2011-2012 Primary Set 1 solutions

P1.1. Professor Trigg was asked how old he was.
He replied, " If you divide my age by 2, 3, 4 or 6, there is always 1 left over, but if you divide it by 7, there is no remainder."
How old is Professor Trigg?
Explain your reasoning.

Solution
Multiples of 2, 3, 4 and 6 are 12, 24, 36, 48, 60, 72, 84, 96, 108, ...
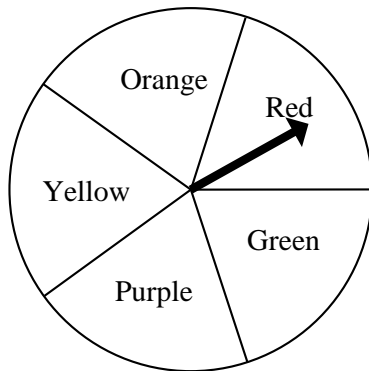Adding 1 gives : 13, 25, 37, 49, 61, 73, 85, 97, 109
Look for a multiple of 7
Age is 49 years
The next possibilty is 133 which is probably too old!

P1.2.

Adam has found a spinner which has five colours on it where each colour is equally likely to come up. Adam decides to make his own.
Adam's spinner has four colours – red, blue, orange and green. He wants it to satisify these conditions:

- red to come up half the time;
- red to come up twice as often as blue;
- and orange to come up twice as often as green.

What fraction of the new spinner should be coloured orange?
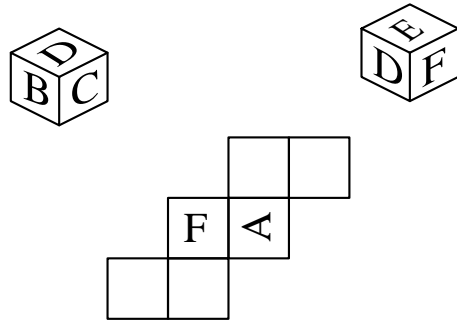
Solution
Half the spinner must be red.
Blue is half the red region, i.e. a quarter of spinner
A quarter is covered by orange and green.
So orange is $\frac{2}{3}$ of a $\frac{1}{4}$, i.e. $\frac{1}{6}$.

P1.3.

A cube has the letters A, B, C, D, E and F marked on the faces. Below are two views of the cube. Use these to complete the net. **Describe each of your steps.**

Solution

Looking at the net shown and the die on the right; since A is to the right of F, A is opposite D.

Comparing the two dice, B is opposite F. This fixes the positions of A, B, D, E and F and so C must be opposite E.

Check the orientation of the letters.

Construct the net as shown.