

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

I declare this is my own work.

GCSE MATHEMATICS

F

Foundation Tier Paper 2 Calculator

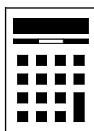
Wednesday 4 June 2025

Morning Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- a calculator
- mathematical instruments
- the Formulae Sheet (enclosed).



Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

Advice

In all calculations, show clearly how you work out your answer.

For Examiner's Use

Pages

Mark

2–3

4–5

6–7

8–9

10–11

12–13

14–15

16–17

18–19

20–21

22–23

24

TOTAL



J U N 2 5 8 3 0 0 2 F 0 1

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

Any writing in blue should be written in the exam.

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

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

Answer **all** questions in the spaces provided.

1 (a) Solve $w + 8 = 19$

[1 mark]

Subtracting 8 from both sides eliminates the +8 on the left and gets w on its own. $19 - 8 = 11$

$$w = \underline{\hspace{2cm} 11 \hspace{2cm}}$$

1 (b) Solve $3x = 24$

[1 mark]

Dividing both sides by 3 eliminates the 3 on the left and gets x on its own. $24 \div 3 = 8$

$$x = \underline{\hspace{2cm} 8 \hspace{2cm}}$$

1 (c) Solve $20 - y = 7$

[1 mark]

13 must be subtracted from 20 to get 7.
 $20 - 13 = 7$

$$y = \underline{\hspace{2cm} 13 \hspace{2cm}}$$



- 2** The **only** animals in a field are sheep and cows.
The ratio sheep : cows = 31 : 47
There are fewer than 100 animals in the field.

- 2 (a)** Write down the number of **cows** in the field.

[1 mark]

Answer _____ 47

- 2 (b)** In total, how many animals are there in the field?

[1 mark]

31 + 47

There are 31 sheep when there are 47 cows. Adding the 31 sheep and the 47 cows finds that there are 78 animals in total in the field

Answer _____ 78

The ratio is in its simplest form. So the smallest possible number of sheep is 31 and the smallest possible number of cows is 47. The next smallest possible number of sheep is $31 \times 2 = 62$ and the next smallest possible number of cows is $47 \times 2 = 94$. But $62 + 94 = 156$, which is not fewer than 100 animals. So the number of cows must be 47 as any greater multiple of 47 will result in there being more than 100 animals in total.

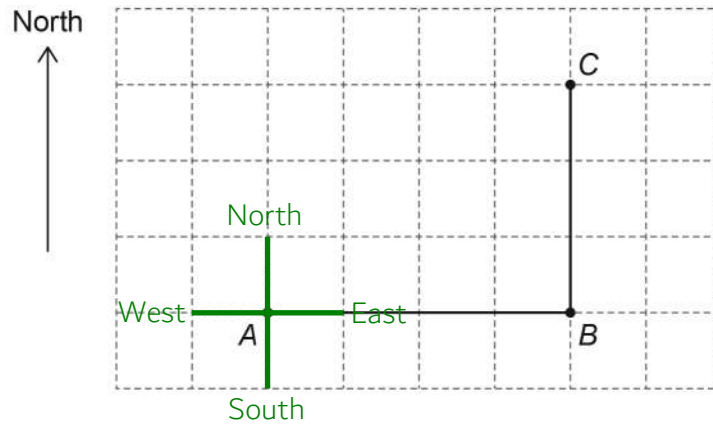
The ratio does not necessarily tell how many animals there are. The ratio 62 : 94 simplifies to 31 : 47

Turn over for the next question



- 3 A path joins points A, B, and C.
The scale drawing shows the path on a centimetre grid.

Scale: 1 centimetre represents 10 metres



- 3 (a) Write down the direction of B from A.

[1 mark]

Answer East

- 3 (b) Work out the **actual** distance along the path from A to C.

