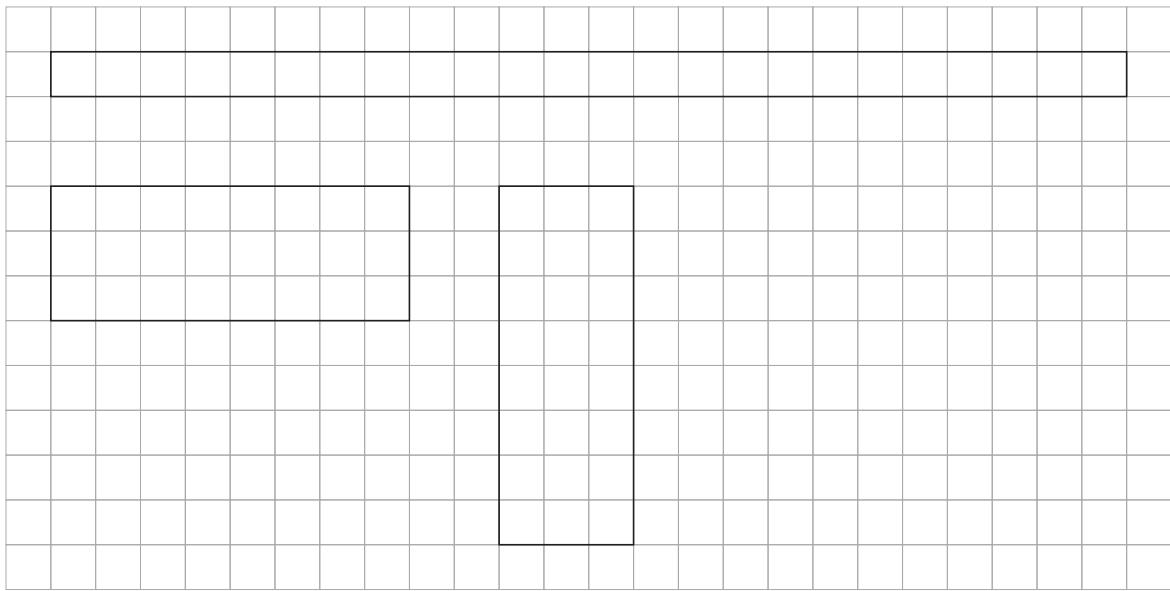
1. Tuhia kia toru ngā pikitia o te pouaka me te tuhi anō i ngā inenga tapa rerekē e taea ana, kia eke ki te 240cm³ te rōrahi o te pouaka.
2. Tuhia te raumata o ia pouaka, ka tātai ai i te horahanga o te kāri mārō hei hanga i ia pouaka.
3. Ko tēhea te pouaka he iti rawa te horahanga o te kāri mārō?
4. Ka taea te waihanga tētahi atu pouaka he iti ake i tēnā te horahanga o te kāri mārō, engari e 240cm³ tonu te rōrahi o te pouaka? Whakamāramatia mai.



Whakatairitea te tere o ngā mea e toru nei, ka raupapa ai mai i te mea pōturi rawa ki te mea tere rawa. Tuhia tō matapae i te tuatahi, ka tātai ai:

- te waka ama: 500 mita i te 3 meneti
- te pahikara a Mihi: 10 km i te 20 meneti
- te omaoma a Tama: 400 mita i te 1 meneti

- Whiriwhiria ngā tapawhā hāngai katoa, ko te 24 te horahanga, ka tuhi ai ki te pepa tukutuku. Kia tauoti ngā tapa katoa. Anei ētahi:



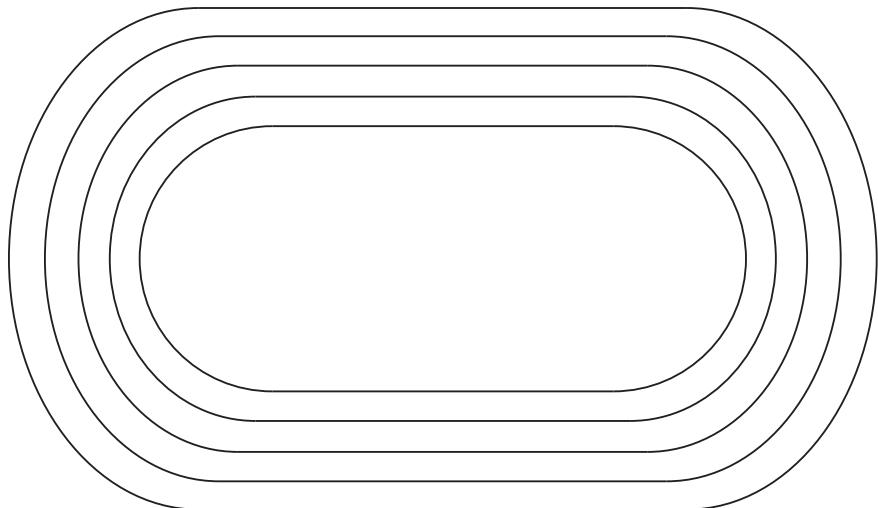
- Tuhia te roa o ngā tapa, te paenga me te horahanga o ia tapawhā hāngai ki tētahi tūtohi.
- Tuhia he kauwhata rārangi hei whakaatu i te roa o tētahi tapa me te paenga o ngā tapawhā hāngai ki te kauwhata.
- He aha te tauira e kitea mai ana i te kauwhata?
- Kimihia te roa o ngā tapa mō te tapawhā hāngai he iti rawa atu te paenga.
- Kimihia te roa o ngā tapa mō te tapawhā hāngai he nui rawa atu te paenga.
- Kei te hanga māra a Himiona. E hiahia ana ia kia 24m^2 te horahanga o te māra. He nui te utu hei hoko i ngā rākau hei tapa mō te māra, nō reira e whai ana ia kia iti rawa atu te paenga o te māra. Ka hia nei te roa o ngā tapa?
- Kei te hanga māra a Waiora. E hiahia ana ia kia 30m^2 te horahanga o te māra. He nui te utu hei hoko i ngā rākau hei tapa mō te māra, nō reira e whai ana ia kia iti rawa atu te paenga o te māra. Ka hia nei te roa o ngā tapa? Whakamāramahia te rautaki i whāia e koe.

