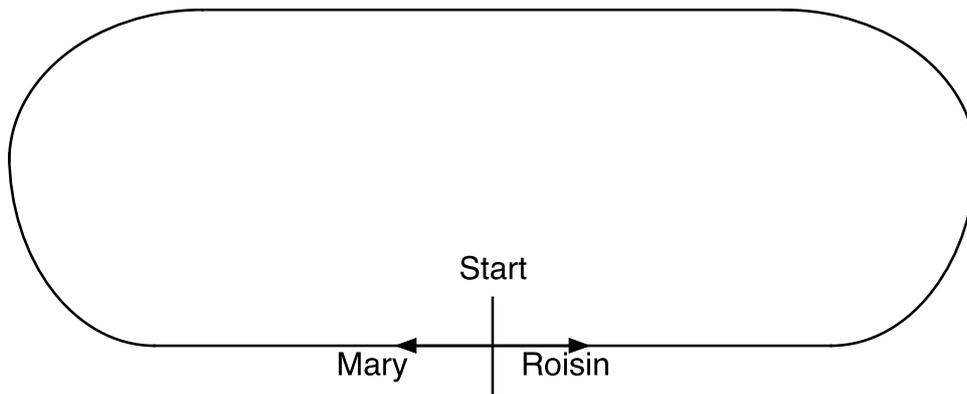
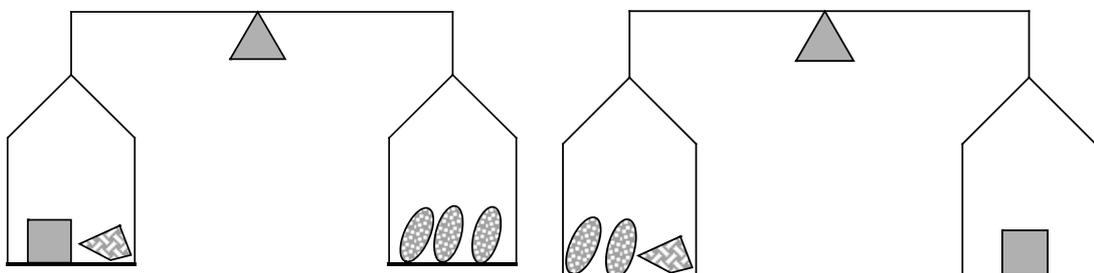


### *Problem solving questions relating to Number*

1. In this question (including all five answers) the letters 'o' and 'f' each appear  
 (a) once (b) twice (c) three times (d) four times (f) five times
2. John is 12 cm taller than Fred. Pat is 15 cm shorter than John. Fred is 123 cm tall. How tall is Pat?
3. A calculator displays  $\frac{1}{6}$  as 0.166666, how would  $\frac{1}{60}$  be displayed?
4. How many numbers between 1 and 100 have the figure 3 in them?
5. Mary can run three times as fast as Roisin. If they set off in opposite directions around the track shown below, where will they meet for the first time? Show your answer on the track itself



6. Approximately how many seconds have you been alive?
7. Roughly how many euro coins, laid edge to edge would be required to cover the floor of your mathematics room? What fraction of the floor is still visible through the array of coins?
8. The diagram below shows two scales. In the first, three ovals weigh the same as one cube and one pyramid while in the second one cube weighs as much as two ovals and one pyramid. How many pyramids will balance one oval?



9. How many pairs of numbers of the form  $x$  and  $2x + 1$  are there in which both numbers are prime numbers less than 100?

10. A crossnumber is similar to a crossword except that the answers are numbers with one digit in each square. Us the clues to complete the Crossnumber