[2 marks]

$4 + 3$

It is 4 cm along the path from A to B. It is 3 cm along the path from B to C. Adding the 4 cm and the 3 cm finds that the total distance on the drawing is 7 cm. The path does not go directly from A to C, it must go from A to B then from B to C

7×10

Every 1 cm represents 10 m. So multiplying the 7 cm on the drawing by 10 finds that it represents 70 m

Answer 70 metres



4 (a) Simplify $a \times b$

[1 mark]

Answer _____ ab

Writing the letters next to each other means that they are multiplied

4 (b) Simplify fully $c + c + c$

[1 mark]

Answer _____ $3c$ $c + c + c = 3 \times c = 3c$ 4 (c) Simplify fully $p \times p \times p$

[1 mark]

Answer _____ p^3

To the power of 3 means that there is 3 of it multiplied together

4 (d) Simplify $d \div d$

[1 mark]

Answer _____ 1

Anything divided by itself is 1

Turn over for the next question

Turn over ►



5

Jenny walks

- 400 metres to the shop
- 250 metres to the park
- 380 metres home.

Show that Jenny walks more than 1 kilometre.

[2 marks]

$$400 + 250 + 380$$

← Adding all the distances finds that the total distance travelled is 1030 m

$$1030 \div 1000 = 1.03 \text{ km}$$

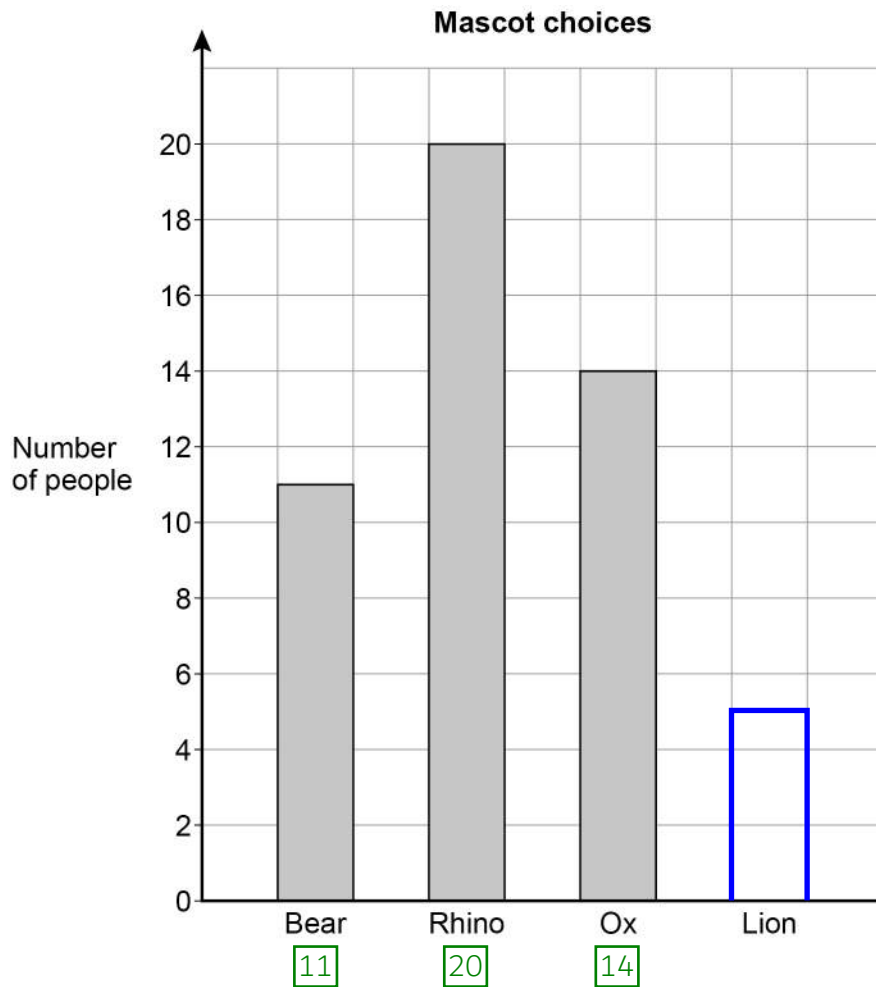
← There are 1000 m in 1 km. So dividing the 1030 m by 1000 converts it to 1.03 km



6

50 people choose a mascot for a team.