1. Tuhia kia whā ngā tapawhā whakarara, ko te 24cm^2 te horahanga. E pai ana te whakamahi pepa tukutuku, te rūri, me te tāporowhita. Whiriwhiria te paenga o ia tapawhā whakarara.



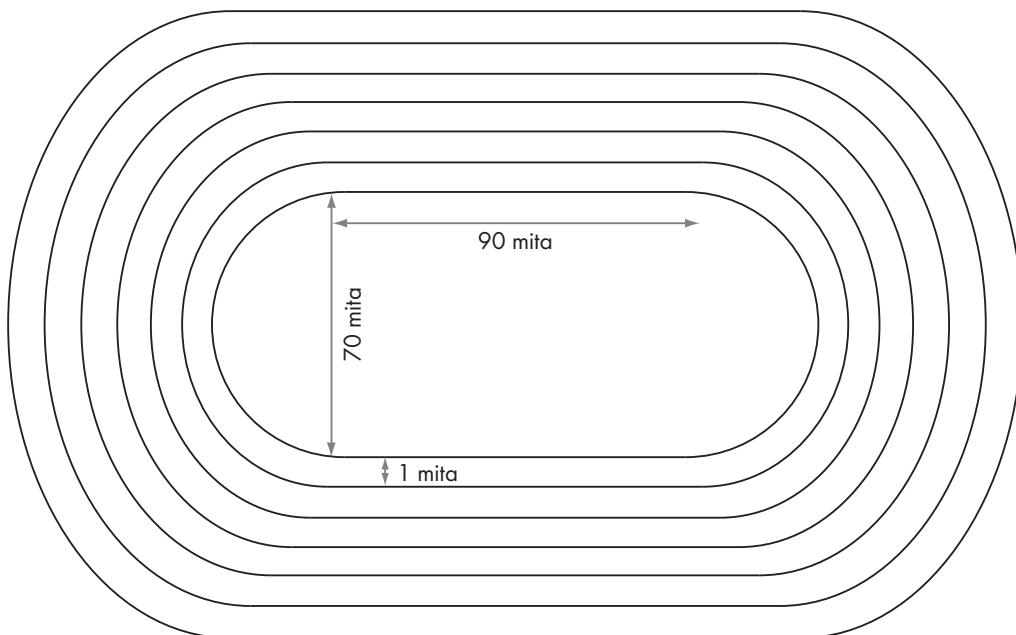
2. Tuhia kia whā ngā tapawhā whakarara, ko te 48cm te paenga. E pai ana te whakamahi pepa tukutuku, te rūri, me te tāporowhita. Whiriwhiria te horahanga o ia tapawhā whakarara.

He hoahoa tēnei o tētahi ara omaoma. He tapawhā hāngai te āhua, me ētahi porowhitia haurua ki ia pito:



Tuhia he hoahoa āwhata o tētahi ara omaoma kia pēnei anō te āhua. E tika ana kia 400m te roa huri amio i te ara roto. E hiahiatia ana te wāhi o roto i te ara omaoma hei papa tākaro haupoi. He tapawhā hāngai te papa tākaro haupoi, e 91.4 mita te roa, e 55 mita te whānui.

E ono ngā ara omaoma i te papa omaoma nei. Kotahi mita te whānui o ia ara:



1. E hia mita te tawhiti huri amio i ia ara omaoma?
2. Ki hea tīmata ai te kaiomaoma i te ara tuarua, kia ūrite ai te tawhiti o tana omaoma ki te kaiomaoma i te ara tuatahi?