**Clues Across**

- 1. Prime Number
- 3. Square of 3 Down

**Clues Down**

- 1. Prime Number
- 2. Square of 1 Down
- 3. Square root of 3 Across

	<b>1</b>	<b>2</b>
<b>3</b>		

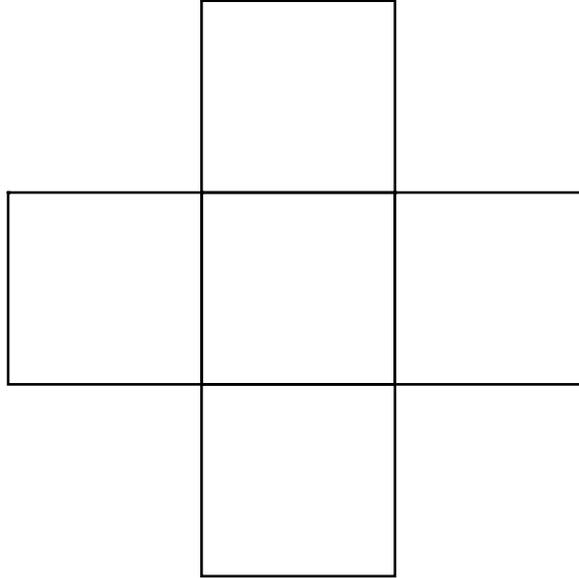
11. A person starts counting at 19 and continues to 89, taking one second to say each number. How long does it take altogether?

12. The names of the whole numbers are written in the order in which they appear in the dictionary. Which one comes fifth?

13. Which of the numbers 28,30,26,37, and 29 is the average (or mean) of the other four?

14. The date May 7 1935 is strange in that when it is written in the form 7-5-35 we can see that  $5 \times 7 = 35$ . How many such dates are there in 2015?

15. If the numbers 1,2,3,4,5 are arranged in five squares , shown below, so that the horizontal and vertical both add to 8. Which number must be placed in the middle square?



16. The sum of the three consecutive odd numbers 9, 11 and 13 is  $9 + 11 + 13 = 33$ . Find three consecutive odd numbers that sum to 51. Show your work and explain your reasoning. Now find:
- five consecutive odd numbers that add to give 175
  - six consecutive odd numbers that add to give 240
17. In a rugby match the final score line was **Ireland 23 England 17**. Find:
- the maximum possible number of tries that could have been scored in the game.
  - the minimum possible number of tries scored
18. Two positive integers add to give 20. How many pairs of numbers can you find? Which pair gives the maximum number when multiplied?
19. Write the number 101 as the sum of positive whole numbers whose product is as large as possible (<http://www.math.toronto.edu/>).

20. Pat bought a size 5 match day sliotar at a sports day. He paid for it using 9 coins. Find:
- the maximum and
  - minimum possible cost of the sliotar.

Are your answers reasonable?

Use your knowledge of the typical cost of a match day size 5 sliotar to estimate the actual payment made by Pat

### ***Problem solving questions relating to Algebra***

- There are 8 teams involved in a sports tournament. Each team plays every other team once and only once. It does not matter who wins the games. Therefore, how many games in all are played? You may want to call your teams A,B,C OR 1,2,3.
- A boy cycled 100 kilometres in five days. Each day he cycled 8 kilometres more than the day before. How many kilometres did he cycle on the first day?
- A shop sells a combination of both three-wheeled buggies and four-wheeled buggies. A customer counted 24 buggy wheels in total in the shop. Use your reasoning and problem solving skills to find how many three-wheeled and how four-wheeled buggies there could have been in the shop on this day.
- What is the smallest positive number with exactly five positive whole number divisors?

### ***Problem solving questions relating to Shape & Space***

1. A cattle pen that measures 7m in length by 10m in width is enlarged to 4 times its area whilst maintaining its relative proportions. What are the new dimensions of the pen (i.e. its length and the width)?
  
2. A farmer wants to build a new area for his sheep. The farmer decides that the enclosure must be square or rectangular with an area of 100 square metres and have sides with whole-number lengths.
  - (i) What could be the possible side-lengths of the enclosure?
  - (ii) How many metres of fencing will be needed for each possible design?
  - (iii) Use your copy or some graph paper to draw all the possible rectangular or square designs.
  - (iv) Include a key to tell how much each unit on the grid paper equals.
  - (v) Which fence would you advise the farmer to build? Why?

(Adapted by Dr Sean Delaney from NCTM website)

### ***Problem solving questions relating to Data***

1. A magician placed 4 red skittles for every 10 blue skittles into a bag as part of a trick. How many red skittles were there if the magician counted 36 more red skittles than blue skittles?
  
2. Joe and Rachel each roll a standard die obtaining a number at random from 1 to 6. What is the chance that Joe's number is larger than Rachel's number?