The bar chart shows some information about their choices.



The **50** people each choose one of bear, rhino, ox or lion.

Complete the bar chart.

[4 marks]

$$50 - 11 - 20 - 14 = 5$$

Subtracting the 11 who choose bear, the 20 who choose rhino and the 14 who choose ox from the 50 total people finds that 5 choose lion



- 7 Work out 80p as a fraction of £1
Give your answer in its simplest form.

[2 marks]

$$\frac{80}{100}$$

← £1 = 100p. Both amounts of money must be using the same unit in order to give it as a fraction

Answer _____

$\frac{4}{5}$

↑

The calculator simplifies the fraction

- 8 (a) Convert $3\frac{1}{2}$ hours to minutes.

[1 mark]

$$3\frac{1}{2} \times 60$$

← There are 60 minutes in 1 hour. So multiplying the hours by 60 converts it to minutes

Answer _____ 210 _____ minutes

- 8 (b) Convert 1400 grams to kilograms.

[1 mark]

$$1400 \div 1000$$

← There are 1000 grams in 1 kilogram. So dividing the number of grams by 1000 converts it to kilograms

Answer _____ 1.4 _____ kilograms

- 8 (c) Convert 32 kilometres to miles.

Use 8 kilometres = 5 miles

[2 marks]

$$32 \div 8$$

← Dividing the 32 kilometres by the 8 kilometres finds that it is 4 lots of the 8 kilometres

$$4 \times 5$$

← It is 4 lots of the 8 kilometres so must be 4 lots of the 5 miles

Answer _____ 20 _____ miles



- 9 The table shows information about two workers on one day.

	Total working time (hours)	Working time spent online (minutes)
Zeke	8	200
Margot	4	110

- 9 (a) Margot started work at 10:30am
What time did she finish?

[1 mark]

$10^{\circ}30^{\circ} + 4^{\circ}$ ← Adding the times as sexagesimals on the calculator. Margot worked for a total of 4 hours

Answer 14:30

- 9 (b) Zeke says he spent **more than one quarter** of his total working time online.
Is he correct?

[3 marks]

Tick a box.

Yes

☒

No

☐

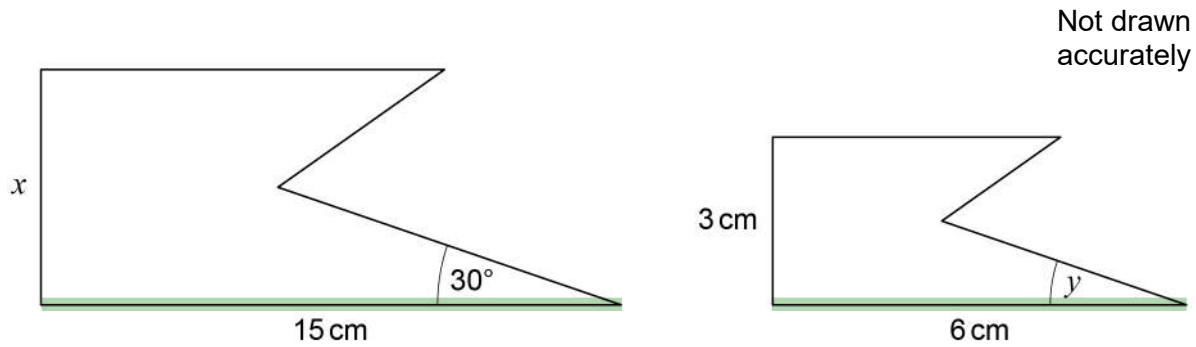
Show working to support your answer.