Wāhanga 6

Te Kuputaka



Te Kuputaka

Māori → Ingarihi

aho	1. chord (of a circle) 2. sine (<i>tohu</i> : sin) 3. string
ahu ~nga	1. dimension (of space) 2. direction, bearing (<i>kupu kē atu</i> : aŋa, aro ~nga) 3. orientation
āhua	shape (<i>kupu kē atu</i> : hanga)
āhua ahu-rua	two-dimensional figure (<i>whakapotonga</i> : āhua ahu-2)
āhua ahu-toru	three-dimensional figure (<i>whakapotonga</i> : āhua ahu-3)
āhuahanga	geometry
āhua rite	approximately equal to (<i>tohu</i> :~ <i>kupu kē atu</i> : e pātata ana)
āhuatanga	attribute, feature, property
āhuatanga pūmau	invariant property (<i>takenga mai</i> : āhuatanga – property; pūmau – fixed, constant, permanent)
āhuatanga taurangi	variant property (<i>takenga mai</i> : āhuatanga – property; taurangi – variable)
ahu-rua	two-dimensional (<i>whakapotonga</i> : ahu-2)
ahu-tahi	one-dimensional (<i>whakapotonga</i> : ahu-1)
ahu-toru	three-dimensional (<i>whakapotonga</i> : ahu-3)
āputa	gap
aro kē	non-standard (<i>takenga mai</i> : aro – have a certain direction; kē – different, other, strange)
aro whānui	standard (<i>takenga mai</i> : aro – have a certain direction; whānui – broad, wide)
āwhata	scale (for showing measurement) (<i>takenga mai</i> : arawhata – ladder)
āwhata ōwehenga	ratio scale
āwhata rārangī	line scale
āwhata tauākī	statement scale
hahaka	low (<i>kupu kē atu</i> : hakahaka, pāpaku)
hangā	1. shape (<i>kupu kē atu</i> : āhua) 2. build, make
hāngai	perpendicular, right angled (<i>takenga mai</i> : hāngai – across, at right angles, astride)
hāpono ~tia	prove
hāpūpū	obtuse (angle) (<i>takenga mai</i> : blunt)
haukoti ~a ~nga	intercept
hauroki	diagonal
heketea	hectare (<i>tohu</i> : ha <i>takenga mai</i> : He kupu whakawhitī oro mai i te reo Ingarihi.)

hihi	ray
hoahoa ~ina	diagram, plan (<i>takenga mai</i> : hoahoa – plan of a house)
hoahoa āwhata	scale diagram
hōhonu	deep, depth
horahanga	area (<i>takenga mai</i> : hora – spread out)
horahanga mata	surface area
hōtiu	oblique (<i>takenga mai</i> : hōtiu – oblique, inclined)
huapae	horizontal (<i>kupu kē atu</i> : pae, whakapae)
huatau matua	main idea
inaki	overlap
ine ~a ~nga	measure, measurement
ine-koki	protractor
ine-mahana	thermometer
ine-taumaha	scale (for measuring weight)
ine-tawhiti	odometer
ine-tere	speedometer
ipu ine-kītanga	measuring jug (<i>kupu kē atu</i> : puoto ine)
ira	dot, point (<i>takenga mai</i> : ira – freckle, mole <i>kupu kē atu</i> : tongi)
kapa	row
kāpehu	compass (for direction)
karaka ātārangī	sundial
karaka mati	digital clock
karaka ringa	analogue clock
karamu	gram (<i>tohu: g takenga mai</i> : He kupu whakawhiti oro mai i te reo Ingarihi. <i>kupu kē atu</i> : karama, ramu)
karamumano	milligram (<i>tohu: mg kupu kē atu</i> : karamamano, mirikaramu, miriramu, ramumano)
kerepeti	plasticine
kitanga	capacity
kōaro	1. anticlockwise 2. inverse
koki	angle
koki hāngai	right angle (<i>tohu: ┌</i>)
koki hāpūpū	obtuse angle (<i>takenga mai</i> : koki – angle; hāpūpū – blunt)
koki huripū	whole angle, full turn
koki pātata	adjacent angle

koki rārangi	straight line angle (<i>kupu kē atu</i> : koki torotika)
koki rāwaho	reflex angle
koki roto	interior angle
koki tāhapa	acute angle (<i>takenga mai</i> : koki – angle; tāhapa – at an acute angle <i>kupu kē atu</i> : koki koi)
koki tauaro	opposite angle
koki taurite	corresponding angle
koki tauroto	co-interior angle
koki tauwhiti	alternate angle
koki waho	exterior angle
koki whakahāngai	complementary angles (<i>takenga mai</i> : koki – angle; whaka – causative prefix, to make; hāngai – perpendicular)
koki whakahuripū	conjugate angles (<i>takenga mai</i> : koki – angle; whaka – causative prefix, to make; huri – turn; pū – origin, heart, centre)
koki whakarārangi	supplementary angles (<i>takenga mai</i> : koki – angle; whaka– causative prefix, to make; rārangi – line)
koko-ine	measuring spoon (<i>kupu kē atu</i> : pune ine)
mahere	map, plan
mahere āwhata	scale map
mahere tau	number framework
maihea	weight (for measuring mass) (<i>takenga mai</i> : maihea – sinker for fishing line)
māra kai māori	natural garden
māmā	1. light (mass) 2. simple, easy
manokaramu	kilogram (<i>tohu</i> : kg <i>kupu kē atu</i> : kirokaramu, kivoramu, manoram)
manomita	kilometre (<i>tohu</i> : km <i>kupu kē atu</i> : kiromita)
manorita	kilolitre (<i>tohu</i> : kl <i>kupu kē atu</i> : kirorita)
mārō	1. fathom 2. arm span
mata	face (of a solid figure)
mataono rite	cube
matapae ~hia ~tia	predict
mati	1. digit 2. forefinger width (unit of measurement)
matikara	hand span
mātotoru	thick
mita	metre (<i>tohu</i> : m <i>takenga mai</i> : He kupu whakawhiti oro mai i te reo Ingarihi.)
mitamano	millimetre (<i>tohu</i> : mm <i>kupu kē atu</i> : mirimita)

