

Oil Spill

You need: a photocopy of the enlarged map of the coastline

ACTIVITY

A huge supertanker, *Greased Lightning*, has grounded on a reef off the coast of New Zealand. Latu, the marine expert from Counter Catastrophe, is on the phone to the Prime Minister.

How bad is it, Latu?
Is the ship leaking?

Yes, Prime Minister, and it's breaking up.
We need to treat the oil slick before
it gets to the coastline.



First, Latu has sensor buoys dropped into the oil slick to track its movement.



Then she feeds the data from the buoys into her computer to find out how fast the oil slick is spreading. The coastline map below shows her initial information. Use your photocopy of the enlarged map to answer the questions.

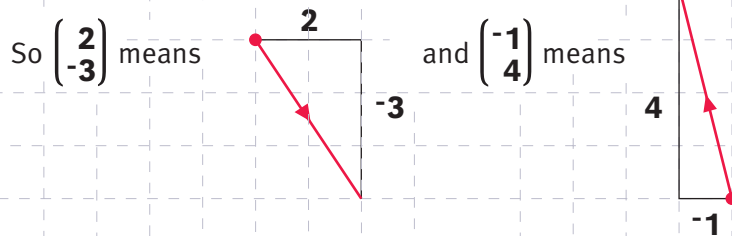
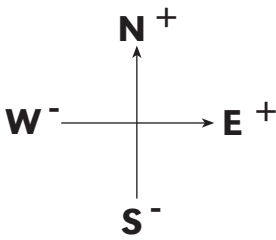


- How far, in kilometres, is the oil slick (as shown on the map) from the nearest land?
 - Which buoy (A, B, C, D, E, F, or G) was your measurement taken from?

2. Satellites receive the signals from the buoys and send their positions to Latu's computer. Her computer gives the movement of each buoy as a vector:

$$\mathbf{A} = \begin{pmatrix} -1 \\ 2 \end{pmatrix} \quad \mathbf{B} = \begin{pmatrix} 0 \\ 2 \end{pmatrix} \quad \mathbf{C} = \begin{pmatrix} 1 \\ 0 \end{pmatrix} \quad \mathbf{D} = \begin{pmatrix} 3 \\ -1 \end{pmatrix} \quad \mathbf{E} = \begin{pmatrix} 3 \\ -3 \end{pmatrix} \quad \mathbf{F} = \begin{pmatrix} 0 \\ -3 \end{pmatrix} \quad \mathbf{G} = \begin{pmatrix} -1 \\ -3 \end{pmatrix}$$

The top number tells how many kilometres east or west the buoy is travelling each day.
The bottom number tells how many kilometres north or south it travels each day.



- Predict which part of the oil slick will reach the coast first. Explain your prediction by drawing the path of the oil slick on your photocopy of the coastline map, using the vectors that Latu's computer produced.
 - What would cause an oil slick to move at different speeds in different places?
3. Latu knows it will take her crew 3 days to refloat and seal the tanker and to treat the oil slick with detergent.
Can she stop the oil slick before it reaches the coast? Explain your answer.



Jody F Millennium oil slick disaster, February 2002
(off the Gisborne coast)