8×60 ← There are 60 minutes in 1 hour. So multiplying the 8 hours Zeke works in total by 60 converts it to 480 minutes

$\frac{1}{4} \times 480 = 120$ ← Doing one quarter of the total working time in minutes finds that this is worth 120 minutes. 200 minutes is more than this



10 These two shapes are similar.



10 (a) Write down the value of y .

[1 mark]

$y =$ 30 °

All the angles in similar shapes are the same

10 (b) Work out the value of x .

[2 marks]

$15 \div 6$ ←

Both of the sides highlighted in green are the same in each shape but are different sizes. Dividing the longer side by the shorter side finds that the scale factor is 2.5, this is what all the sides in the smaller shape are multiplied by to get the sides in the larger shape

2.5×3 ←

Multiplying the scale factor by the 3 cm finds that x is 7.5 cm

$x =$ 7.5 cm



11 Here are two expressions, A and B.

A

$$7(x - 2) + 4x + 6$$

B

$$5(3x + 2) - 4x - 18$$

Show that A and B are equivalent.

[3 marks]

$$7x - 14 + 4x + 6 \leftarrow \text{Expanding the brackets in A}$$

$$11x - 8 \leftarrow \text{Collecting like terms. } 7x + 4x = 11x \text{ and } -14 + 6 = -8$$

$$15x + 10 - 4x - 18 \leftarrow \text{Expanding the brackets in B}$$

$$11x - 8 \leftarrow \text{Collecting like terms. } 15x - 4x = 11x \text{ and } 10 - 18 = -8$$

Both A and B simplify to $11x - 8$, so they are equivalent

12 4 apples cost £2.20

Work out the cost of 7 of these apples.

[2 marks]

$$2.20 \div 4 \leftarrow \text{Dividing the £2.20 by the 4 apples finds that 1 apple costs £0.55}$$

$$0.55 \times 7 \leftarrow \text{Multiplying the cost of 1 apple by 7 finds that the cost of 7 apples is £3.85}$$

Answer £ 3.85



- 13** Ingrid records the number of minutes she uses her mobile phone over four weeks.

140 168 205 192

- 13 (a)** Work out the range.

[1 mark]

$$205 - 140 \leftarrow \text{Range} = \text{largest} - \text{smallest}$$

Answer 65 minutes

- 13 (b)** Ingrid records the number of minutes for a fifth week.

The mean for all **five** weeks is 178 minutes.

Work out the number of minutes used in the fifth week.

[3 marks]

$\frac{\text{total}}{\text{number}}$ $\leftarrow$ Mean = total $\div$ number, where total is the total number of minutes in all of the weeks combined and number is the number of weeks. Writing this as a formula triangle

$178 \times 5 \leftarrow$ Covering t in the formula triangle finds that total = mean $\times$ number.
So the total number of minutes in all five weeks is 890 minutes

$890 - 140 - 168 - 205 - 192 \leftarrow$ Subtracting the known numbers of minutes from the total number of minutes finds that the fifth week must be 185 minutes

Answer 185 minutes



14

Match each description to the correct expression.

One has been done for you.

[4 marks]

		$2n$
	2 more than n	$n + 2$
A	n doubled	$\sqrt{n}$
B	n multiplied by itself	$\frac{n}{2}$
C	half of n	$n - 2$
D	2 less than n	n^2
		$2 - n$

A: Doubling is multiplying by 2. $n \times 2 = 2n$.

B: Multiplying by itself is squaring. This is raising to the power of 2.

C: Halving is dividing by 2. Putting n over 2 does this.D: Subtracting 2 from n expresses 2 less than n 

15

A rectangle has

- an area of 60 cm^2
- a side length of 10 cm

Warren says,

“The perimeter of the rectangle is 32 cm because $60 \div 10 = 6$ ”

Is Warren correct?

Tick a box.

Yes

☒

No

☐

Show working to support your answer.

