2017 national curriculum tests

Key stage 2

Mathematics

Paper 2: reasoning

First name						
Middle name						
Last name						
Date of birth	Day		Month		Year	
School name						
DfE number						

.CG Maths.
Worked Solutions

Please note that these worked solutions have neither been provided nor approved by the Standards and Testing Agency and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

Any writing in blue indicates what must be written in order to answer the questions and get the marks. The worked solutions have been designed to show the smallest amount of work which needs to be done to answer the question.

Anything written in green in a cloud doesn't have to be written in the exam.

Anything written in orange in a rectangle doesn't have to be written in the exam and is there to show what should be put into a calculator or measured using a ruler or protractor.

If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

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Please do not write on this page.

Instructions

You **must not** use a calculator to answer any questions in this test.

Questions and answers

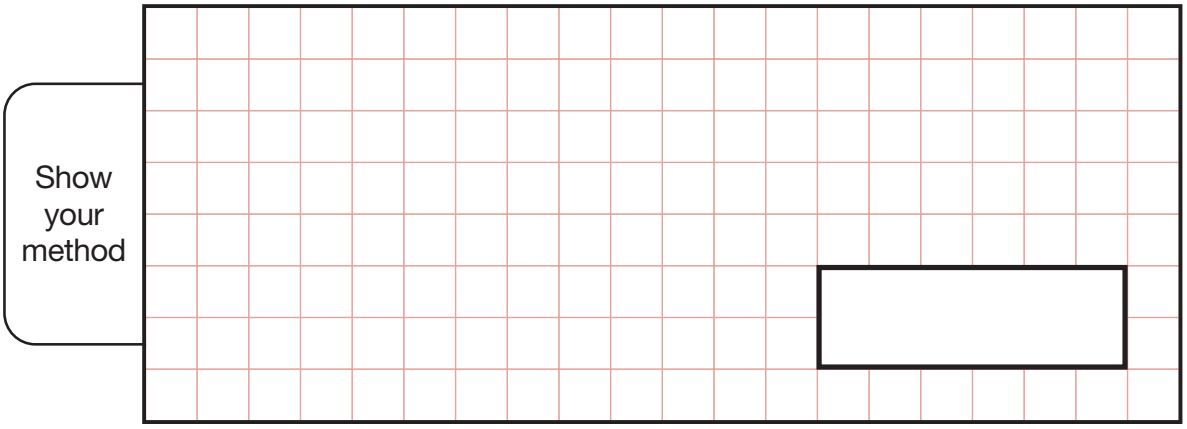
You have **40 minutes** to complete this test.

Follow the instructions for each question.

Work as quickly and as carefully as you can.

If you need to do working out, you can use the space around the question.
Do not write over any barcodes.

Some questions have a method box like this:



For these questions, you may get a mark for showing your method.

If you cannot do a question, **go on to the next one**.
You can come back to it later, if you have time.

