



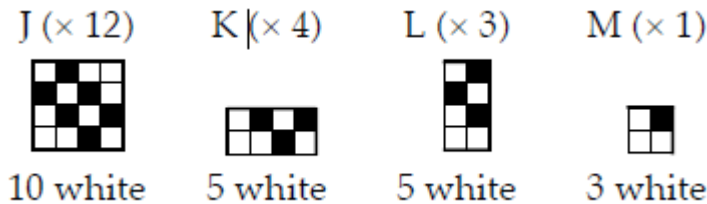
## Number Nest Weekly Challenge

1. Willy Stockitt likes to display his tins of beans in just one large triangular pile. His shop window is 80 cm high and 42 cm wide, and his bean tins are 10 cm high and 5 cm wide. What is the largest number of tins he can display in his window? **36 tins**

The highest possible pile of tins is 80 cm, the height of 8 tins. As this pile is also 8 tins wide, the pile will also fit widthways in the window. The number of tins in each pile is a triangular number (not surprisingly), and the eighth triangular number is 36.

2. Tyler Wall wants to tile her kitchen by repeating this 4 x 4 pattern of tiles, starting from the bottom left corner and working across and up. The area that she wants to tile measures 18 tiles across and 14 tiles up. Tiles are sold in packs of 10. How many **packs** of white tiles will she need to buy? **16 packs**

A pattern of 18 tiles along and 14 tiles up, will require 3 complete rows of 4 patterns of 16 tiles (J) and 4 patterns of 8 tiles (K) as well as 3 patterns of 8 tiles (L) and 1 pattern of 4 tiles (M):



Therefore the number of white tiles will be  $12 \times 10 + 4 \times 5 + 3 \times 5 + 3 = 158$  and so Tyler will need to buy 160 tiles in 16 packs.

3. A book has 256 pages with, on average, 33 lines on each page and 9 words on each line. Which of the following is the best approximation to the number of words in the book?  
A) 64,000      B) 68,000      C) 72,000      **D) 76,000**      E) 80,000

The number of words =  $256 \times 33 \times 9 \approx 250 \times 300 = 75000$ . The best estimate, therefore, is 76,000.

4. Kim writes all the counting numbers from 1 to 100 in order without leaving any gaps:

123456789101112131415 ...

What is the 100th digit that Kim writes? **5**

The first 9 numbers are single digits, so after writing these Kim has 91 digits left. Each number from 9 to 99 requires two digits, and so after writing 91 further digits Kim will have written another 45 complete two-digit numbers (up to the number 54); the one digit left will be a 5, the first digit of 55.

5. 48% of the pupils at a certain school are girls. 25% of the girls and 50% of the boys at this school travel to school by bus. What percentage of the whole school travel by bus?  
A) 37%      **B) 38%**      C) 62%      D) 43%      E) 45%

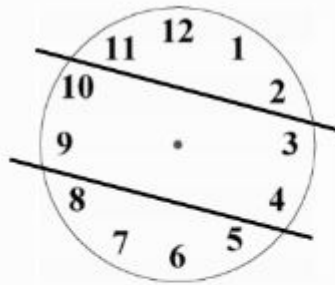
The girls who travel by bus make up 12% ( $\frac{1}{4}$  of 48%) of the whole school and the corresponding figure for boys is 26% ( $\frac{1}{2}$  of 52%). Hence 38% of the whole school travel by bus.

6. Despite his name, Mr. Bean likes to eat lots of fruit. He finds that four apples and two oranges cost £1.54 and that two oranges and four bananas cost £1.70. How much would he have to pay if he bought one apple, one orange and one banana? **81p**

The total cost of four apples, four oranges and four bananas is  $£1.54 + £1.70 = £3.24$ . Hence the amount Mr. Bean would pay for one apple, one orange and one banana is  $£3.24 \div 4 = 81p$ .

## Bonus Question

Use 2 straight lines to split the clock face into 3 parts, so that the sums of the numbers in each of the parts are equal.



Answer:

$$\begin{aligned} \text{Each sum equal to } & \frac{1}{3} \text{ of } 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12 \\ & = \frac{1}{3} \text{ of } 78 = 26 \end{aligned}$$