Q1.

Amina asked 60 children to choose their favourite flavour of jelly.

These were her results.

Flavour	Number of children
Raspberry	12
Lemon	8
Orange	15
Blackcurrant	25
Total	**60**

What **percentage** of the 60 children chose orange?

[ ] %

1 mark

Q2.

Write the missing number.

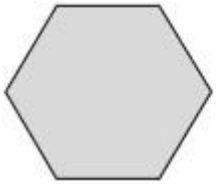
$$6 + 2 \times 2 - \square = 6$$

1 mark

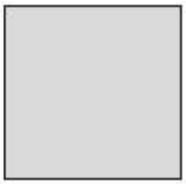
Q3.

These two shapes have the **same** perimeter.

regular hexagon



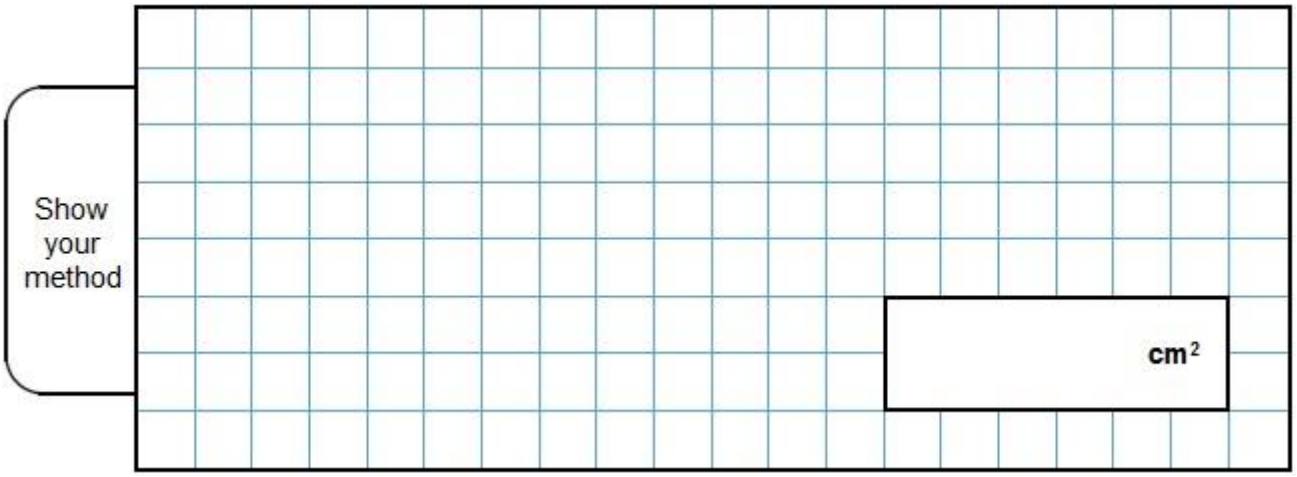
square



Not actual size

The length of each side of the **hexagon** is **8** centimetres.

Calculate the **area** of the **square**.

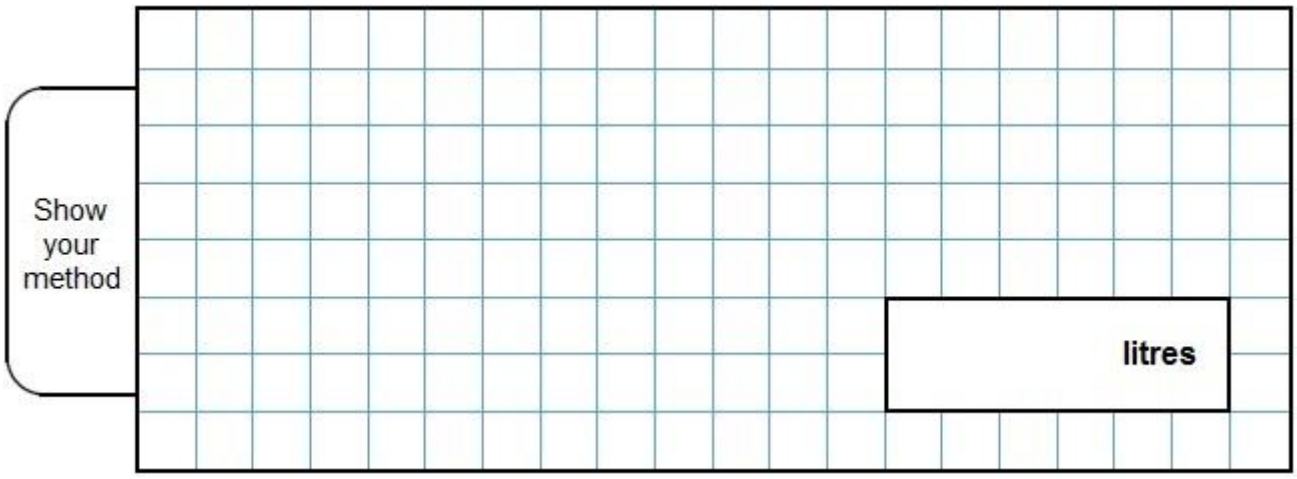


2 marks

Q4.

A machine pours 250 millilitres of juice every 4 seconds.

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



2 marks

Q5.

Tick the fractions that are **equal** to 20%.

$\frac{1}{20}$ ☐

$\frac{20}{40}$ ☐

$\frac{1}{5}$ ☐

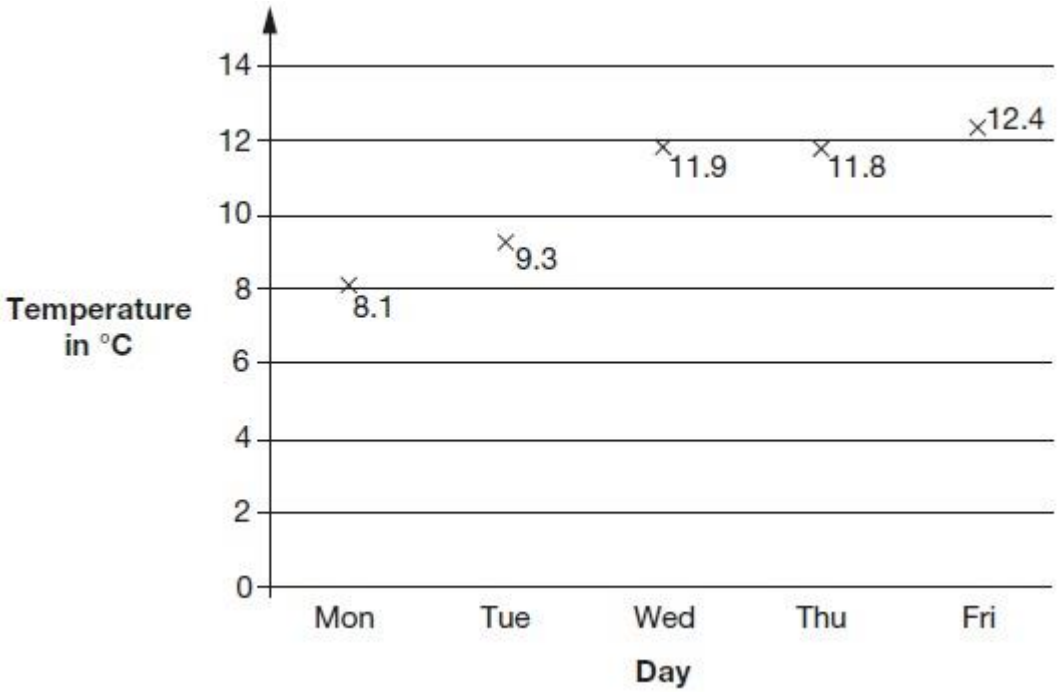
$\frac{3}{15}$ ☐

$\frac{2}{100}$ ☐

2 marks

Q6.