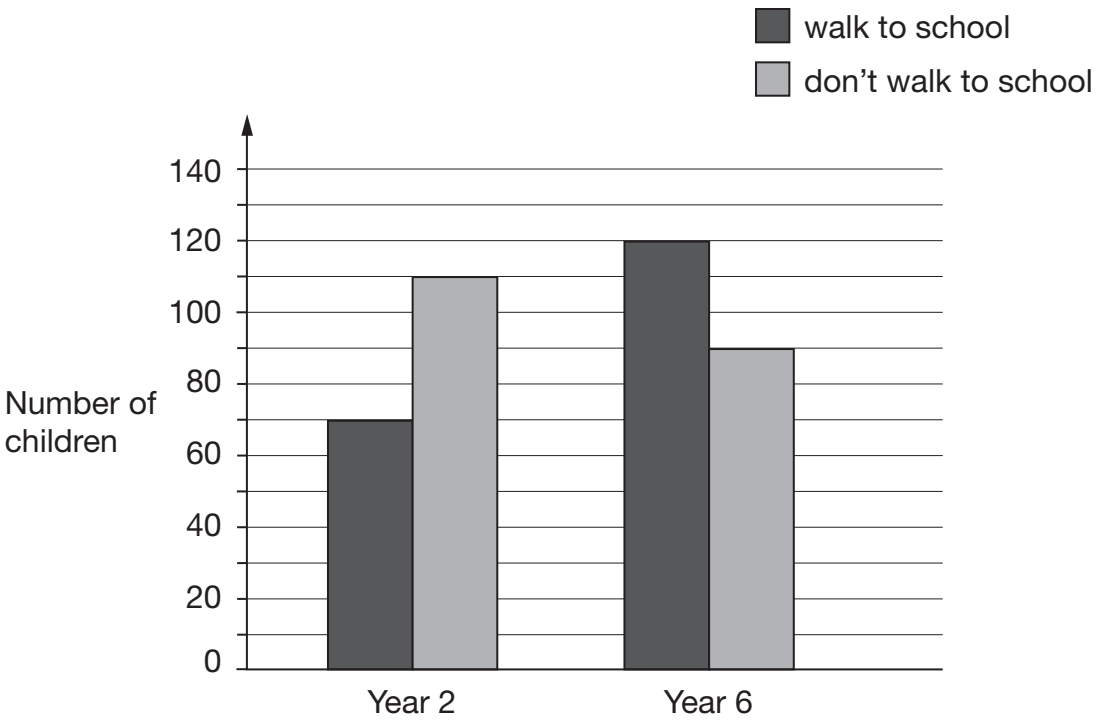
If you finish before the end, **go back and check your work**.

Marks

The number under each line at the side of the page tells you the maximum number of marks for each question.

1 William asks the children in Year 2 and Year 6 if they walk to school.

This graph shows the results.



Altogether, how many children **don't** walk to school?

110
+ 90
200

Don't walk to school is represented by the light grey bars. For Year 2 it is halfway between 100 and 120 so it represents 110 children. For Year 6 it is halfway between 80 and 100 so it represents 90 children

200

1 mark

How many **more** Year 6 children than Year 2 children walk to school?

120
− 70
50

Walk to school is represented by the dark grey bars. For Year 2 it is halfway between 60 and 80 so it represents 70 children. For Year 6 it represents 120 children. Working out the difference (largest subtract smallest) works out how many more there were

50

1 mark

2 Circle the number that is **10 times** greater than nine hundred and seven.

9,700 907 9,007 970 9,070

1 mark

907 x 10 = 9070
As 907 is a whole number, we can add a 0 to multiply it by 10

3 Write the missing numbers to make this **multiplication** grid correct.

×	7	6
9	63	54
8	56	48

We can work out these two numbers first as
9 x 7 = 63
9 x 6 = 54

Once we have the 7 and 6, we can work out this one is 8 as
7 x 8 = 56

1 mark

4 This table shows the heights of three mountains.

Mountain	Height in metres
Mount Everest	8,848
Mount Kilimanjaro	5,895
Ben Nevis	1,344

How much higher is Mount Everest than the combined height of the other two mountains?

Show your method

5895 + 1344 = 7239

(1 1)

The combined height of the other two mountains

8 8 3⁴ 1⁸ − 7239 = 1609

The difference between Mount Everest and the combined height of the other two mountains is how much higher it is

1609 m

2 marks

5 Complete this table with the missing numbers.

One row has been done for you.

Number	1,000 more
3,500	4,500
85	1085
8099	9,099
14250	15,250

2 marks

85 + 1000 = 1085
To work out the number, subtract 1000 as this is the opposite of 1000 more
9099 - 1000 = 8099
15250 - 1000 = 14250

6 Write these numbers in order of size, starting with the **smallest**.

1.9 0.96 1.253 0.328

smallest			
0.328	0.96	1.253	1.9

1 mark

Compare the units then tenths. 0.328 and 0.96 have 0 units so they are smallest. 0.328 only has 3 tenths so it is smaller than 0.96 which has 9 tenths. 1.253 only has 2 tenths so it is smaller than 1.9 which has 9 tenths