mita pūrua	square metre (<i>tohu:</i> m ²)
mita pūtoru	cubic metre (<i>tohu:</i> m ³)
mitarau	centimetre (<i>tohu:</i> cm <i>kupu kē atu:</i> henemita)
mitarau pūrua	square centimetre (<i>tohu:</i> cm ²)
mitarau pūtoru	cubic centimetre (<i>tohu:</i> cm ³)
ngaku	strip (e.g. of paper)
ōrite	1. congruent 2. equal (<i>tohu:</i> =)
otinga	answer, product, quotient, result, solution (<i>takenga mai:</i> oti – finished)
ōwehenga	ratio (<i>takenga mai:</i> ō – of, belonging to; wehe – detach, divide)
pae	pi (<i>tohu:</i> π <i>takenga mai:</i> He kupu whakawhitinga oro mai i te reo Kiriki.)
pae hapa	margin of error
paemahana	temperature (<i>takenga mai:</i> pae – margin, boundary, threshold; mahana – warm <i>kupu kē atu:</i> mahana, pāmahana)
paenga	circumference, perimeter
paenga (o te) porowhitia haurua	semicircumference
pākete	bucket, packet (<i>takenga mai:</i> He kupu whakawhiti oro mai i te reo Ingarihi.)
pānga	function, relation (<i>takenga mai:</i> pā – connected with <i>kupu kē atu:</i> hononga)
pānga riterite	proportional relationship
papa	board, chart, plane, surface
papanui	palm of hand
papatahi	flat
papatipu	mass (<i>takenga mai:</i> papatipu – solid mass)
paremata ~tia	compensate
pepa tukutuku	grid paper
poro	1. prism (<i>takenga mai:</i> poro – butt end, block) 2. block (<i>kupu kē atu:</i> poraka)
poro āhuatanga ake	attribute block
porotiti	counter, disk
porowhitia ~tia	circle (<i>kupu kē atu:</i> porohita ~tia)
poto	short
pou	column
poutū	vertical (<i>kupu kē atu:</i> poupou)
pū	1. exponent, indice, power (<i>takenga mai:</i> pū – heap, stack, bundle <i>kupu kē atu:</i> taupū) 2. centre (<i>kupu kē atu:</i> pokapū)

pūmau ~tanga	conserve, conservation (remain unchanged)
pūrua	to the power of two (squared)
pūtahi	intersect (<i>takenga mai</i> : pūtahi – join, meet)
pūtoro	radius (<i>takenga mai</i> : pū – centre; toro – stretch forth, extend)
putu	degree (angle and temperature) (<i>tohu</i> : ° <i>takenga mai</i> : putu – lie one upon another <i>kupu kē atu</i> : tākiri [kupu whakawhiti])
pūwaenga	midpoint (of a line segment) (<i>takenga mai</i> : pū [pūwāhi] – point; waenga – the middle, midst)
pūwāhi	point (on a graph, line, plane, or in space) (<i>takenga mai</i> : pū – origin, centre; wāhi – place, locality)
rahi ~nga	amount, dimension, numerous, quantity, plentiful, size (<i>kupu kē atu</i> : nui)
rākau Ātaarangi	Cuisenaire rods (<i>kupu kē atu</i> : rākau karakara, rākau whaikano)
raki	north (<i>kupu kē atu</i> : tokerau*)
rapanga	problem (<i>takenga mai</i> : rapa – seek, look for)
rārangī	line
rārangī hāngai	perpendicular line
rārangī whakarara	parallel line
rauata	overhead projector
rautaki āhuahanga	geometric strategy
rawaka	sufficient, enough
rāwhiti	east (<i>kupu kē atu</i> : waho*)
rearua	double
rita	litre (<i>tohu</i> : l)
ritamano	millilitre (<i>tohu</i> : ml <i>kupu kē atu</i> : miririta)
rite	alike, equal, regular, similar (in proportion)
roa	length, long
rohe	boundary (<i>kupu kē atu</i> : paenga, paetaha)
rohe wā	time zone
rōnaki	gradient, slope (<i>takenga mai</i> : rōnaki – sloping, slanting)
rōpū	category, group
rōrahi	volume (<i>takenga mai</i> : rō [roto] – inside; rahi – size)
ruarua	few (<i>kupu kē atu</i> : torutoru)
rūri	ruler (<i>takenga mai</i> : He kupu whakawhiti oro mai i te reo Ingarihi. <i>kupu kē atu</i> : tauine)
taha	side
tāhāngai	set square (<i>takenga mai</i> : tā – print; hāngai [kokī hāngai] – right angle)