This graph shows the maximum temperature for five days.



For what fraction of the five days was the maximum temperature below 10°C?

1 mark

What was the **mean** maximum temperature, to one decimal place?

Show your method

°C

2 marks

Q7.

The International Space Station orbits the Earth at a height of 250 miles.

What is the height of the International Space Station in **kilometres?**

Use 8 kilometres equals 5 miles.

km

1 mark

Q8.

$$x + 2y = 20$$

x and y are whole numbers **less than 10**

What could x and y be?

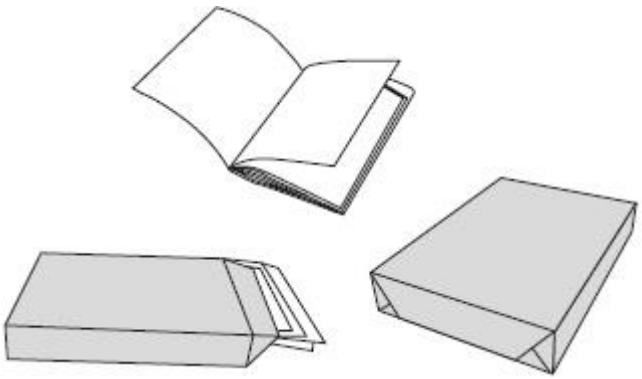
$x =$ ☐

$y =$ ☐

1 mark

Q9.

Adam is making booklets.



Each booklet must have **34** sheets of paper.

He has **2** packets of paper.

There are **500** sheets of paper in each packet.

How many complete booklets can Adam make from **2** packets of paper?

Show your method

booklets

2 marks

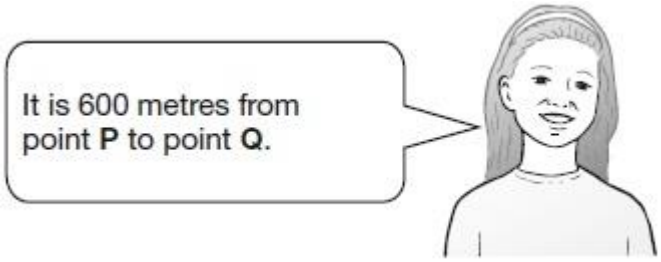
Q10.

Not to scale

The distance from point **P** to point **R** is 800 metres.

The distance from point **P** to point **Q** is **4 times** the distance from point **Q** to point **R**.

Olivia says,



Explain why Olivia is **not** correct.

1 mark

Q11.

$\frac{6}{5}$ $\frac{3}{5}$ $\frac{3}{4}$

Write these fractions in order, starting with the **smallest**.

smallest

1 mark

Q12.

There are 28 pupils in a class.

The teacher has 8 litres of orange juice.

She pours 225 millilitres of orange juice for every pupil.

How much orange juice is left over?

Show your method

3 marks

Q13.

Layla wants to estimate the answer to this calculation.

$$3\frac{9}{10} - 2\frac{1}{8} + 1\frac{4}{5}$$

Tick the calculation below that is the best estimate.

Tick **one**

3 − 2 + 2 ☐

4 − 2 + 1 ☐

4 − 2 + 2 ☐

3 − 2 + 1 ☐

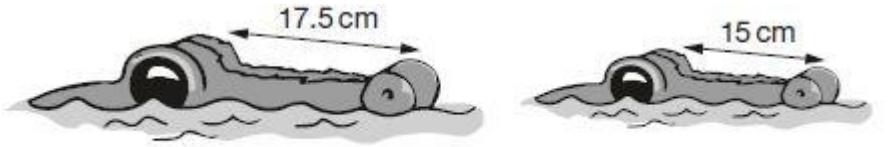
1 mark

Q14.

The length of an alligator can be estimated by:

- measuring the distance from its eyes to its nose
- then multiplying that distance by 12

What is the **difference** in the estimated lengths of these two alligators?



Not to scale

Show your method

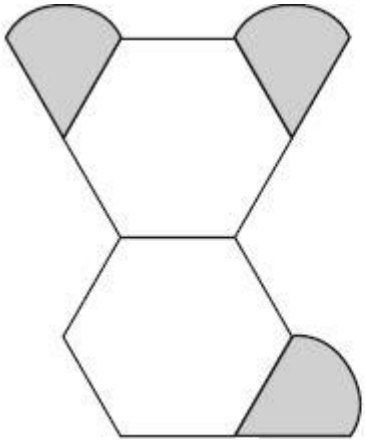
cm

2 marks

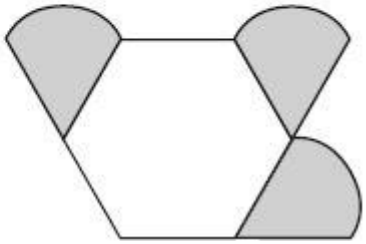
Q15.

Amina is making designs with two different shapes.

She gives each shape a value.

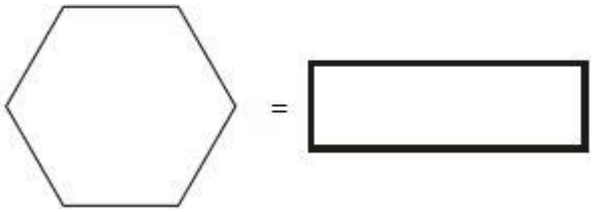


Total value is 147

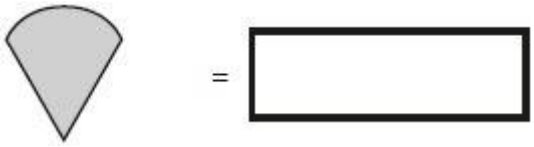


Total value is 111

Calculate the value of each shape.



1 mark



1 mark

Q16.

The length of a day on Earth is 24 hours.

The length of a day on Mercury is $58\frac{2}{3}$ times the length of a day on Earth.

What is the length of a day on Mercury, in **hours**?