7 Write the missing numbers.

60 months = 5 years

There are 12 months in a year and 60 is 5 lots of 12

72 hours = 3 days

There are 24 hours in a day and 72 is 3 lots of 24

24, 48, 72

84 days = 12 weeks

There are 7 days in a week and 84 is 12 lots of 7

2 marks

$$7\overline{)84}\quad 12$$

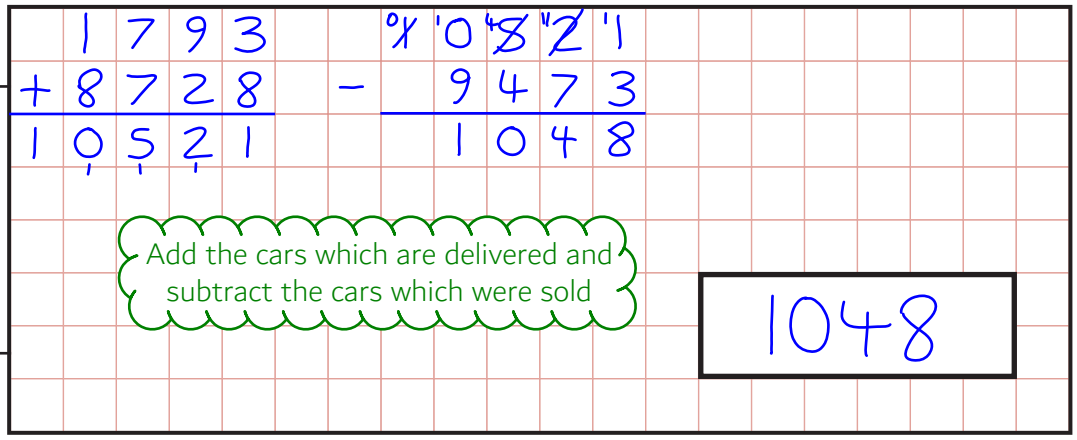
8 At the start of June, there were 1,793 toy cars in the shop.

During June,

- 8,728 more toy cars were delivered
- 9,473 toy cars were sold.

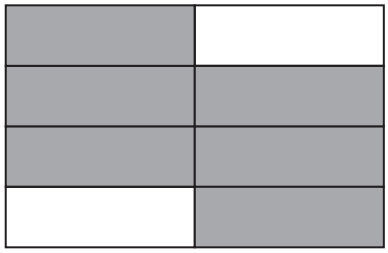
How many toy cars were left in the shop at the end of June?

Show your method



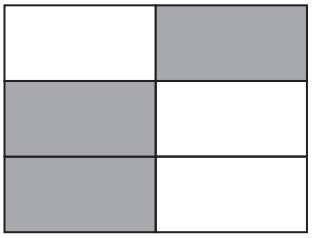
2 marks

9 Tick two shapes that have $\frac{3}{4}$ shaded.



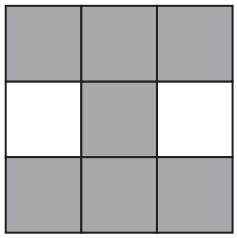
6 out of 8 are shaded. This simplifies to 3/4

$\frac{6 \div 2}{8 \div 2} = \frac{3}{4}$



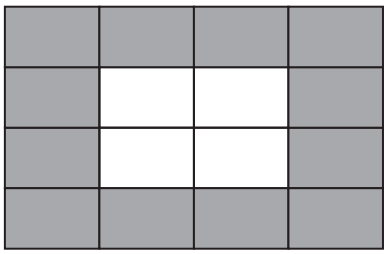
3 out of 6 are shaded. This doesn't simplify to 3/4

$\frac{3 \div 3}{6 \div 3} = \frac{1}{2}$



$\frac{7}{9}$

7 out of 9 are shaded. This doesn't simplify to 3/4



$\frac{12 \div 4}{16 \div 4} = \frac{3}{4}$

12 out of 16 are shaded. This simplifies to 3/4

1 mark

10 Round **84,516**

to the nearest 10 — 84520

1 is in the 10s place. The 6 in the next place causes it to round up to a 2. Everything after the 2 becomes 0