[1 mark]

$$10w = 60$$

Area of rectangle = length $\times$ width. The length is 10 cm. Let w be the width. The area is 60 cm^2

$$w = 60 \div 10$$

Rearranging to find the width, w . Dividing both sides by 10 gets w on its own and finds that the width is 6 cm

$$10 + 10 + 6 + 6 = 32$$

Perimeter is all of the outside sides added together. There are two lengths and two widths on a rectangle. So the perimeter is 32 cm and Warren is correct

16

Rearrange $a + 3 = b$ to make a the subject.

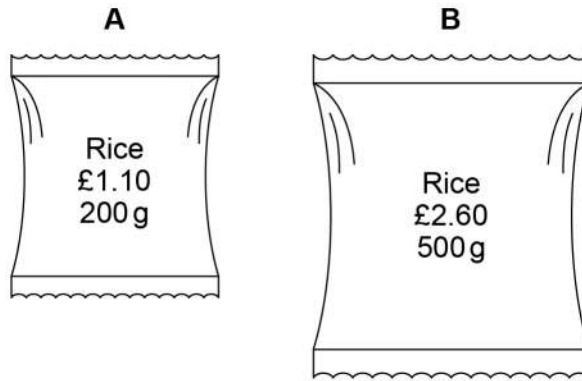
[1 mark]

$$a = \underline{\hspace{2cm}} \quad b - 3$$

Subtracting 3 from both sides gets a on its own



17



Which packet of rice is better value for money?

Tick a box.

A

☐

B

☒

You **must** show your working.

[3 marks]

$$110 \div 200 = 0.55$$

£1.10 is 110p. Dividing the cost in pence by the mass in grams finds that A costs 0.55p per gram

$$260 \div 500 = 0.52$$

£2.60 is 260p. Dividing the cost in pence by the mass in grams finds that B costs 0.52p per gram

B costs less pence for each gram so is better value



- 18 (a) Sam uses either the bus or the train to get to work.

$$\frac{\text{number of days using bus}}{\text{number of days using train}} = \frac{1}{8}$$

Write down the ratio number of days using bus : number of days using train

[1 mark]

Answer 1 : 8

The number of days using bus could be 1. The number of days using train could be 8. Writing this as a ratio

- 18 (b) Write the ratio $6a : 5a$ in the form $n : 1$ where n is a **decimal**.

[2 marks]

6 : 5 ← Dividing both sides of the ratio by a simplifies it and gets rid of the letters

Answer 1.2 : 1

Both sides are multiplied by the same amount

Dividing both sides by 5 gets 1 on the right

- 18 (c) $1 : x = x : 4$

Work out the value of x

[1 mark]

$$\frac{x}{1} = \frac{4}{x}$$

Both ratios are equivalent, so both sides of the ratio on the left are multiplied by the same amount to get both sides of the ratio on the right. So dividing the orange x by the orange 1 expresses what the left ratio was multiplied by. Dividing the pink 4 by the pink x also expresses what the left ratio was multiplied by. So these two expressions must be equal as they both express the same thing

$$x^2 = 4$$

$$x = \underline{\quad 2 \quad}$$

Multiplying both sides of the equation by x to get all the x on the same side. The 1 as the denominator can be ignored as dividing by 1 has no effect