taitapa	frame
takanga wā	passage of time
takiwā	region (of space or time)
tana	tonne (<i>tohu: t kupu kē atu: manokiro</i>)
tapa	edge
tāpaetanga kōrero	assertion
tapa pātata	adjacent side
tapa tauaro	opposite side
tapatoru	triangle
tapawhā hāngai	rectangle, oblong
tapawhā rite	square
tapeke	1. score (result of a game) 2. sum, total 3. balance (of a bank account)
tāporowhita	compass (for drawing circles) (<i>takenga mai: tā – print; porowhita – circle kupu kē atu: taputapu tuhi porowhita</i>)
taputapu ine	measuring device
tāroa	hypotenuse (<i>takenga mai: tāroa – long</i>)
tāruarua	repeat
tauaro	opposite (<i>kupu kē atu: anganui</i>)
taumaha	heavy, weight
taurahi	scale factor for enlargement (<i>takenga mai: tau – number; rahi – size kupu kē atu: tau whakarahi</i>)
taura ine	measuring tape
taurangi	variable
tautohu	indicate
tauhwata	point on a scale (<i>takenga mai: tau – number; whata [āwhata] – scale</i>)
tawhiti	distant, distance (<i>kupu kē atu: mamao</i>)
teitei	altitude, height, high, tall (<i>kupu kē atu: tāroaroa [of a person], tiketike</i>)
tepe o te tika	limit of accuracy (<i>takenga mai: tepe – boundary, limit; tika – correct</i>)
tīhi	apex (<i>takenga mai: tīhi – summit, top, peak</i>)
tika	accurate, correct, valid (<i>kupu kē atu: tōtika</i>)
tōraro	negative (of a number) (<i>takenga mai: tō – that of, pertaining to; raro – below</i>)
tōtika	accuracy
tuke	measurement from tip of the hand to the elbow

tukutuku	grid
ture	formula, rule (<i>kupu kē atu: tikanga tātai</i>)
ture a Pythagoras	theorem of Pythagoras
tūtohi	table (e.g. of data)
tūtohi tukutuku	array
uru	west (<i>kupu kē atu: rātō</i>)
wā	1. time (<i>kupu kē atu: tāima</i>) 2. space, spatial (<i>kupu kē atu: mokowā</i>)
waeine	unit of measurement (<i>takenga mai: wae – divide, part, portion; ine – measure</i>)
waeine aro kē	non-standard unit of measurement
waeine aro whānui	standard unit of measurement
waeine Celsius	degrees Celsius (<i>tohu: °C kupu kē atu: wacine tohurau</i>)
waeine ngahuru	metric unit
wairākau māori	natural compost
wā-mati	digital time
wā-ringa	analogue time
wāti tū	stop watch
wāwāhi ~a	break down, partition (<i>kupu kē atu: wāhi ~a</i>)
weherua ~tia	bisect (<i>takenga mai: wehe – divide; rua – two</i>)
whāiti	narrow (<i>kupu kē atu: kūiti</i>)
whaituhi ~a	trace (<i>takenga mai: whai – follow; tuhi – write</i>)
whakaahua ā-hinengaro	mental image
whakaahuahanga	representation
whakaaro pānga riterite	proportional thinking/reasoning
whakaawhiwhi ~a	round (a number) (<i>takenga mai: whaka – causative prefix, to make; āwhiwhi – near, approximate</i>)
whakamātau ~ria	test, trial, experiment
whakaoti ~a	solve, complete
whakarōpū ~ngia	classify, group
whakatairite ~a	compare (<i>kupu kē atu: whakataurite ~a</i>)
whakatairite mata ki mata	direct comparison
whakatairite tipa	indirect comparison
whakatau tata	estimate
whakatekaraka	clockwise (<i>kupu kē atu: ā-karakaka</i>)
whana ine-taumaha	spring scale

whānui	breadth, wide, width
whārangī tārua	blackline master, copymaster
whārite	equation (<i>takenga mai</i> : whārite – balance by an equivalent)
whārite ine-taumaha	balance (for measuring weight)
whetoko	pace, step (measurement)
wīra ine	measuring wheel

Te Kuputaka

Ingarihi → Māori

accuracy	tōtika
accurate	tika (<i>kupu kē atu</i> : tōtika)
acute angle	koki tāhapa (<i>takenga mai</i> : koki – angle; tāhapa – at an acute angle <i>kupu kē atu</i> : koki koi)
adjacent angle	koki pātata
adjacent side	tapa pātata
alternate angle	koki tauwhiti
altitude	teitei (<i>kupu kē atu</i> : tiketike)
analogue clock	karakka ringa
analogue time	wā-ringa
angle	koki
answer	otinga (<i>takenga mai</i> : oti – finished)
anticlockwise	kōaro
apex	tihi (<i>takenga mai</i> : tihi – summit, top, peak)
approximately equal to	āhua rite (<i>tohu</i> : ≈ <i>kupu kē atu</i> : e pātata ana)
arc	pewa (<i>takenga mai</i> : pewa – anything bow-shaped)
area	horahanga (<i>takenga mai</i> : hora – spread out)
arm span	mārō
array	tūtohi tukutuku
assertion	tāpaetanga korero
attribute	āhuatanga
attribute block	poro āhuatanga ake
axis of symmetry	rārangī hangarite (<i>kupu kē atu</i> : tuaka hangarite)
balance (for measuring weight)	whārite ine-taumaha
bearing	ahu ~nga (<i>kupu kē atu</i> : anga, aro ~nga)
bisect	weherua ~tia (<i>takenga mai</i> : wehe – divide; rua – two)
blackline master	whārangī tārua
block	poro (<i>kupu kē atu</i> : poraka)
boundary	rohe (<i>kupu kē atu</i> : paenga, paetaha)
breadth	whānui
break down	wāwāhi ~a (<i>kupu kē atu</i> : wāhi ~a)
bucket	pākete