5 is in the 100s place. The 1 in the next place causes it to round down to a 5. Everything after the 5 becomes 0

to the nearest 100 — 84500

to the nearest 1,000 — 85000

4 is in the 1000s place. The 5 in the next place causes it to round up to a 5. Everything after the 5 becomes 0

2 marks

11 Here is a rule for the time it takes to cook a chicken.

Cooking time = 20 minutes plus an extra 40 minutes for each kilogram

Minutes = 20 + 40 x mass

How many minutes will it take to cook a 3 kg chicken?

40 × 3 = 120

20 + 120 = 140

140 minutes

1 mark

BIDMAS so multiply the 40 by the 3kg first. Then add the result to 20

What is the mass of a chicken that takes 100 minutes to cook?

100 − 20 = 80

80 / 40 = 8 / 4

2 kg

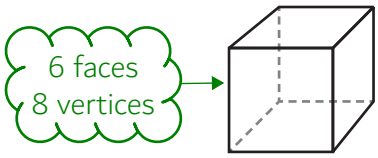
1 mark

There is 20 minutes regardless of how many kilograms there are so subtracting this leaves the time due to the mass

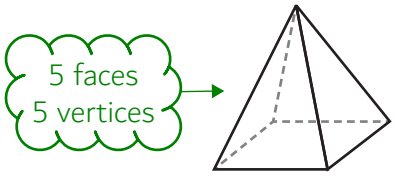
Every 40 minutes is for 1kg so working out how many lots of 40 works out the mass. 80 ÷ 40 simplifies to 8 ÷ 4 which is 2

12 Here are diagrams of some 3-D shapes.

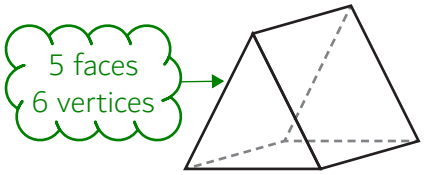
Tick each shape that has the same number of faces as vertices.



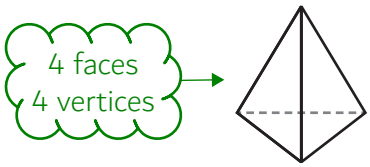
Cube ☐



Square-based pyramid ✓



Triangular prism ☐



Triangular-based pyramid ✓

2 marks

13 Ally and Jack buy some stickers.

Pack of 12 stickers
£10.49

12 stickers
99p each

Ally buys a pack of 12 stickers for £10.49

Jack buys 12 single stickers for 99p each.

How much more does Jack pay than Ally?

Show your method

$$\begin{array}{r} 12.^{1}\cancel{0}^{1}0 \\ -\ 0.12 \\ \hline 11.88 \end{array} \qquad \begin{array}{r} 11.^{7}8^{1}8 \\ -\ 10.49 \\ \hline 1.39 \end{array}$$

99p is 1p less than £1. 12 stickers at £1 each costs £12. Subtract 12p as this is 1p too much per sticker

The difference (largest subtract smallest) works out how much more Jack pays

£ 1.39

2 marks

14 Amina planted some seeds.

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

Altogether, 12 seeds grew.

How many seeds did Amina **plant**?

