



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 3 Calculator

Wednesday 14 June 2023

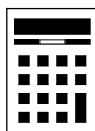
Morning

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.

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	
24–25	
TOTAL	

Advice

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



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

Answer **all** questions in the spaces provided.Do not write
outside the
box

1 (a) Solve $5x = 15$

[1 mark]

$$x = \frac{15}{5} = 3$$

$$x = \underline{3 \text{ (1)}}$$

1 (b) Solve $y + 7 = 50$

[1 mark]

$$y = 50 - 7$$

$$= 43$$

$$y = \underline{43 \text{ (1)}}$$

1 (c) Solve $\frac{c}{4} = 8$

[1 mark]

$$c = 8(4)$$

$$= 32$$

$$c = \underline{32 \text{ (1)}}$$



Do not write
outside the
box

2 Here is a list of numbers.

10 8 2 11 12 15 4 4

2 (a) Write down the mode.

[1 mark]

Answer 4 (1)

2 (b) Work out the median.

[2 marks]

$$2 \quad 4 \quad 4 \quad \underline{8 \quad 10} \quad 11 \quad 12 \quad 15$$

$$\text{median} = \frac{8+10}{2} = 9$$

Answer 9 (1)

2 (c) Work out the range.

[1 mark]

$$15 - 2 = 13$$

Answer 13 (1)

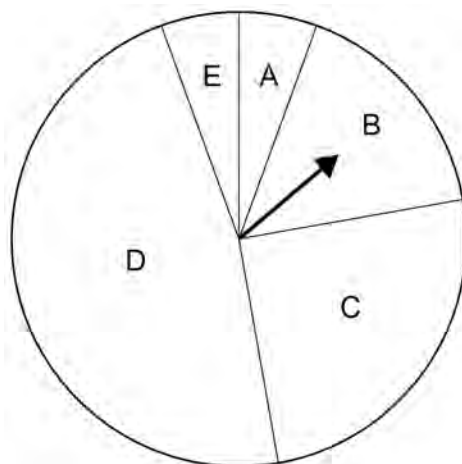
Turn over for the next question

Turn over ►



- 3 (a) A fair spinner with five sections is spun.

Do not write
outside the
box



Complete these statements.

[2 marks]

The spinner is **most likely** to land on section D Ⓢ

The spinner is **equally likely** to land on sections A and E Ⓢ



3 (b) Two different spinners are spun.

One spinner has sections labelled with colours.

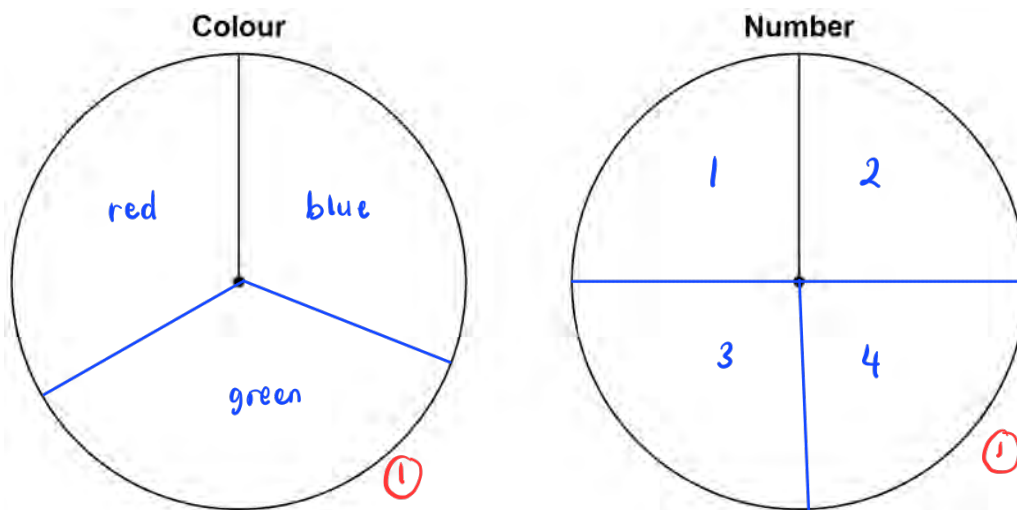
The other spinner has sections labelled with numbers.

Here is a list of **all** the possible outcomes.

Red 1	Red 2	Red 3	Red 4
Blue 1	Blue 2	Blue 3	Blue 4
Green 1	Green 2	Green 3	Green 4

Show the possible sections on the two spinners.

[2 marks]



Turn over for the next question

Turn over ►



- 4 A reel holds 9.5 metres of ribbon.
2 pieces of ribbon are cut from the reel.
Each piece is 20 centimetres long.
What length of ribbon is left on the reel?
State the units of your answer.