Show your method

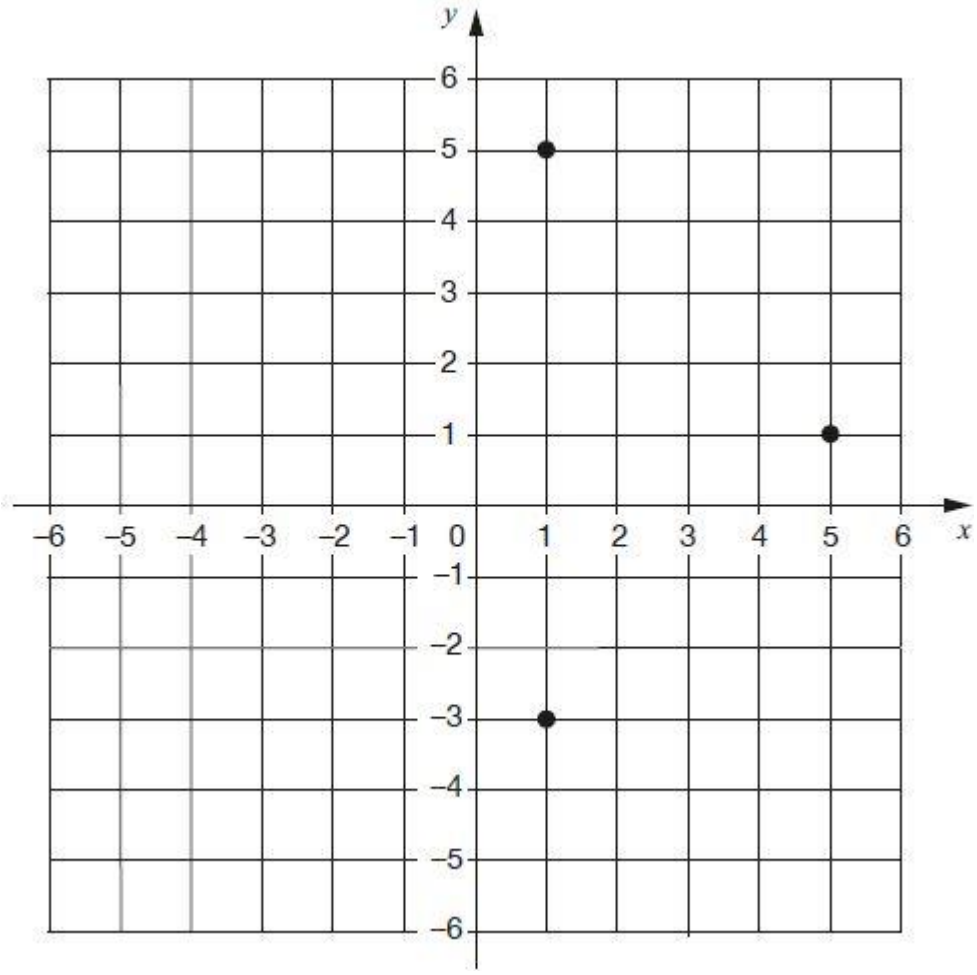
hours

2 marks

Q17.

Layla draws a **square** on this coordinate grid.

Three of the vertices are marked.



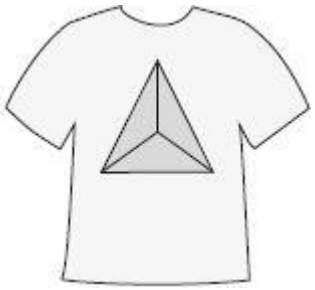
What are the coordinates of the missing vertex?

(,)

1 mark

Q18.

A shop prints designs on T-shirts.



They use this formula to work out the price for printing a design.

price = 60p × number of colours + £1.25

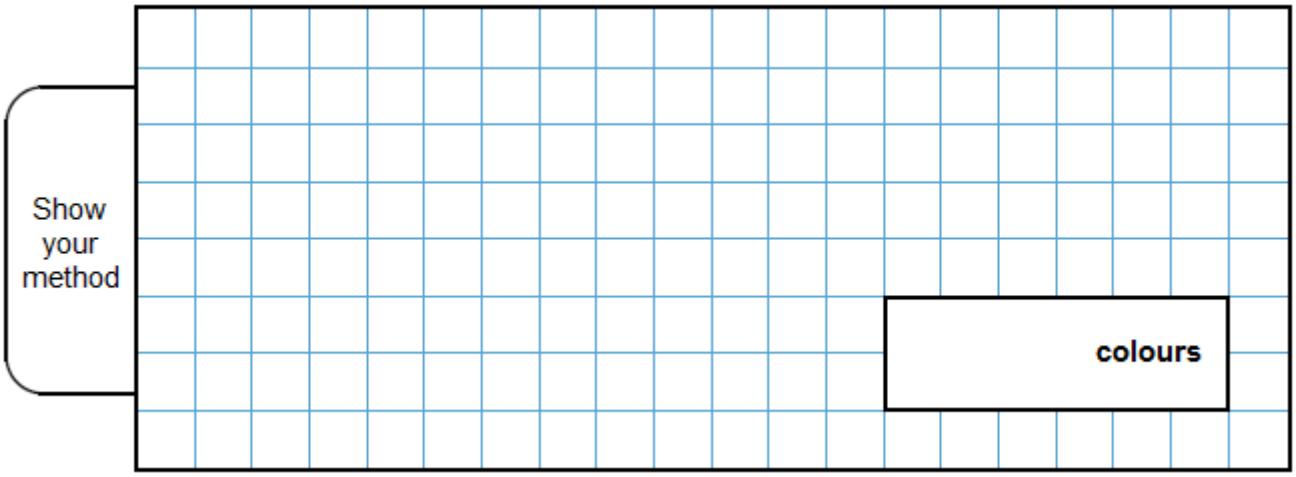
What is the price for printing a design that has **3** colours in it?

£

1 mark

Amina has **£5** to spend on printing a design.

What is the greatest number of **colours** she can have in the design?

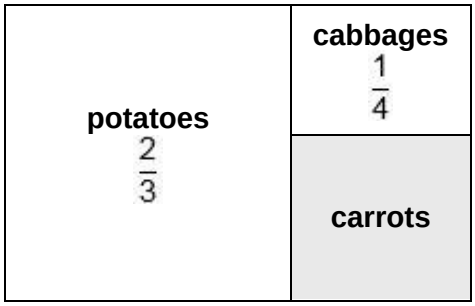


2 marks

Q19.

This is a diagram of a vegetable garden.

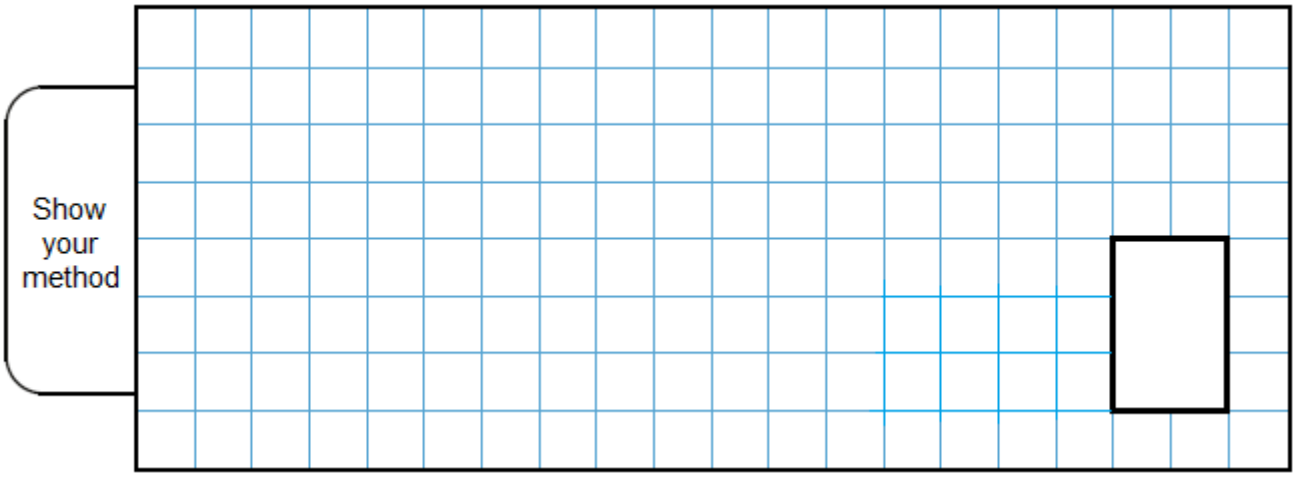
It shows the fractions of the garden planted with potatoes and cabbages.



Not to scale

The remaining area is planted with carrots.

What **fraction** of the garden is planted with carrots?



2 marks

Q20.

$$33{,}630 = 354 \times 95$$

Use this multiplication to complete the calculations below.

$354 \times 9.5 =$ ☐

$3{,}540 \times 95 =$ ☐

$3{,}363 \div 95 =$ ☐

2 marks

Q21.

Jack finished a sponsored run in 53 minutes 25 seconds.

Ally finished 3 minutes 50 seconds **after** Jack.

How long did Ally take?

☐ **min** ☐ **sec**

1 mark

Layla finished the run 8 minutes 45 seconds **before** Jack.

How long did Layla take?

min sec

1 mark

Q22.

Amina planted some seeds.

For every 3 seeds Amina planted, only 2 seeds grew.

Altogether, 12 seeds grew.

How many seeds did Amina **plant**?

1 mark

Q23.

A cat sleeps for **12 hours** each day.

50% of its life is spent asleep.

Write the missing percentage.

