

Counting problems 1 (Junior UKMT)

These questions must be attempted without a calculator

Topics covered in the questions below may not necessarily be from the topic of the title.

1. Mary has three brothers and four sisters.

If they, and Mary, all buy each other an Easter egg, how many eggs will be bought?

A 14 B 28 C 42 D 56 E 64

2. A “double-decker” sandwich has three slices of bread and two layers of filling (bread/filling/bread/filling/bread). Each slice of bread has to be buttered on each side that is in contact with the filling. I make as many of these sandwiches as possible from a sliced loaf which has 22 usable slices, excluding the crusts which are not used.

How many sides of bread do I have to butter?

A 21 B 22 C 28 D 32 E 42

3. The number 2002 is a *palindrome*, since it reads the same forwards and backwards.

For how many other years this century will the number of the year be a palindrome?

A none B 1 C 9 D 81 E 90

4. For how many three-digit numbers does the sum of the digits equal 25?

A 2 B 4 C 6 D 8 E 10

5. Granny tells Dilly that her glove drawer contains 1 left-hand blue glove, 2 left-hand green gloves, 3 right-hand blue gloves, and 4 right-hand green gloves, and asks her to bring a pair of gloves from the drawer. Unfortunately Dilly cannot tell the difference between left-hand and right-hand gloves, but, thankfully, can identify blue and green.

What is the smallest number of gloves that Dilly should bring, in order to be sure that these include a matching pair?

A 2 B 4 C 6 D 8 E 10

6. The Pythagoras School of Music has 100 students. Of these, 60 are in the band and 20 are in the orchestra.

Given that 12 students are in both the band and the orchestra, how many are in neither the band nor the orchestra?

A 8 B 20 C 24 D 28 E 32

7. 5p, 2p and 1p coins (or a mixture of any or all of these) are used to make a total of 11p.
In how many different ways can this be done?

A 13 B 11 C 9 D 6 E 3

8. A comb for horses has 100 teeth, each 1 mm wide. The gaps between the teeth are also 1 mm wide.

How long is the comb?



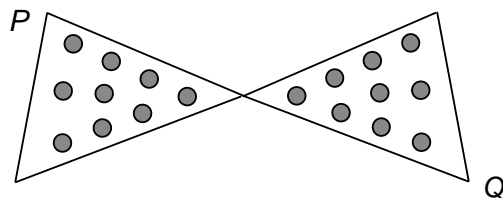
A 9.9 cm B 10 cm C 19 cm D 19.9 cm E 20 cm

9. Nicolas wrote a Christmas card for each of his three sisters – Carol, Holly and Ivy – and put each card into a separate envelope.

In how many different ways can he send a card to each sister so that none of them receives the correct card?

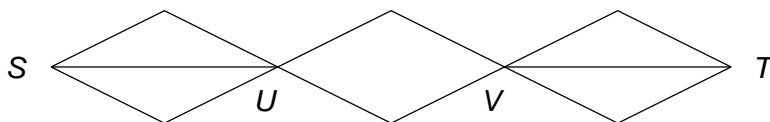
A 1 B 2 C 3 D 4 E 5

10. A ladybird has landed at point P on Sam's bow-tie. If it travels only along the edges of the bow-tie, but cannot travel along any edge more than once, how many different ways are there for it to get from P to Q ?



A 1 B 2 C 3 D 4 E 5

11. How many different routes are there from S to T which do not go through either of the points U and V more than once?



A 3 B 6 C 8 D 12 E 18

12. The digits of the year 2000 A.D., add up to 2. In how many *other* years since 1 A.D. has this happened?

A 3 B 6 C 8 D 9 E 10