[3 marks]

$$20 \text{ cm} \div 100 = 0.2 \text{ m} \quad (1)$$

$$0.2 \text{ m} \times 2 = 0.4 \text{ m} \quad (1)$$

$$9.5 \text{ m} - 0.4 \text{ m} = 9.1 \text{ m}$$

(1)

Answer 9.1 m



- 5 (a) The term-to-term rule for a sequence is

subtract 1 then multiply by 5

The 1st term is 4

Work out the 3rd term.

[2 marks]

$$\text{2nd term} : (4-1) \times 5 = 15 \quad (1)$$

$$\text{3rd term} : (15-1) \times 5 = 70 \quad (1)$$

Answer 70

- 5 (b) The term-to-term rule for a different sequence is

add 20 then divide by 2

The 2nd term is 50

Work out the 1st term.

[2 marks]

$$\text{let 1st term} = x$$

$$\frac{x+20}{2} = 50$$

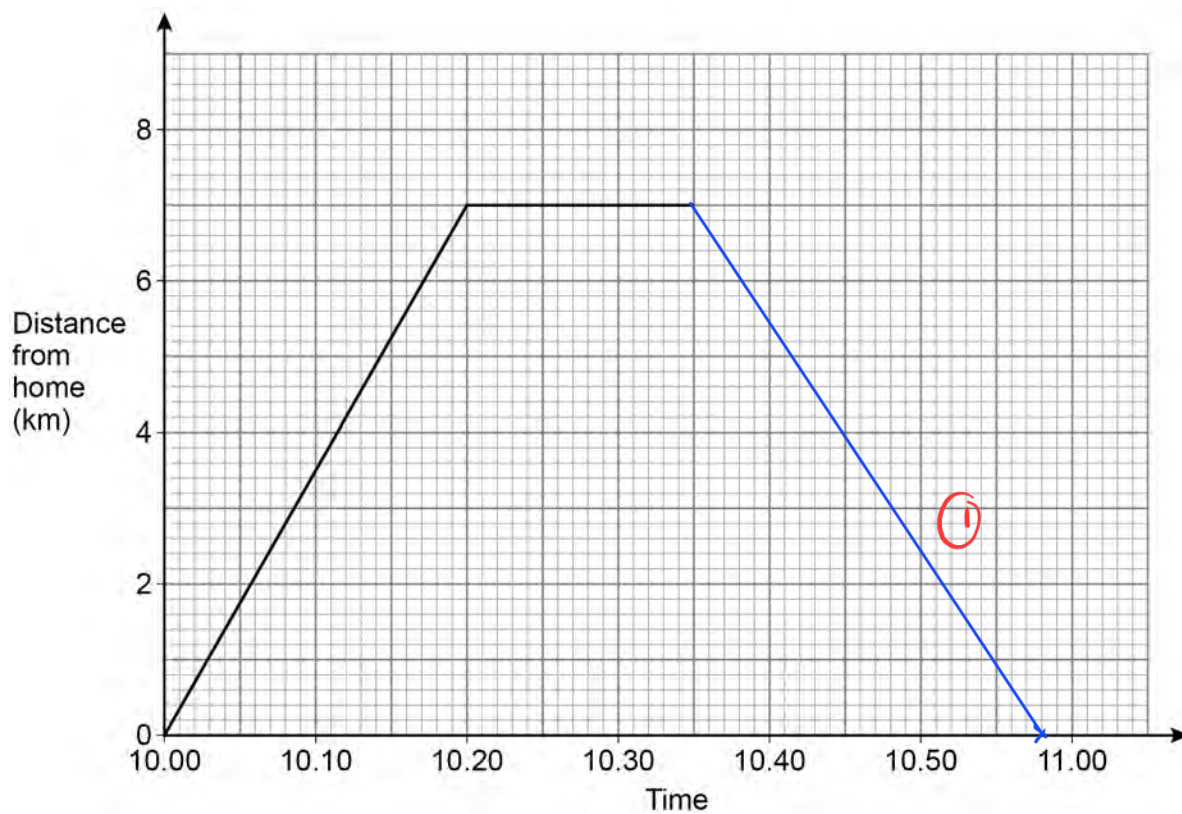
$$x+20 = 100 \quad (1)$$

$$x = 80$$

Answer 80 (1)



- 6 Scarlett leaves home at 10.00 to cycle to the supermarket.
Here is part of a distance-time graph of her trip to the supermarket.



- 6 (a) She arrives at the supermarket at 10.20
How far is the supermarket from her home?

[1 mark]

Answer 7 ⓪ km

- 6 (b) She leaves the supermarket at 10.35
How long does she stay at the supermarket?