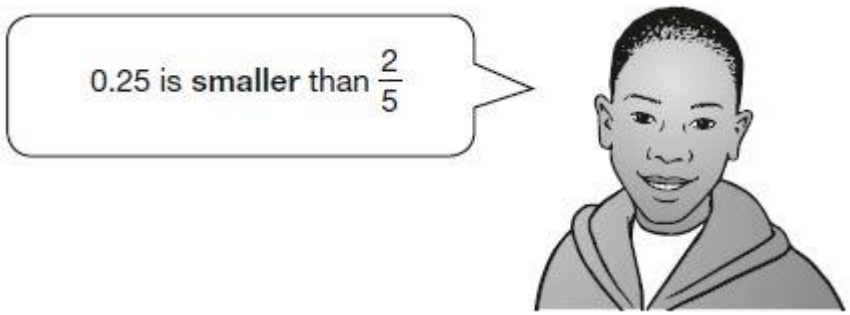
A koala sleeps for **18 hours** each day.

% of its life is spent asleep.

1 mark

Q24.

Adam says,

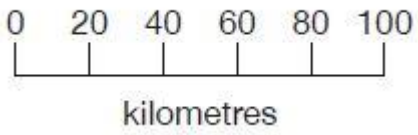


Explain why he is correct.

1 mark

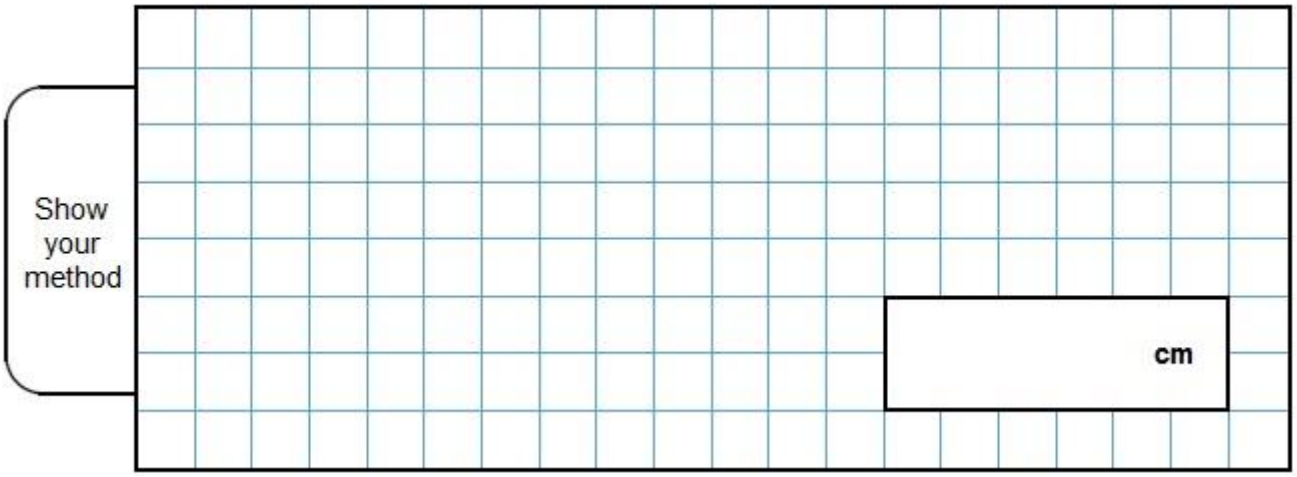
Q25.

On a map, 1 cm represents 20 km.



The distance between two cities is **250 km**.

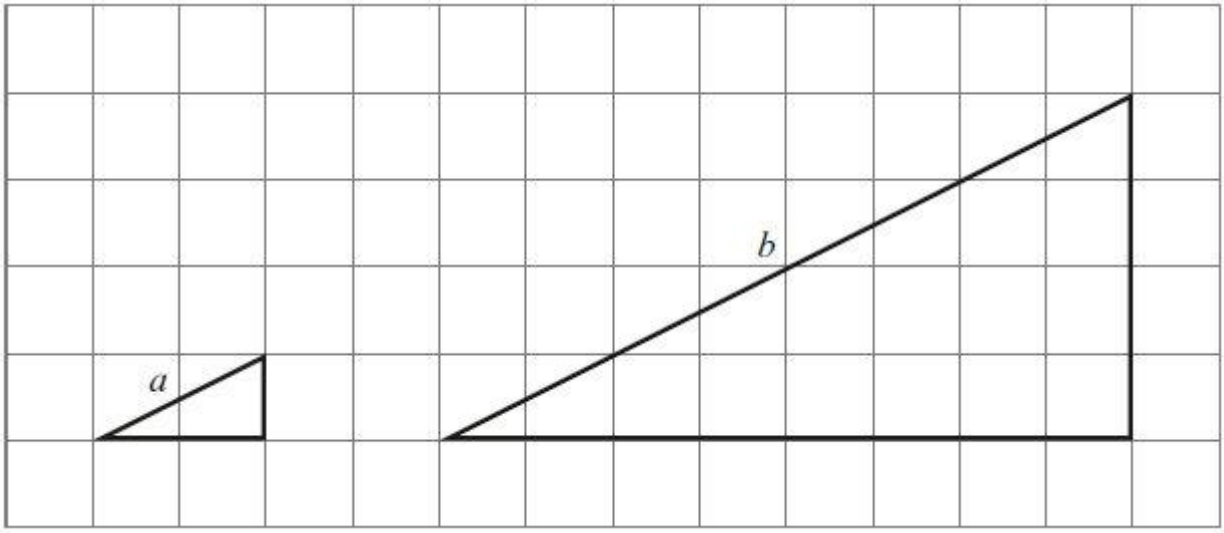
On the map, what is the distance between the two cities?



2 marks

Q26.

Here are two similar right-angled triangles.



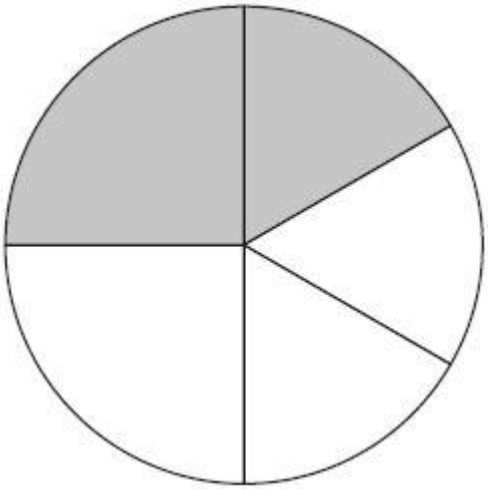
Write the ratio of side a to side b.

$a : b =$ ☐ :

1 mark

Q27.

In this circle, $\frac{1}{4}$ and $\frac{1}{6}$ are shaded.

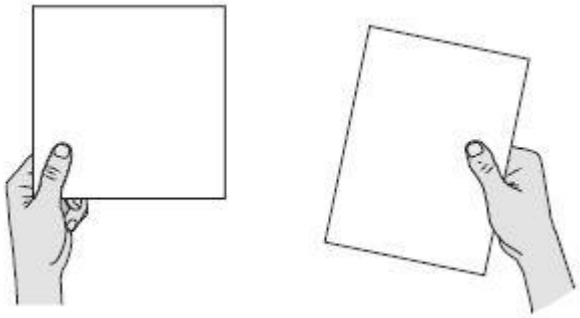


What fraction of the whole circle is **not** shaded?