For every 2 which grew, 3 were planted. 6 lots of 2 is 12 so therefore 6 lots of 3 were planted. 6 x 3 = 18

18

1 mark

15 At the end of a film, the year is given in Roman numerals.

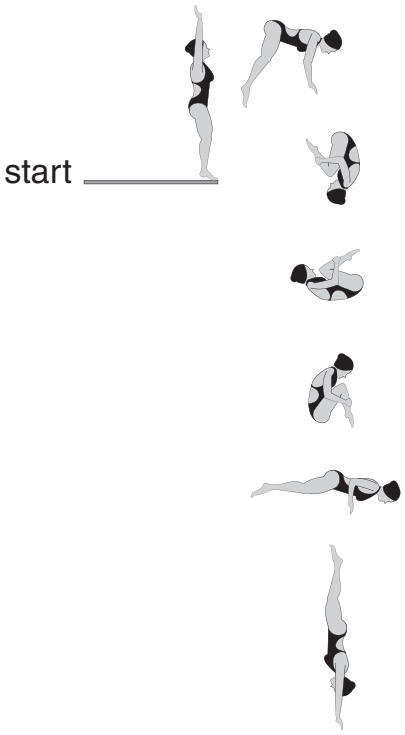
Write the year MMVI in **figures**.

M = 1000
V = 5
I = 1
1000 + 1000 + 5 + 1 = 2006

2006

1 mark

16 Layla completes one-and-a-half somersaults in a dive.



6 quarter turns

How many **degrees** does Layla turn through in her dive?

$$\begin{array}{r} 90 \\ \times\ \ 6 \\ \hline 540 \end{array}$$

Each quarter turn is 90 degrees

540 °

1 mark

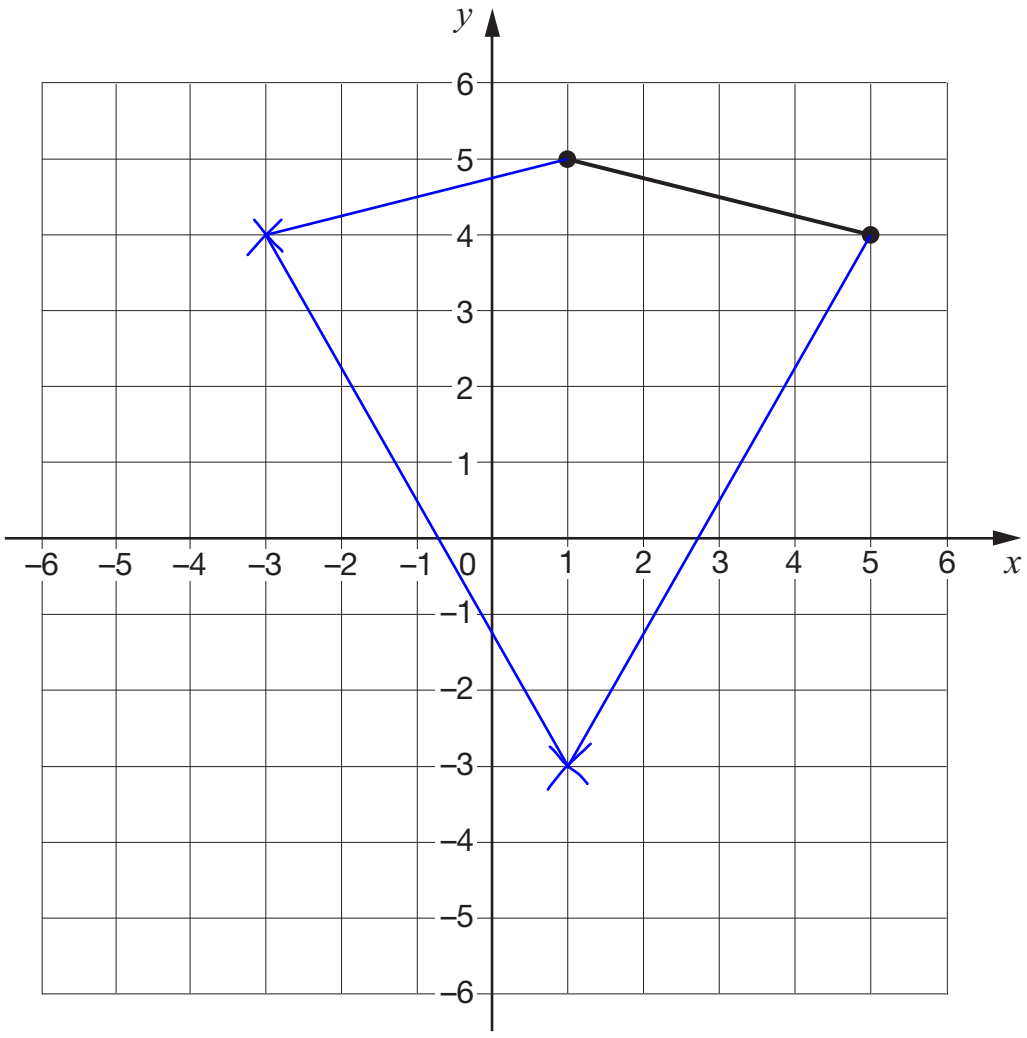
17 The vertices of a quadrilateral have these coordinates.