Square rooting both sides finds that $x = 2$



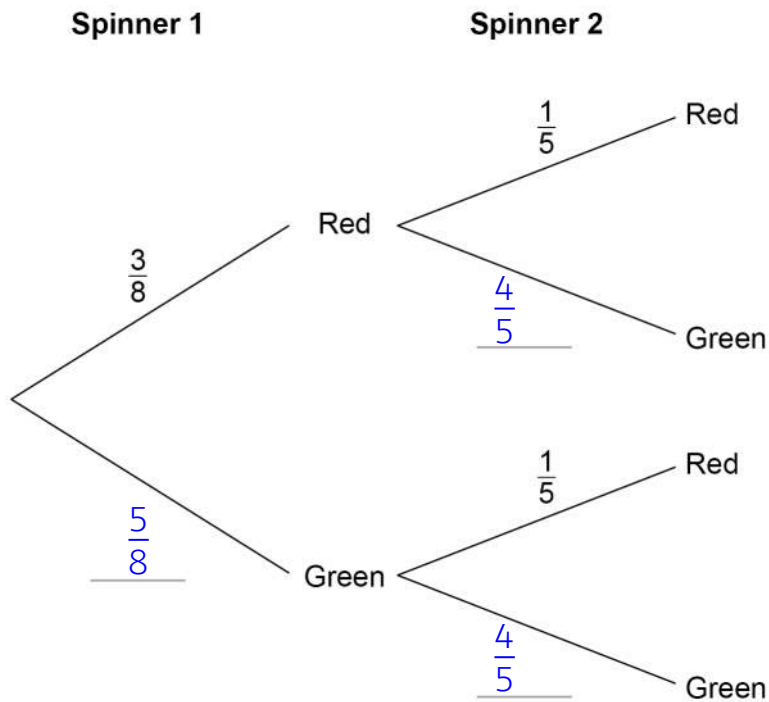
- 19 Two spinners each have only red sections and green sections.

Spinner 1 $P(\text{red}) = \frac{3}{8}$

Spinner 2 $P(\text{red}) = \frac{1}{5}$

- 19 (a) Complete the tree diagram.

[2 marks]



Each set of branches must add up to 1

- 19 (b) Both spinners are spun.

Work out the probability that **both** spinners land on red.

[1 mark]

$$\frac{3}{8} \times \frac{1}{5}$$

Red AND red. AND means to multiply the probabilities

Answer $\frac{3}{40}$



20

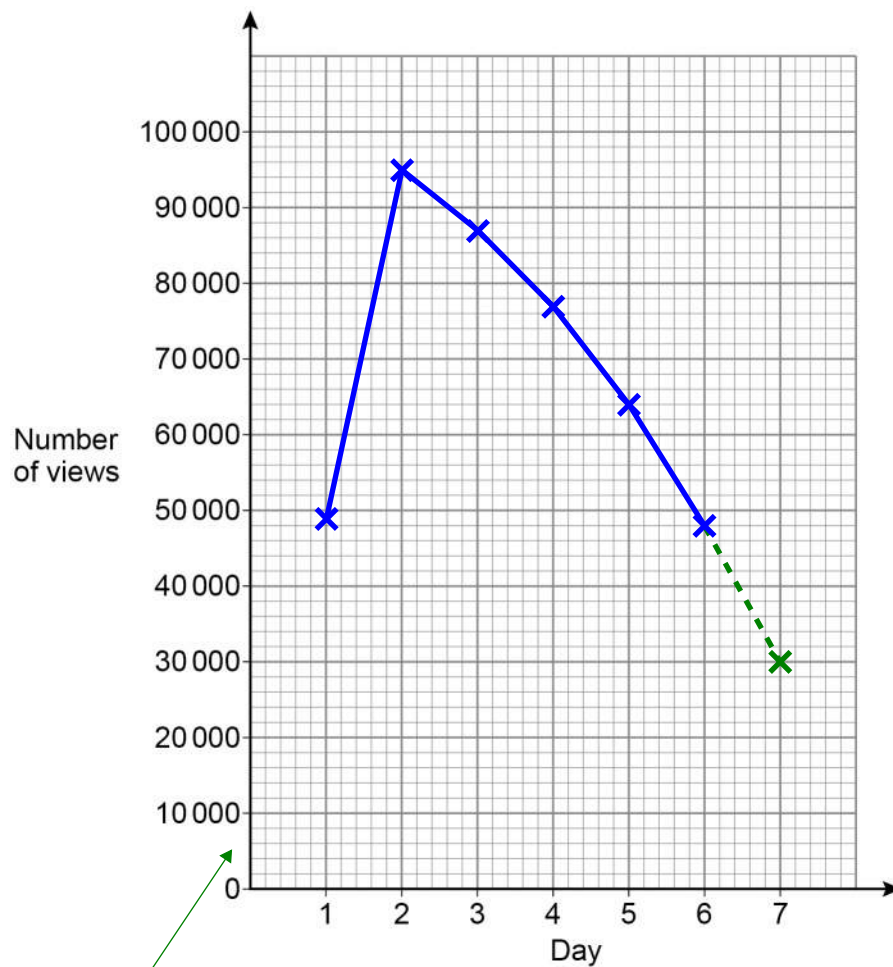
Youssuf posted an advert on his social media channel.