Show your method

2 marks

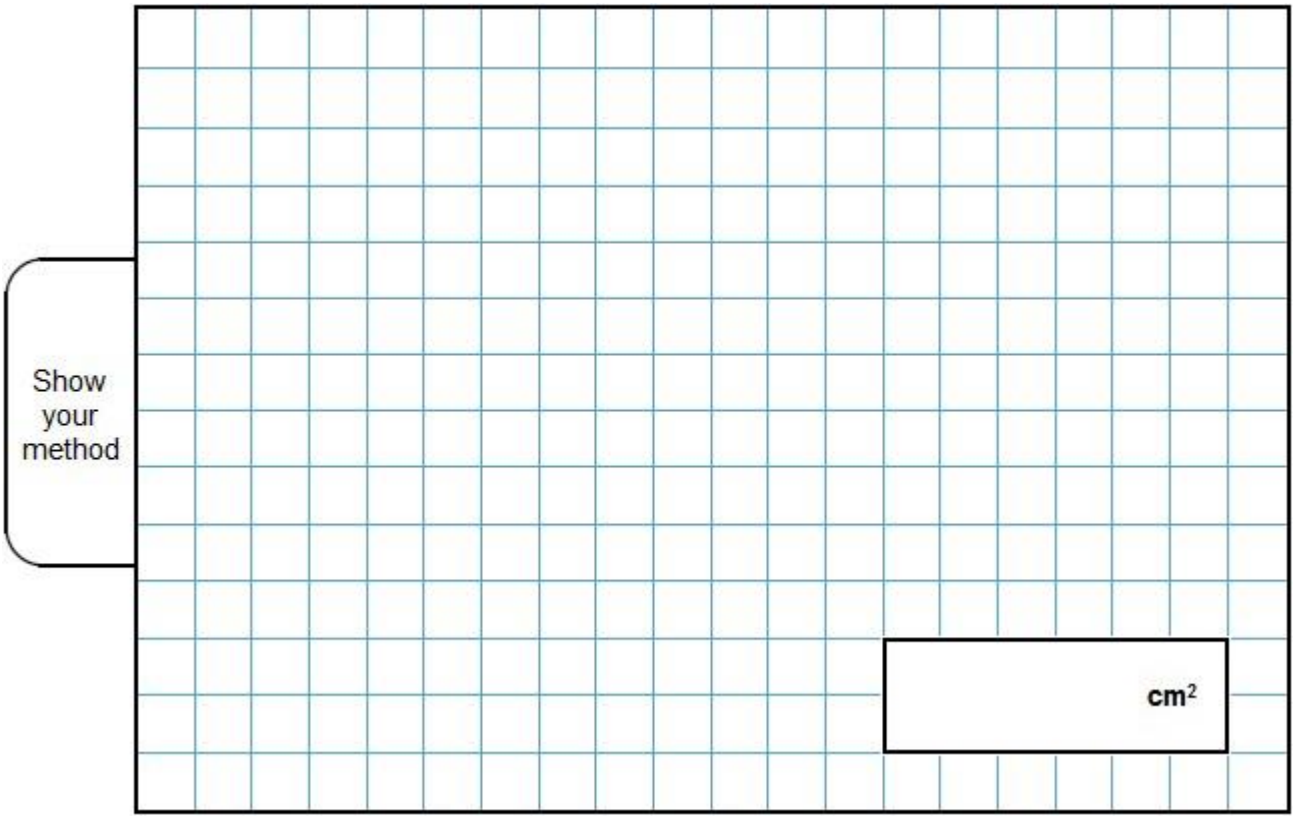
Q28.



A square tile measures 20 cm by 20 cm.

A rectangular tile is 3 cm **longer** and 2 cm **narrower** than the square tile.

What is the **difference in area** between the two tiles?

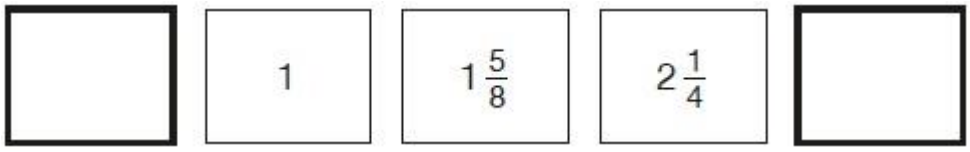


3 marks

Q29.

The numbers in this sequence increase by the same amount each time.

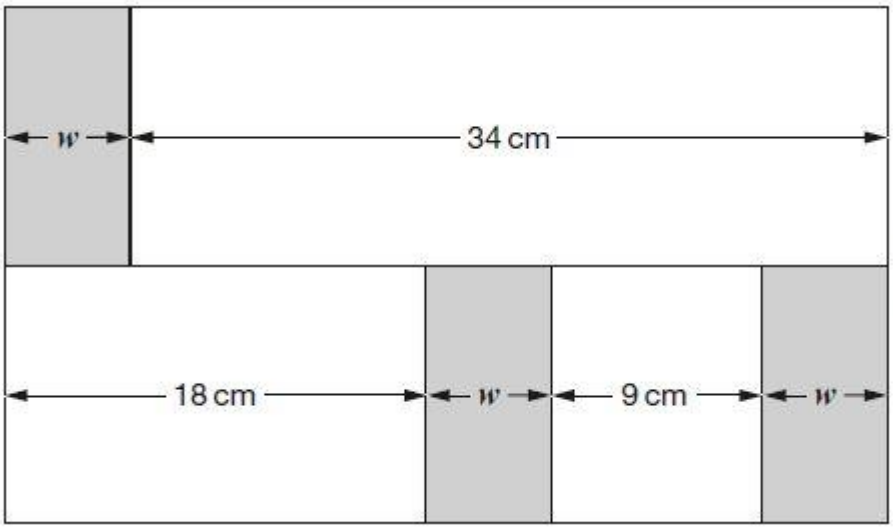
Write the missing numbers.



2 marks

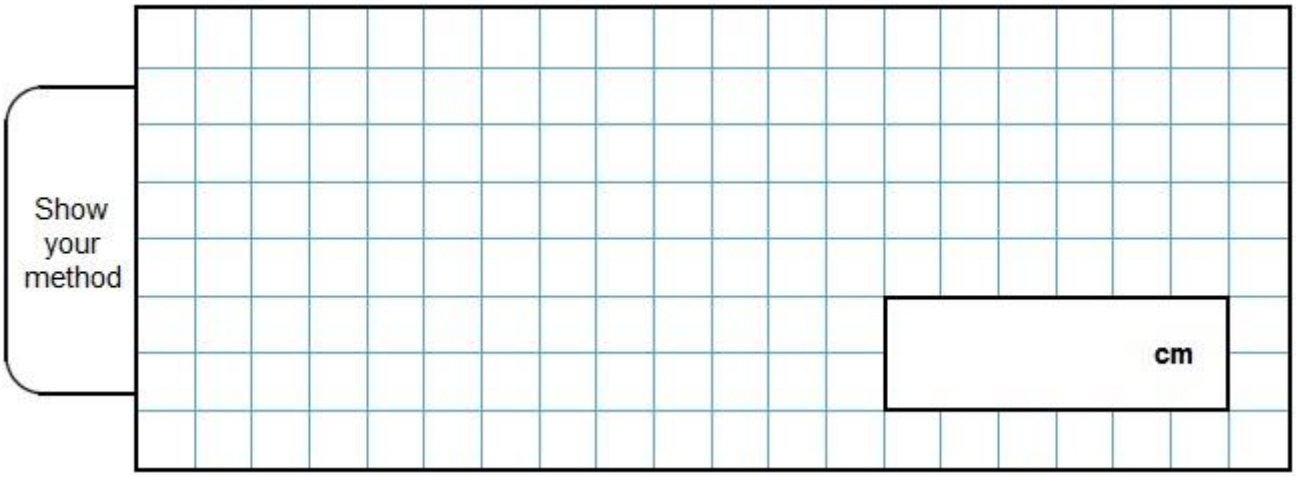
Q30.

In this diagram, the shaded rectangles are all of equal width (w).



Not to scale

Calculate the width (w) of one shaded rectangle.