build, make	waihangā (<i>kupu kē atu:</i> hangā)
capacity	kītanga
category	rōpū
centimetre	mitarau (<i>tohu:</i> cm <i>kupu kē atu:</i> henemita)
centre	pū (<i>kupu kē atu:</i> pokapū)
chord (of a circle)	aho
circle	porowhita ~tia (<i>kupu kē atu:</i> porohita ~tia)
circumference	paenga
classify, group	whakarōpū ~ngia
clockwise	whakatekaraka (<i>kupu kē atu:</i> ā-karaka)
co-interior angle	koki tauroto
column	pou
compare	whakatairite ~a (<i>kupu kē atu:</i> whakataurite ~a)
compass (for direction)	kāpehu
compass (for drawing circles)	tāporowhita (<i>takenga mai:</i> tā – print; porowhita – circle <i>kupu kē atu:</i> taputapu tuhi porowhita)
compensate	paremata ~tia
complementary angles	koki whakahāngai (<i>takenga mai:</i> koki – angle; whaka – causative prefix, to make; hāngai – perpendicular)
complete	whakaoti ~a
congruent	ōrite
conjugate angles	koki whakahuri pū (<i>takenga mai:</i> koki – angle; whaka – causative prefix, to make; huri – turn; pū – origin, heart, centre)
conserve, conservation (remain unchanged)	pūmau ~tanga
construct	waihangā ~tia
copymaster	whārangī tārua
correct	tika (<i>kupu kē atu:</i> tōtika)
corresponding angle	koki taurite
counter, disk	porotiti
cube	mataono rite
cubic centimetre	mitarau pūtoru (<i>tohu:</i> cm ³)
cubic metre	mita pūtoru (<i>tohu:</i> m ³)
Cuisenaire rods	rākau Ātaarangi (<i>kupu kē atu:</i> rākau karakara, rākau whaikano)
deep, depth	hōhonu

degree (angle and temperature)	putu (<i>tohu: ° takenga mai:</i> putu – lie one upon another <i>kupu kē atu:</i> tākiri [kupu whakawhitī])
degrees Celsius	waeine Celsius (<i>tohu: °C kupu kē atu:</i> waeine tohurau)
diagonal	hauroki
diagram	hoahoa ~ina (<i>takenga mai:</i> hoahoa – plan of a house)
digital clock	karaka mati
digital time	wā-mati
dimension (of space)	ahu ~nga
dimension, size	rahi ~nga
direct comparison	whakatairite mata ki mata
direction	ahu ~nga (<i>kupu kē atu:</i> anga, aro ~nga)
distant, distance	tawhiti (<i>kupu kē atu:</i> mamao)
dot, point	ira (<i>takenga mai:</i> ira – freckle, mole <i>kupu kē atu:</i> tongi)
double	rearua
east	rāwhiti (<i>kupu kē atu:</i> waho)
edge	tapa
ellipsoid	poirapa (<i>takenga mai:</i> poi – sphere; rapa – spread out, extended)
equal	ōrite (<i>tohu: =</i>)
equation	whārite (<i>takenga mai:</i> whārite – balance by an equivalent)
estimate	whakatau tata
experiment	whakamātau ~ria
exterior angle	koki waho
face (of a solid figure)	mata
fathom	mārō
feature	āhuatanga
few	ruarua (<i>kupu kē atu:</i> torutoru)
flat	papatahi
forefinger width (unit of measurement)	mati
formula	ture (<i>kupu kē atu:</i> tikanga tātai)
frame (e.g. of a picture)	taitapa
function, relation	pāngā (<i>takenga mai:</i> pā – connected with kupu kē atu: hononga)
gap	āputa
geometric strategy	rautaki āhuahanga
geometry	āhuahanga