The table shows the number of views of the advert during its first 6 days.

Day	1	2	3	4	5	6
Number of views	49 000	95 000	87 000	77 000	64 000	48 000

20 (a) On the grid, draw a time series graph to represent the data.

[2 marks]



This scale goes up 10000 over 5 small boxes. $10000 \div 5 = 2000$, so each small box is worth 2000 and half a box is worth 1000

20 (b) Youssuf receives 0.018p for each view of the advert.

Estimate how much he receives from views of the advert on **day 7**

[3 marks]

$$30000 \times 0.018$$

From the graph, it can be estimated that there are 30000 views on day 7.
Multiplying these views by the 0.018p for each view finds that he receives 540p

$$540 \div 100$$

£1 = 100p, so dividing the 540p by 100 converts it to £5.40

Answer £ 5.40

21 70% of the discs in a box are red and the rest are blue.

- 40% of the red discs are removed.
- 50% of the blue discs are removed.

In total, what percentage of the discs are removed from the box?

[3 marks]

$$100 - 70 = 30$$

Percentage is out of 100. So subtracting the 70% which are red from 100% finds that 30% are blue

$$\frac{40}{100} \times \frac{70}{100} = \frac{7}{25}$$

Putting the 40% over 100 converts it to a fraction. Putting the 70% over 100 converts it to a fraction. 'of' means to multiply so multiplying the fractions expresses 40% of 70% as a fraction

$$\frac{50}{100} \times \frac{30}{100} = \frac{3}{20}$$

Putting the 50% over 100 converts it to a fraction. Putting the 30% over 100 converts it to a fraction. 'of' means to multiply so multiplying the fractions expresses 50% of 30% as a fraction

$$\frac{7}{25} + \frac{3}{20} = \frac{43}{100}$$

Adding the fractions expresses the fraction of the discs which are removed

Answer 43 %

Percentage is out of 100 so 43/100 is 43%



22

A group of adults and students go to a theme park.

Here are the prices.

Adult	£24.50
Student	£16.25
One adult free with every 5 students	

In the group there are 48 students.

The total price for the group is £927

How many adults are in the group?

[4 marks]

- 16.25×48 ← Multiplying the cost of each student by the number of students finds that it was £780 for all the students
 $927 - 780$ ← Subtracting the cost for the students from the total price finds that it costs £147 for the adults
 $147 \div 24.50 = 6$ ← Dividing the cost for the adults by the cost of each adult finds that 6 adults were paid for
 $48 \div 5$ ← Dividing the 48 students by 5 finds that there are 9 lots of 5 students (with a remainder), so there are 9 adults who go for free
 $6 + 9$ ← Adding the 9 adults who go for free to the 6 adults who were paid for finds that there were 15 adults in the group

Answer 15



- 23 (a) The length of a fence panel is 160 cm to the nearest 10 cm

Complete the error interval.

[2 marks]

$$160 \pm \frac{10}{2}$$

← Adding and subtracting half of what it is to the nearest finds the lower and upper bounds

Answer 155 cm $\leq$ length $<$ 165 cm

- 23 (b) A different fence panel measures 2 metres to the nearest 10 cm

Kim says that the total length of **three** of these fence panels must be less than 6.2 m

Show that Kim is correct.