2 marks

Q31.

Here is a pattern of number pairs.

a	b
1	9
2	19
3	29
4	39

Complete the **rule** for the number pattern.

$$b = \square \times a - \square$$

1 mark

Q32.

$n = 22$

What is $2n + 9$?

1 mark

$2q + 4 = 100$

Work out the value of q.

$q =$

1 mark

Q33.

Miss Mills is making jam to sell at the school fair.

Strawberries cost £7.50 per kg.

Sugar costs 79p per kg.

10 glass jars cost £6.90

She uses 12 kg of strawberries and 10 kg of sugar to make 20 jars full of jam.

Calculate the total cost to make 20 jars full of jam.

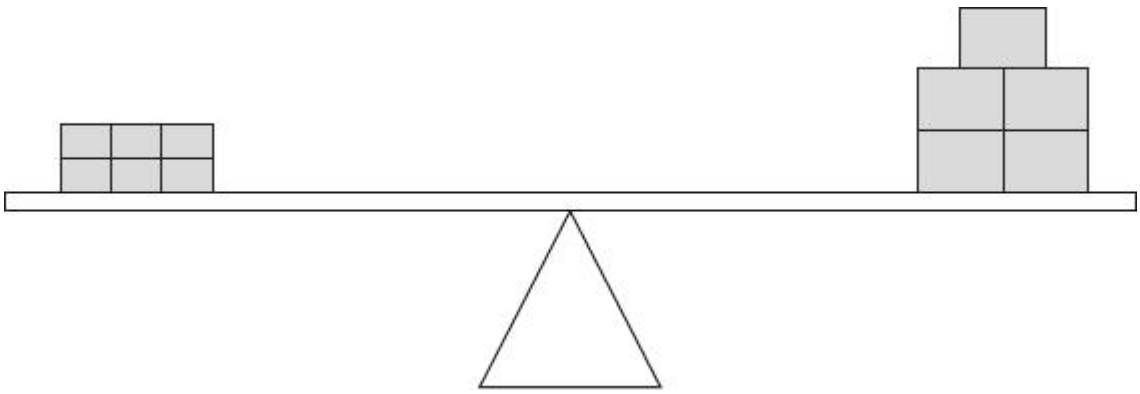
Show your method

£

3 marks

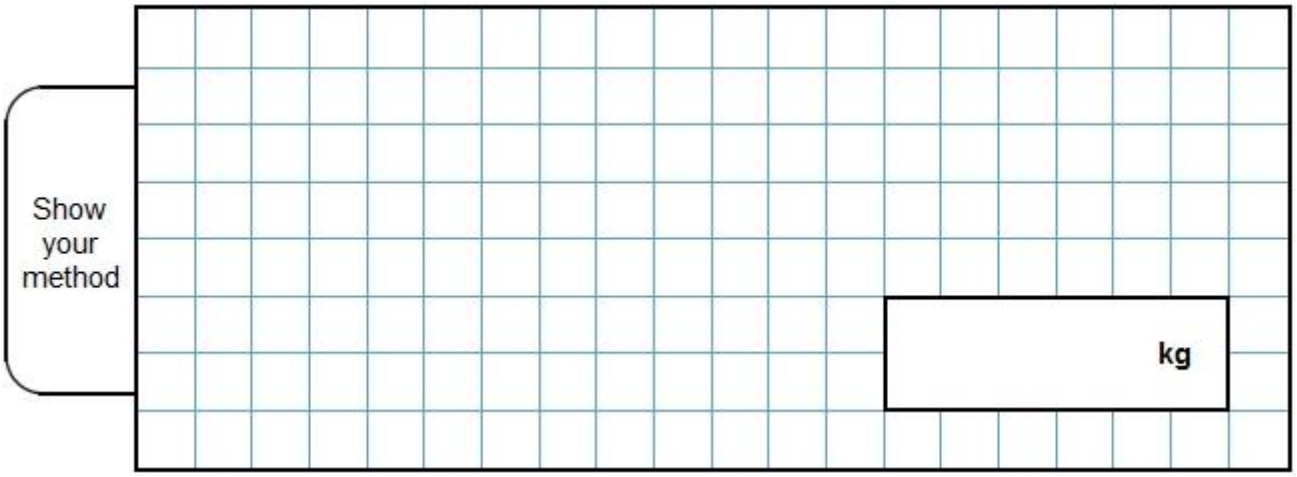
Q34.

6 small bricks have the same mass as 5 large bricks.



The mass of one small brick is 2.5 kg.

What is the mass of one large brick?



2 marks

Q35.

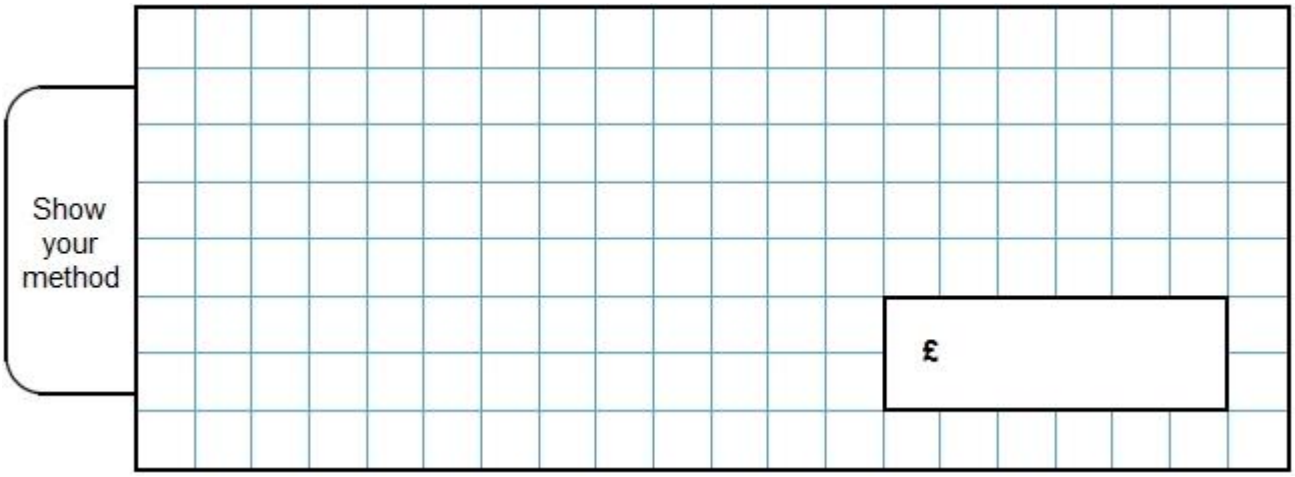
Lara had some money.

She spent £1.25 on a drink.

She spent £1.60 on a sandwich.

She has **three-quarters** of her money left.

How much money did Lara have to **start with**?



2 marks

Q1.

25

[1]

Q2.

4

[1]

Q3.

Award **TWO** marks for the correct answer of 144

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

- 8 × 6 = 48
  48 ÷ 4 = 13 (error)
  13 × 13 = 169

OR

Award **ONE** mark for:

- evidence for the side length of the square calculated correctly, i.e. 12

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

Up to 2m

[2]

Q4.

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 ÷ 4 = 15
- 250 × 15 = 3750
- 3750 ml ÷ 1000 =

OR

- 250 ÷ 4 = 62.5 ml per second
- 62.5 × 60 = 3750
- 3750 ml ÷ 1000 =

OR

- 60 ÷ 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.*

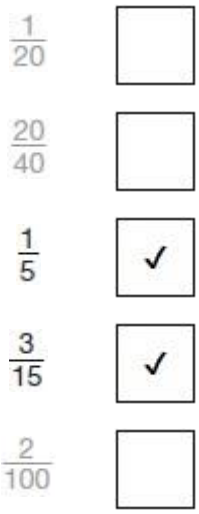
*Answer need not be obtained for the award of **ONE** mark.*

Up to 2m

[2]

Q5.