(1, 5) (5, 4) (1, –3) (–3, 4)

One side of the quadrilateral has been drawn on the grid.

Complete the quadrilateral.

Use a ruler.



1 mark

(1 , 5) and (5 , 4) have already been plotted.
Coordinates are in the form (x , y) so the first number is the x-coordinate (how far across) and the second number is the y-coordinate (how far up)

18 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.

75 %

of its life is spent asleep.

1 mark

$\frac{18 \div 6}{24 \div 6} = \frac{3}{4}$

There are 24 hours in a day. 18 out of the 24 are spent asleep. This fraction simplifies to 3/4

$4 \overline{)100}$ = 25

$25 \times 3 = 75$

3/4 is 75% but if we didn't know this, we can find the percentage by finding 3/4 of 100

19 Amina posts three large letters.

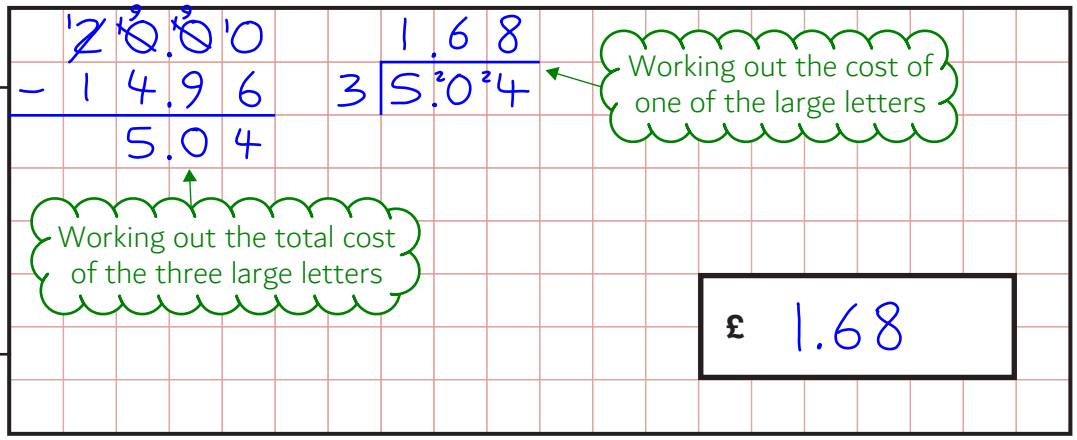
The postage costs the same for each letter.

She pays with a £20 note.

Her change is £14.96

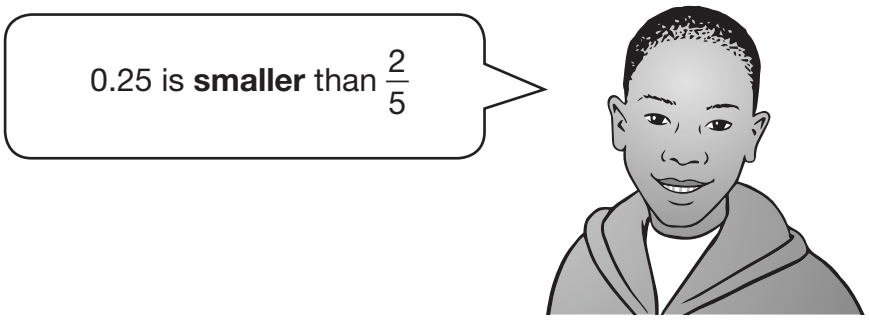
What is the cost of posting **one** letter?

