Maths Reasoning Questions: Multiplication problems

- You may find it helpful to watch this this video before you attempt to answer any questions. It explains how to solve missing number problems.

- If you don't know, or need a reminder of how to do multiplication with the column method, complete the step-by-step guide and watch the tutorial on this page.

Worked example: We are going to use the 'RUCSAC' method to solve these problems.

A toy shop orders 11 boxes of marbles.
Each box contains 6 bags of marbles.
Each bag contains 45 marbles.
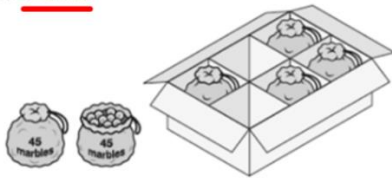
How many **marbles** does the shop order in total?

Show your method

marbles

1. I have **read** the question and **underlined** the important information.
2. I have thought about the question and what I am being asked to do. I now **understand.**
3. In each box there are six bags of marbles. There are 45 marbles in each bag, so I will need to multiply the number of marbles (45) by the number of bags (6). This will give me the number of marbles in each box. Because there are 11 boxes, I will need to multiply my answer by 11. I have **chosen** the calculations I need to complete.
4. I **solved** the problem using column method (there is a guide on the first page about column method multiplication) and found that 45 multipled by six is 270. I then multiplied 270 by 11 which gave me 2,970. I have the problem.

$$\begin{array}{r} 4\ 5 \\ 6\ \times \\ \hline 2\ 7\ 0 \\ _2\ _3 \end{array}$$

$$\begin{array}{r} 2\ 7\ 0 \\ 1\ 1\ \times \\ \hline 2\ 7\ 0 \\ 2\ 7\ 0\ 0 \\ \hline 2\ 9\ 7\ 0 \end{array}$$

5. I followed my plan by finding the number of marbles in a box, and then the number of marbles in 11 boxes to find the total number of marbles. I have **answered** the question.
6. I carefully **checked** my calculations to make sure I haven't made a mistake. My answer is 2,970

Warming up*

1.

Jason gets **£5** pocket money each week.

Holly gets **£3** pocket money each week.

They both save all their money for **ten weeks.**

How much **more** money has Jason saved than Holly?

£

2.

Jason is given £4 each month from his gran.

How much money does he collect in a year?

£

3.

Holly has four bowls.

She puts **8** grapes in each bowl.

There are **5** grapes left over.

How many grapes did she start with?

grapes

4.

Apple
27p

Banana
17p

Mia buys **four** apples and **six** bananas.

How much does she spend altogether?

Show your method

£

Feeling more confident**

1.

Write what the missing numbers could be.

$$\boxed{} \quad \times \quad \boxed{} \quad = \quad 180$$

2.

Miss Smith had 150 reward stickers at the start of the year.

She gave 8 children 7 stickers each.

She gave 12 children 6 stickers each.

How many stickers **are left**?

Show your method

_____ stickers

3.

Write in the missing number.

$$20 \quad \times \quad 10 \quad = \quad 25 \quad \times \quad \boxed{}$$

4.

Circle **three** numbers that add to make a **multiple** of **10**

21   22   23   24   25   26   27   28   29

Ready for a challenge***

1.

$$17 \times 19 = 323$$

Use the fact above to find the missing numbers below.

$$170 \times 190 = \boxed{}$$

$$3{,}230 \div 19 = \boxed{}$$

$$1{,}700 \times \boxed{} = 32{,}300$$

2.

In this sequence, the rule to get the next number is

Multiply by 2, and then add 3

Write the missing numbers.

	25	53	

3.

A machine pours 250 millilitres of juice every 4 seconds.

How many **litres** of juice does the machine pour every **minute**?
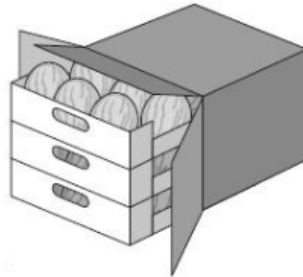
Show your method

litres

4.

A box contains trays of melons.

There are 15 melons in a tray.

There are 3 trays in a box.

A supermarket sells **40** boxes of melons.

How many melons does the supermarket sell?

Show
your
method

melons

Warming up*

1.

£20

2.

£48

3.

37

4.

Award **TWO** marks for the correct answer of £2.10

If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g.
- $27 \times 4 + 17 \times 6 =$
- $27 + 27 + 27 + 27 = 108$
  $17 + 17 + 17 + 17 + 17 + 17 = 102$
  $108 + 102 = £2.00$ (*error*)
- $27 + 17 = 44$
  $44 \times 4 = 176$
  $176 + 34 =$

Feeling more confident**

1.

4 5C5a	Two numbers with a product of 180, e.g. $\boxed{3}$ × $\boxed{60}$ = 180	1m	Accept fractions and decimals e.g. $\boxed{1.8}$ × $\boxed{100}$ = 180

2.

Award **TWO** marks for the correct answer of 22

If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g.

- $8 \times 7 + 12 \times 6 =$
  $56 + 72 = 128$
  $150 - 128 = 21$ (*error*)
- $150 - 56 - 72 =$

3.

Calculation completed as shown: $\boxed{20}$ × $\boxed{10}$ = $\boxed{25}$ × $\boxed{8}$	1m

4.

Any three numbers circled that sum to a multiple of ten, e.g.

- 21, 22, 27
- 25, 27, 28

Ready for a challenge***

1.

Award **TWO** marks for three numbers correct, as shown:

$170 \times 190 =$ **32,300**

$3,230 \div 19 =$ **170**

$1,700 \times$ **19** $= 32,300$

If the answer is incorrect, award **ONE** mark for any two numbers correct.

2.

(a) 11 written in the first box, as shown:

| **11** | 25 | 53 | |

(b) 109 written in the last box, as shown:

| | 25 | 53 | **109** |

3.

Award **TWO** marks for the correct answer of 3.75

If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g.

- $60 \div 4 = 15$
- $250 \times 15 = 3750$
- 3750 ml $\div 1000 =$

OR

- $250 \div 4 = 62.5$ ml per second
- $62.5 \times 60 = 3750$
- 3750 ml $\div 1000 =$

OR

- $60 \div 4 = 15$, so there are 15 lots of 4 seconds in 1 minute so there are 15 bottles per minute.
- There are 4 bottles in 1 litre
- $15 \div 4 =$

  *Accept for **TWO** marks, 3,750 ml for final answer in working and the answer box blank **OR** 3,750 in the answer box where the litres has been replaced with millilitres.*

  *Accept for **ONE** mark 3,750 litres (l) in the answer box **OR** the final answer in working and answer box blank.*

  *Answer need not be obtained for the award of **ONE** mark.*

  Up to 2m

4.

Award **TWO** marks for the correct answer of 1800

If the answer is incorrect, award **ONE** mark for evidence of appropriate complete method with no more than one arithmetic error, e.g.

- 40 × 15 = 500 *(error)*
  500 × 3 = 1500

  > **Do not** accept sight of a correct multiplication, e.g. 40 × 15 × 3, for **ONE** mark unless part of the calculation is evaluated correctly.
  >
  > Misreads are **not** allowed.

If no answer is given, the first part of the calculation must be evaluated correctly for the award of **ONE** mark, e.g.

- 15 × 3 = 45
  45 × 40 =

OR

- 40 × 15 = 600
  600 × 3 =

OR

- 40 × 3 = 120
  120 × 15 =

Up to **2m**