Award **TWO** marks for two boxes ticked correctly, as shown:



If the answer is incorrect, award **ONE** mark for:

- only **ONE** box ticked correctly and no incorrect boxes ticked
- **TWO** boxes ticked correctly and **ONE** incorrect box ticked.

Accept alternative unambiguous positive indication of the correct answer, e.g. Y.

Up to 2m

[2]

Q6.

(a) $\frac{2}{5}$

Accept equivalent fractions and decimals e.g. $\frac{4}{10}$ *and 0.4*

1

(b) Award **TWO** marks for the correct answer of 10.7

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

- $8.1 + 9.3 + 11.9 + 11.8 + 12.4 = 53.5$
  $53.5 \div 5$

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

Any correct rounding or truncating does not negate an appropriate method.
Any value which does not result from correct rounding or truncating implies an additional step not shown.

Up to 2m

[3]

Q7.

400

[1]

Q8.

Award **ONE** mark for any pair of whole numbers less than 10 that satisfy the equation, i.e.

$x = 8$ **AND** $y = 6$

OR

$x = 6$ **AND** $y = 7$

OR

$x = 4$ **AND** $y = 8$

OR

$x = 2$ **AND** $y = 9$

[1]

Q9.

Award **TWO** marks for the correct answer of 29

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

- 2 × 500 = 1,000
  1,000 ÷ 34 =

OR

- 2 × 500 ÷ 34 =

OR

- 500 ÷ 34 = 14 r23 *(error)*
  14 r23 × 2 = 28 r46

OR

- 34 × 10 = 340
  34 × 30 = 1,020

Answer = 30 booklets *(error)*

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

*Answer does not need to have been rounded or rounded correctly for the award of **ONE** mark.*

If a pupil reaches a non-integer answer, for example 28 r2 and expresses it as 28.2 without further working, this is considered a notation error and is condoned.

*Within an appropriate method, if the pupil's remainder from 500 divided by 34 is less than 17 and this remainder is ignored before doubling, this is acceptable for **ONE** mark. If the pupil's remainder is 17 or more and it has been ignored before doubling, this is **not** acceptable for **ONE** mark.*

***Do not** accept a trial and improvement method.*

Up to 2 marks

[2]

Q10.

An explanation that gives the correct values for PQ and/or QR, e.g.

- PQ = 640 m
- QR is 160, 160 times 4 is not 600 m
- 

OR

An explanation recognising PR is 800 m and must be 5 times QR, e.g.

- the total distance is 800 m. Divide by 5 to give 160 for distance between Q and R, so P and Q is 4 × 160 = 640 m (not 600 m)
- if QR is 200 m, then PR is 1000 m not 800m
- if PQ is 600 m then QR is 800 − 600 = 200 m. Then PR is 5 × 200 = 1000 m but it is only 800 m.

OR

An explanation that PQ is not 600 m, e.g.

- if it was 600 m then the shorter distance would be 200 m if added to make 800 m, 600 m is 3 times 200, not 4 times
- Olivia is not correct because 600 ÷ 4 = 150 and 600 + 150 doesn't equal 800
- Olivia is not correct because 800 − 600 = 200 and 600 is not 4 times 200

***Do not** accept vague, incomplete or incorrect explanations, e.g.*

- *Olivia is not correct because you can't divide 600 by 4 like you can for 800*

***Do not** accept explanations which include incorrect mathematics or incorrect information that is relevant to the explanation.*

[1]

Q11.

Fractions written in the correct order, as shown:

$\frac{3}{5}$ $\frac{3}{4}$ $\frac{6}{5}$

Accept the fraction joined to the correct box, rather than written in it.

***Do not** accept transcription errors or misreads for this question.*

[1]

Q12.

Award **THREE** marks for the correct answer of 1.7 (litres) or 1,700 (ml).

If the answer is incorrect, award **TWO** marks for:

- sight of 6,300 **OR** 6.3 as evidence of the multiplication completed correctly

OR

- evidence of an appropriate complete method with no more than one error, e.g.
  - 28 × 225 = 6,300
    8 litres = 8,000 ml
    8,000 − 6,300 = 2,700 *(error)*

Award **ONE** mark for evidence of an appropriate method, e.g.

- 8,000 − 28 × 225 =

*Unit need not be given for the award of **THREE** marks. An incorrect unit is treated as one error.*

A misread may affect the award of marks. No marks are awarded if there is more than one misread or if the mathematics is simplified.

***TWO** marks will be awarded for an appropriate complete method with the misread number followed through correctly.*

***ONE** mark will be awarded for evidence of an appropriate complete method with the misread number followed through correctly with one arithmetic error.*

*If the answer reached in the first part of the calculation gives an answer greater than 8(L) or 8000(ml) and the smaller value is then subtracted from it, **ONE** mark may still be available.*

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

Up to 3m

[3]

Q13.

Third box only ticked correctly, as shown:

3 − 2 + 2 ☐

4 − 2 + 1	☐
4 − 2 + 2	✓
3 − 2 + 1	☐

Accept alternative unambiguous positive indication of the correct answer, e.g. Y.

[1]

Q14.

Award **TWO** marks for the correct answer of 30

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

- 17.5 × 12 = 210
  15 × 12 = 180
  210 − 180 =

OR

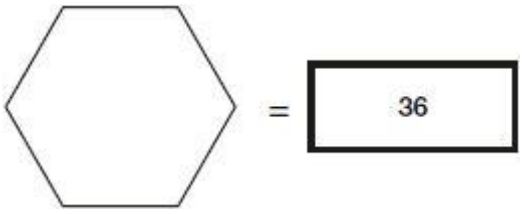
- 2.5 × 12 =

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

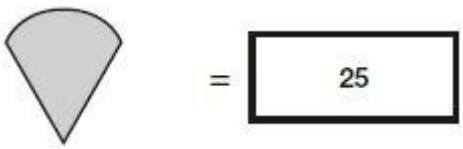
Up to 2m

[2]

Q15.

(a) 

1

(b) 

*Award **ONE** mark for an answer of*

- *(147 – 2 × answer for box 1) ÷ 3*

OR

- *(111 – answer for box 1) ÷ 3*

Any follow-through fraction or decimal answer must be expressed as an exact value.

1

[2]

Q16.

Award **TWO** marks for the correct answer of 1,408

OR

for an answer in the range of 1,406 to 1,409 inclusive.

If the answer is incorrect, award **ONE** mark for:

- sight of 1,392

OR

- evidence of an appropriate method, e.g.
  - $24 \times 58\frac{2}{3}$ = answer

    Within an appropriate method, if a decimal equivalent for $\frac{2}{3}$ is given, it must be rounded or truncated to at least 2 decimal places.

  - 24 × 58 = 1,394 *(error)*
    $\frac{2}{3}$ of 24 = 16
    1,394 + 16 = answer
  - $24 \times \frac{176}{3}$ = answer
  - 24 × 58.67 = answer.

    *A final answer is required for the award of **ONE** mark.*

Up to 2m

[2]

Q17.

(−3, 1)

***Do not** accept (3−, 1)*

[1]

Q18.

(a) £3.05

Refer to the additional guidance on marking answers involving money.

1

(b) Award **TWO** marks for the correct answer of 6

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

- £5 − £1.25 = £3.75
  £3.75 ÷ 60p = 6.25
  7 colours (rounded incorrectly)

OR

- £5 − £1.25 = £4.75 *(error)*
  475 ÷ 60 =

OR

- 6 × 60 = 360
  £3.60 + £1.25 = £4.85
  7 colours *(rounded incorrectly)*

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

Up to 2m

[3]

Q19.

Award **TWO** marks for the correct answer of $\frac{1}{12}$ or an equivalent fraction.