Show your method



2 marks

20 Adam says,



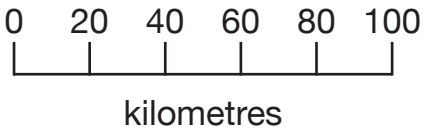
Explain why he is correct.

$$5\overline{)2.^{2}0}\quad 0.4$$

2/5 is 0.4 and 0.25 is smaller

1 mark

21 On a map, 1cm represents 20 km.



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

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

Show your method

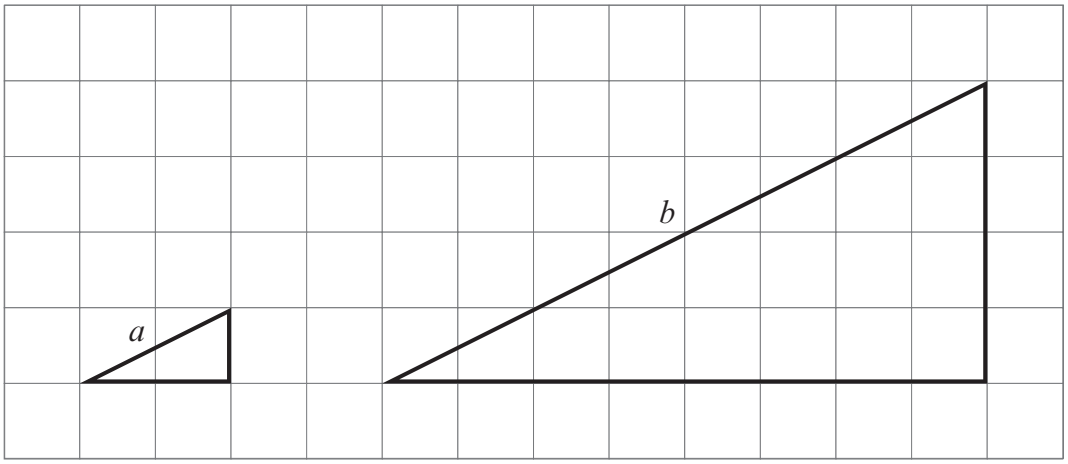
$$20 \overline{)\,2\,5^{5}0.^{10}0} \quad 12.5$$

Every 20km is represented by 1cm.
There are 12.5 lots of 20km
therefore it is represented by 12.5cm

12.5 **cm**

2 marks

22 Here are two similar right-angled triangles.



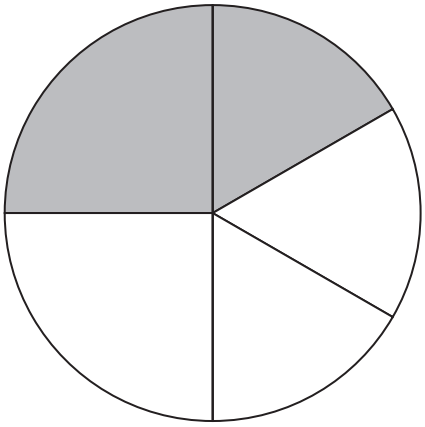
Write the ratio of side a to side b.

$a : b =$ 1 : 4

1 mark

Side b is 4 times longer than side a so if a is worth 1 part, b would be 4 parts

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



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

Show your method

$\frac{1 \times 6}{4 \times 6} + \frac{1 \times 4}{6 \times 4} \quad \frac{6}{24} + \frac{4}{24} = \frac{10}{24} \quad \frac{24}{24} - \frac{10}{24} = \frac{14}{24}$

Working out the total fraction shaded. Making the denominators the same so they can be added

The full circle is represented by 24/24 (1). Subtracting 10/24 leaves the fraction not shaded

$\frac{14}{24}$

No need to simplify the fraction

2 marks