gradient	rōnaki (<i>takenga mai</i> : rōnaki – sloping, slanting)
gram	karamu (<i>tohu</i> : g <i>takenga mai</i> : He kupu whakawhiti oro mai i te reo Ingarihi. <i>kupu kē atu</i> : karama, ramu)
greater than	nui ake (<i>tohu</i> : >)
grid	tukutuku
grid paper	pepa tukutuku
group	rōpū
hand span	matikara
hectare	heketea (<i>tohu</i> : ha <i>takenga mai</i> : He kupu whakawhiti oro mai i te reo Ingarihi.)
height	teitei (<i>kupu kē atu</i> : tiketike, tāroaroa [mō te tangata])
hemisphere	poi haurua (<i>kupu kē atu</i> : poi rite haurua)
high	teitei (<i>kupu kē atu</i> : tiketike)
horizontal	huapae (<i>kupu kē atu</i> : pae, whakapae)
hypotenuse	tāroa (<i>takenga mai</i> : tāroa – long)
indicate	tautohu
indirect comparison	whakatairite tipa
intercept	haukoti ~a ~nga
interior angle	koki roto
intersect	pūtahi (<i>takenga mai</i> : pūtahi – join, meet)
invariant property	āhuatanga pūmau (<i>takenga mai</i> : āhuatanga – property; pūmau – fixed, constant, permanent)
inverse	kōaro
kilogram	manokaramu (<i>tohu</i> : kg <i>kupu kē atu</i> : kirokaramu, kivoramu, manoram)
kilitre	manorita (<i>tohu</i> : kl <i>kupu kē atu</i> : kirorita)
kilometre	manomita (<i>tohu</i> : km <i>kupu kē atu</i> : kiromita)
length, long	roa ~nga
light (mass, weight)	māmā
limit of accuracy	tepe o te tika (<i>takenga mai</i> : tepe – boundary, limit; tika – correct)
line	rārangi
line of symmetry	rārangi hangarite (<i>kupu kē atu</i> : tuaka hangarite)
line scale	āwhata rārangi
litre	rita
long	roa
low	hahaka (<i>kupu kē atu</i> : hakahaka, pāpaku)
main idea	huatau matua

map	mahere
margin of error	pae hapa
mass	papatipu (<i>takenga mai</i> : papatipu – solid mass)
measure, measurement	ine ~a ~nga
measurement from tip of the hand to the elbow	tuke
measuring device	taputapu ine
measuring jug	ipu ine-kītanga (<i>kupu kē atu</i> : puoto ine)
measuring spoon	koko ine (<i>kupu kē atu</i> : pune ine)
measuring tape	taura ine
measuring wheel	wīra ine
median of a triangle	rārangī weherua
mental image	whakaahua ā-hinengaro
metre	mita (<i>tohu</i> : m <i>takenga mai</i> : He kupu whakawhiti oro mai i te reo Ingarihi.)
metric unit	waeine ngahuru
midpoint (of a line segment)	pūwaenga (<i>takenga mai</i> : pū [pūwāhi] – point; waenga – the middle, midst)
milligram	karamumano (<i>tohu</i> : mg <i>kupu kē atu</i> : karamamano, mirikaramu, miriramu, ramumano)
millilitre	ritamano (<i>tohu</i> : ml <i>kupu kē atu</i> : miririta)
millimetre	mitamano (<i>tohu</i> : mm <i>kupu kē atu</i> : mirimita)
narrow	whāiti (<i>kupu kē atu</i> : kūti)
natural compost	wairākau māori
natural garden	māra kai māori
negative (of a number)	tōraro (<i>takenga mai</i> : tō – that of, pertaining to; raro – below)
non-standard	aro kē (<i>takenga mai</i> : aro – have a certain direction; kē – different, other, strange)
non-standard unit of measurement	waeine aro kē
north	raki (<i>kupu kē atu</i> : tokerau)
number framework	mahere tau
oblique	hōtiu (<i>takenga mai</i> : hōtiu – oblique, inclined)
obtuse angle	koki hāpūpū (<i>takenga mai</i> : koki – angle; hāpūpū – blunt)
odometer	ine-tawhiti
one-dimensional	ahu-tahi (<i>whakapotonga</i> : ahu-1)
opposite	tauaro (<i>kupu kē atu</i> : anganui)
opposite angle	koki tauaro
opposite side	tapa tauaro

orientation	ahu ~nga
overhead projector	rauata
overlap	inaki
ovoid	poihema (<i>takenga mai</i> : poi – sphere; hema – tapering)
pace, step (measurement)	whetoko
palm of hand	papanui
parallel line	rārangi whakarara
partition	wāwāhi ~a (<i>kupu kē atu</i> : wāhi ~a)
passage of time	takanga wā
perimeter	paenga
perpendicular	hāngai (<i>takenga mai</i> : hāngai – across, at right angles, astride)
perpendicular line	rārangi hāngai
pi	pae (<i>tohu: π takenga mai</i> : He kupu whakawhitinga oro mai i te reo Kiriki.)
plan	mahere
plane (surface)	papa
plasticine	kerepeti
point, dot	ira (<i>takenga mai</i> : ira – freckle, mole <i>kupu kē atu</i> : tongi)
point (on a graph, line, plane, or in space)	pūwāhi (<i>takenga mai</i> : pū – origin, centre; wāhi – place, locality)
point (on a scale)	tauwhata (<i>takenga mai</i> : tau – number; whata [āwhata] – scale)
power of two (squared)	pūrua
predict	matapae ~hia ~tia
prism	poro (<i>takenga mai</i> : poro – butt end, block)
problem	rapanga (<i>takenga mai</i> : rapa – seek, look for)
product	otinga (<i>takenga mai</i> : oti – finished)
property	āhuatanga
proportional relationship	pānga riterite
proportional thinking/reasoning	whakaaro pānga riterite
protractor	ine-koki
prove	hāpono ~tia
radius	pūtoro (<i>takenga mai</i> : pū – centre; toro – stretch forth, extend)
ratio	ōwehenga (<i>takenga mai</i> : ō – of, belonging to; wehe – detach, divide)
ratio scale	āwhata ūwehenga
ray	hihi