If the answer is incorrect, award **ONE** mark for:

- sight of $\frac{11}{12}$

OR

- evidence of appropriate method, e.g.
  - $\frac{2}{3}+\frac{1}{4}$
    $\frac{8}{12}+\frac{3}{12}=\frac{10}{12}$ *(error)*
    $1-\frac{10}{12}=$
  - $1-\frac{2}{3}-\frac{1}{4}=$

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

Up to 2m

[2]

Q20.

Award **TWO** marks for numbers completed, as shown:

354 × 9.5 =	**3,363**
3,540 × 95 =	**336,300**
3,363 ÷ 95 =	**35.4**

Award **ONE** mark for any two numbers completed correctly.

***Do not** accept transcription errors or misreads for this question.*

Up to 2m

[2]

Q21.

(a) 57 min 15 sec

The answer is a time interval (see the guidance).

1

(b) 44 min 40 sec

1

[2]

Q22.

18

Accept 18:12 ***OR*** *12:18*

[1]

Q23.

75

[1]

Q24.

An explanation showing that 0.25 is less than $\frac{2}{5}$, e.g.

- $\frac{2}{5}$ is $0.4 > 0.25$
- 0.25 is $\frac{5}{20} < \frac{8}{20}$
- 0.25 is 25% and $\frac{2}{5}$ is 40% and 25% is smaller than 40%
- 0.25 is a quarter.

  You need 8 quarters to make 2, but only 5 lots of $\frac{2}{5}$ to make 2
- $\frac{2}{5} = 0.4$
- $\frac{1}{4}$ is $\frac{1}{4}$ smaller than a half, but $\frac{2}{5}$ is only $\frac{1}{10}$ smaller, so $\frac{1}{4}$ is smaller than $\frac{2}{5}$

Do not *accept vague, incomplete or incorrect explanations, e.g.*

- *Because* $\frac{1}{4}$ *is bigger than* $\frac{2}{5}$

- *Because* $\frac{1}{4}$ *comes first on a number line*
- *Because 0.25 is* $\frac{1}{4}$

Accept $\frac{2.5}{10}$ *as an equivalent to* $\frac{1}{4}$ *in an explanation when comparing to* $\frac{4}{10}$

[1]

Q25.

Award **TWO** marks for the correct answer of 12.5

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

- 250 ÷ 20

OR

- 20 km is 1 cm
  100 km is 5 cm
  50 km is 2.5 cm
  5 cm + 5 cm + 2.5 cm

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

***Do not** accept incorrect proportions in any step without evidence of the calculation performed.*

Up to 2m

[2]

Q26.

1:4

Accept other equivalent ratios, e.g. 2:8 or 0.5:2

***Do not** accept reversed ratios, e.g. 4:1 or 8:2*

[1]

Q27.

Award **TWO** marks for the correct answer of $\frac{7}{12}$

*Accept equivalent fractions or an **exact** decimal equivalent, e.g.* $0.53\dot{8}$

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

- $\frac{1}{4}+\frac{1}{6}=$

  $\frac{3}{12}+\frac{2}{12}=\frac{5}{12}$

  $1-\frac{5}{12}$

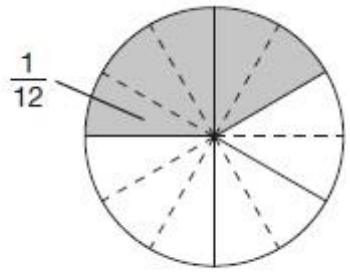
OR

- $\frac{1}{4}+\frac{1}{6}+\frac{1}{6}$

OR

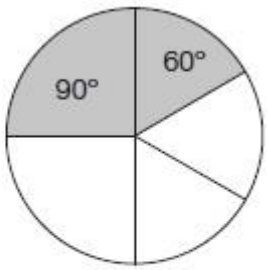
- $1-\frac{1}{4}-\frac{1}{6}$

OR

- 

  $\frac{3}{12}+\frac{4}{12}$

OR

- 

  $90° + 60° = 150°$

  $1-\frac{150}{360}$

*Accept for **ONE** mark an answer between 0.58 and 0.59 inclusive.*

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

Up to 2m

[2]

Q28.

Award **THREE** marks for the correct answer of 14

If the answer is incorrect, award **TWO** marks for:

- sight of 414 as evidence of 23 × 18 completed correctly

OR

- evidence of an appropriate method with no more than one arithmetic error, e.g.

20 × 20 = 400

$$\begin{array}{r} 23 \\ \times\ 18 \\ \hline 230 \\ 184 \\ \hline 314 \end{array}$$ *(error)*

400 − 314 = 86

Award **ONE** mark for evidence of an appropriate method.

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

A misread of a number may affect the award of marks. No marks are awarded if there is more than one misread or if the mathematics is simplified.

***TWO** marks will be awarded for an appropriate method using the misread number followed through correctly to a final answer.*

***ONE** mark will be awarded for evidence of an appropriate method using the misread number followed through correctly with no more than one arithmetic error.*

Up to 3m

[3]

Q29.

(a) $\frac{3}{8}$ written in the first box

1

*Accept equivalent fractions or an **exact** decimal equivalent, e.g. 0.375*

(b) $2\frac{7}{8}$ **OR** $\frac{23}{8}$ written in the last box

1

*Accept equivalent fractions or an **exact** decimal equivalent, e.g. 2.875*

[2]

Q30.

Award **TWO** marks for the correct answer of 7

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

- 18 + 9 + 2 widths = 34 + 1 width
  27 + 2 widths = 34 + 1 width
  27 + 1 width = 34
  34 − 27

OR

- 34 − (18 + 9)

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

*Award **ONE** mark for a method which uses algebraic representation correctly, e.g.*

- *34 + w = 18 + w + 9 + w*
  34 + w = 27 + w + w

Up to 2m

[2]

Q31.

Both numbers correct as shown:

$b = \boxed{10} \times a - \boxed{1}$

[1]

Q32.

(a) 53

1

(b) 48

1

[2]

Q33.

Award **THREE** marks for the correct answer of £111.70.

If the answer is incorrect, award **TWO** marks for:

- sight of £90 **AND** £7.90 **AND** £13.80 as all multiplication steps completed correctly.

*Accept for **TWO** marks, sight of 9,000p **AND** 790p **AND** 1,380p as all multiplication steps completed correctly.*

OR

evidence of an appropriate complete method with no more than one arithmetic error, e.g.

$$\begin{array}{r} 7.50 \\ \times\ 12 \\ \hline 88.80 \end{array} \quad \begin{array}{r} 79 \\ \times\ 10 \\ \hline 790 \end{array} \quad \begin{array}{r} 6.90 \\ \times\ 2 \\ \hline 13.80 \end{array}$$

(error)

88.80 + 7.90 + 13.80 = 110.50

Award **ONE** mark for evidence of an appropriate complete method.

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

A misread of a number may affect the award of marks. No marks are awarded if there is more than one misread or if the mathematics is simplified.

***TWO** marks will be awarded if an appropriate complete method with the misread number is followed through correctly.*

***ONE** mark will be awarded for:*

- *all multiplication steps completed correctly with the misread number.*

OR

- *evidence of an appropriate complete method with the misread number followed through correctly with no more than one arithmetic error.*

Up to 3m

[3]

Q34.

Award **TWO** marks for the correct answer of 3.

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

- 2.5 × 6 = 15
  15 ÷ 5

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

*Misreads are **not** allowed.*

Up to 2m

[2]

Q35.

Award **TWO** marks for the correct answer of £11.40.

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

- £1.25 + £1.60 = £2.85
  £2.85 × 4

*Accept for **ONE** mark an answer of £1,140 **OR** £1,140p **OR** £11.4 as evidence of an appropriate method.*

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

Up to 2m

[2]