Problem 1 answer: Sam has the choice of 2 breads and 5 fillings.

He has the choice of 2 x 5 = 10 different sandwiches. This can be solved using a tree diagram that first has 2 branches (one for each of the bread types) and then 5 branches at the end of the first branches (one for each of the fillings). This will give 10 ends to the tree.

Now a white sandwich with honey is just one of the ten possible sandwiches. So the chances of Sam making that particular sandwich is 1/10.

Problem 2 answer: For the pizza you get a choice of 4 from one bin and 3 from the other. Hence there are 12 possible pizzas with two toppings, one topping coming from each bin.

The bacon and tomato combination just one of the 12 possible pizzas, so the chances of that pizza are 1/12.

Problem 3 answer: If you construct the tree here you start off with two branches and you add two branches at the end of each branch until four lots of branch levels have been added. This gives 16 possible outcomes. Only one of these is all heads. So the probability that she wins four calls in a row is 1/16.

Problem 4 answer: It should be pointed out that this problem is a little hard to do by a tree diagram. First of all there are 10,000 possible numbers that can be used (going from 0 to 9999). Now there are 26 letters that can go in the first letter position and 26 for the second.

Altogether there are 26 x 26 x 10,000 = 6,760,000 number plates.

Now there are 26 x 26 = 676 number plates with all zeros. So the probability if seeing one of these is 676/6,760,000 = 1/10,000. (You probably wouldn't see one of these very often in Botutuland.)

Problem 5 answer: Laura has 3 ways of getting to the city and then 3 ways of getting to the office. Therefore she has 3 x 3 = 9 ways of getting to work.

The probability of going by ferry and then walking is 1/9.

Problem 6 answer: Tim has 4 x 4 = 16 choices of sports. He has a choice of 2 round-ball games in summer and 3 in winter for a total of 6 combinations. Hence his chances of playing a round-ball game is 6/16 = 3/8

There are 3 sports that are not rugby in summer and 3 sports that are not rugby in winter. Since 3 x 3 = 9 he has a 9/16 chance of not playing any rugby.

Problem 7 answer: There are 16 outcomes here and 8 of them are even. The game is fair.

One way of getting a probability of 10/16 is to take the event 'the sum is less than 6'.
But 'more than 3' works equally well. But there are other possibilities.

Problem 8 answer: Here 10 of the 16 outcomes are even. So it is best to be even. This is definitely not a fair game.

Problem 9 answer: There are only 5 outcomes here out of 16 that have a number divisible by 3. Hence this is not a fair game.

Problem 10 answer: This is n ot a fair game either. There are 5 sums divisible by 3; 5 sums with a remainder of 1 when divided by 3; and 6 with a remainder of 2 when divided by 3. So it is better to be Nelio.

Incidentally, since there are 16 outcomes here and 16 is not divisible by 3, then there is no way that this game could be fair.