reflex angle	koki rāwaho
region (of space or time)	takiwā
regular	rite
relation, function	pānga (<i>takenga mai</i> : pā – connected with <i>kupu kē atu</i> : hononga)
repeat	tāruarua
representation	whakaahuahanga
result	otinga (<i>takenga mai</i> : oti – finished)
right angle	koki hāngai (<i>tohu</i> : 
round (a number)	whakaawhiwhi ~a (<i>takenga mai</i> : whaka – causative prefix, to make; āwhiwhi – near, approximate)
row	kapa
rule	ture (<i>kupu kē atu</i> : tikanga tātai)
ruler	rūri (<i>takenga mai</i> : He kupu whakawhiti oro mai i te reo Ingarihi. <i>kupu kē atu</i> : tauine)
scale	āwhata (for showing measurement) (<i>takenga mai</i> : arawhata – ladder)
scale (for measuring weight)	ine-taumaha
scale diagram	hoahoa āwhata
scale factor for enlargement	taurahi (<i>takenga mai</i> : tau – number; rahi – size <i>kupu kē atu</i> : tau whakarahi)
scale map	mahere āwhata
score (result of a game)	tapeke
sector	pewanga
semicircumference	paenga (o te) porowhita haurua
set square	tāhāngai (<i>takenga mai</i> : tā – print; hāngai [koki hāngai] – right angle)
shape	āhua (<i>kupu kē atu</i> : hanga)
short	poto
side	taha
similar (in proportion)	rite
size	rahi ~nga
slope	rōnaki (<i>takenga mai</i> : rōnaki – sloping, slanting)
solution	otinga (<i>takenga mai</i> : oti – finished)
solve	whakaoti ~a
space, spatial	wā (<i>kupu kē atu</i> : mokowā)
speedometer	ine-tere
sphere	poi (<i>takenga mai</i> : poi – ball <i>kupu kē atu</i> : poi rite)
spring scale	whana ine-taumaha

square centimetre	mitarau pūrua (<i>tobu: cm²</i>)
square metre	mita pūrua (<i>tobu: m²</i>)
standard	aro whānui (<i>takenga mai: aro – have a certain direction; whānui – broad, wide</i>)
standard unit of measurement	waeine aro whānui
statement scale	āwhata tauākī
step, pace	whetoko
stop watch	wāti tū
straight line angle	koki rārangī (<i>kupu kē atu: koki torotika</i>)
string	aho, tuaina
strip (e.g. of paper)	ngaku
sufficient, enough	rawaka
sum	tapeke
sundial	karaka ātārangī
supplementary angles	koki whakarārangī (<i>takenga mai: koki – angle; whaka– causative prefix, to make; rārangī – line</i>)
surface	papa
surface area	horahanga mata
table (e.g. of data)	tūtohi
tall	teitei (<i>kupu kē atu: tiketike, tāroaroa [mō te tangata]</i>)
temperature	paemahana (<i>takenga mai: pae – margin, boundary, threshold; mahana – warm</i> <i>kupu kē atu: mahana, pāmahana</i>)
test	whakamātau ~ria
theorem of Pythagoras	ture a Pythagoras
thermometer	ine-mahana
thick	mātotoru
three-dimensional	ahu-toru (<i>whakapotonga: ahu-3</i>)
three-dimensional figure	āhua ahu-3
tiling	rōpinepine (<i>takenga mai: rōpine – place close together</i>)
time zone	rohe wā
tonne	tana (<i>tobu:t kupu kē atu: manokiro</i>)
total	tapeke
trace	whaituhi ~a (<i>takenga mai: whai – follow; tuhi – write</i>)
trial	whakamātau ~ria
triangle	tapatoru
turn	huri ~hia ~hangā

two-dimensional	ahu-rua (<i>whakapotonga</i> : ahu-2)
unit of measurement	waeine (<i>takenga mai</i> : wae – divide, part, portion; ine – measure)
variable	taurangi
variant property	āhuatanga taurangi (<i>takenga mai</i> : āhuatanga – property; taurangi – variable)
vertical	poutū (<i>kupu kē atu</i> : poupou)
volume	rōrahi (<i>takenga mai</i> : rō [roto] – inside; rahi – size)
weight	1. maihea (for measuring mass) (<i>takenga mai</i> : maihea – sinker for fishing line) 2. taumaha
west	uru (<i>kupu kē atu</i> : rātō)
whole angle	koki huripū
width, wide	whānui

90°

0.4

$\frac{1}{4}$

kg

4 cm

x2

m^2

HE KUPENGA HAO I TE REO

Te Kāwanatanga o Aotearoa