[2 marks]

$$2 \times 100$$

← 1 m = 100 cm, so multiplying the 2 metres by 100 converts it to 200 cm

$$200 + \frac{10}{2}$$

← Adding half of what it is to the nearest finds that the upper bound is 205 cm for each fence panel

$$205 \times 3 = 615$$

← Multiplying the upper bound for each fence panel by the 3 panels finds that their total length must be less than 615 cm

$$6.2 \times 100 = 620$$

← 1 m = 100 cm, so multiplying the 6.2 m by 100 converts it to 620 cm

615 cm is less than the 620 cm, so the total length is definitely less than 6.2 m

- 24 Circle the expression which is a factor of $3x + 15$

[1 mark]

$$3x$$

$$x + 12$$

$$x + 5$$

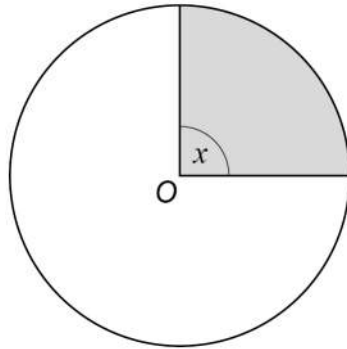
$$x + 15$$

$$3(x + 5)$$

← Factorising finds that 3 and $x + 5$ are factors. To factorise: the highest common factor of 3 and 15 is 3 so bringing this out as a factor. There are no letters in common. Dividing both $3x$ and 15 by 3 and leaving the result in a bracket



25 Here is a circle, centre O.



Not drawn
accurately

25 (a) The circle has a circumference of 20 cm

Assume that angle x is 90°

Work out the shaded area.

Give your answer as a decimal.

[3 marks]

$$2\pi r = 20 \quad \leftarrow \text{Circumference} = 2\pi r, \text{ where } r \text{ is the radius}$$

$$\pi r = 10 \quad \leftarrow \text{Dividing both sides by 2}$$

$$r = 3.1... \quad \leftarrow \text{Dividing both sides by } \pi$$

$$\pi \times 3.1...^2 \quad \leftarrow \text{Area of circle} = \pi r^2, \text{ where } r \text{ is the radius. Using the exact value of the radius in the calculator}$$

$$\frac{90}{360} \times 31.8... \quad \leftarrow \text{There are } 360^\circ \text{ around the centre of a circle. The shaded area is } 90^\circ \text{ out of these } 360^\circ. \text{ So doing } 90/360 \text{ of the area of the circle finds the shaded area. Using the exact value of the area of the circle in the calculator}$$

Answer 7.96 cm²

Rounding 7.957... to 2 decimal places



25 (b) In fact, angle x is smaller than 90°

What does this mean about the shaded area?

Tick **one** box.

[1 mark]

☒

It is smaller than the answer to part (a)

☐

It is the same as the answer to part (a)

☐

It is larger than the answer to part (a)

☐

It could be any of the above

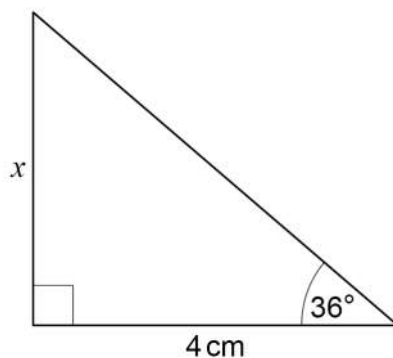
If the angle is smaller, there is a smaller fraction of the whole circle

Turn over for the next question

Turn over ►



26

Not drawn
accuratelyUse trigonometry to work out the value of x .You **must** show your working.**[3 marks]**

SOHCAHTOA

Using right-angled trigonometry. Ticking O as x is the opposite. Ticking A as the 4 cm is the adjacent. There are two ticks on the TOA formula triangle so this one can be used

$\tan 36 \times 4$

Covering O finds that opposite = tan of the angle $\times$ adjacent

$x =$ 2.9 cm

Rounding 2.90... to 1 decimal place

END OF QUESTIONS