[1 mark]

Answer 15 ⓪ minutes



- 6 (c) Scarlett cycles home at a constant speed using the same route.
It takes her 3 minutes longer than her journey to the supermarket.
Complete the distance-time graph.

[2 marks]

$$10.35 + 0.23 = 10.58$$

①

- 7 This week, Liam works
25 hours at £10.20 per hour
and
extra hours at the weekend at £11.80 per hour.

Here are the extra hours he works at the weekend.

Saturday	7 am to 10 am
Sunday	1 pm to 3 pm

In **total**, how much is he paid this week?

[4 marks]

$$25 \times \pounds 10.20 = \pounds 255$$

①

$$\text{Saturday: } 3 \times \pounds 11.80 = \pounds 35.40$$

①

$$\text{Sunday: } 2 \times \pounds 11.80 = \pounds 23.60$$

$$\text{Total: } 255 + 35.40 + 23.60$$

①

$$= 314$$

①

Answer £ 314



8 Three oranges have masses of 60 g, 70 g and 85 g

Show that their **total** mass is between $\frac{1}{5}$ and $\frac{1}{4}$ of a kilogram.

[3 marks]

$$60 + 70 + 85 = 215 \text{ g} = 0.215 \text{ kg}$$

(1)

$$\frac{1}{5} \times 1 \text{ kg} = 0.2 \text{ kg} \quad \frac{1}{4} \times 1 \text{ kg} = 0.25 \text{ kg}$$

(1)

(1)

$$0.2 \text{ kg} < 0.215 \text{ kg} < 0.25 \text{ kg}$$

9 For each statement, tick the correct box.

[3 marks]

	Always true	Sometimes true	Never true
One of the three angles of a triangle is 90°	<input type="checkbox"/>	<input checked="" type="checkbox"/> (1)	<input type="checkbox"/>
One of the three angles of a triangle is obtuse	<input type="checkbox"/>	<input checked="" type="checkbox"/> (1)	<input type="checkbox"/>
One of the three angles of a triangle is reflex	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> (1)



Do not write
outside the
box10 (a) Simplify fully $p^2 \times p$

[1 mark]

$$p^{2+1} = p^3$$

Answer p^3 (1)10 (b) Simplify fully $3a + 5c - a + 6c$

[2 marks]

$$3a - a + 5c + 6c$$

$$= 2a + 11c$$
 (2)

Answer $2a + 11c$

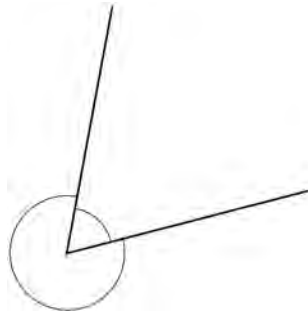
Turn over for the next question

Turn over ►



11

Two angles around a point are shown.

Do not write
outside the
boxNot drawn
accurately

The angles are in the ratio 2 : 7

Show that the larger angle is 280° **[2 marks]**

$$2+7=9$$

$$\frac{7}{9} \times 360^\circ = 280^\circ$$



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outside the
box

12 (a) $c > 4$ $d < 4$ $c - d = 6$

Work out a possible pair of values for c and d .

[2 marks]

$$c = \underline{7} \quad \textcircled{2} \quad d = \underline{1}$$

12 (b) w is greater than 1 **and** less than 2
 x is greater than 0 **and** less than 1

$w + x = 2.6$

Work out a possible pair of values for w and x .

[2 marks]

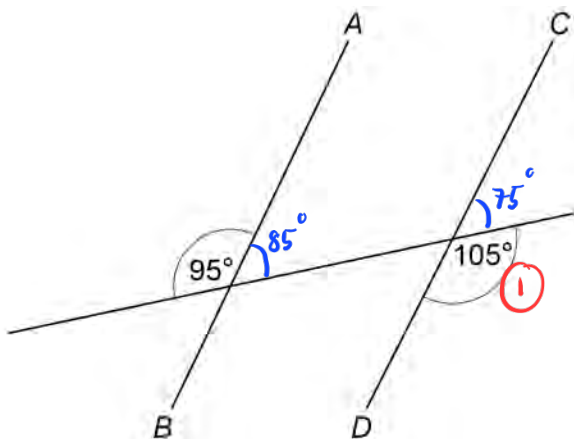
$$w = \underline{1.9} \quad \textcircled{2} \quad x = \underline{0.7}$$

Turn over ►



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13 Here are three straight lines.



Not drawn accurately

Are the lines *AB* and *CD* parallel?

Tick a box.

Yes

No !

Show working to support your answer.

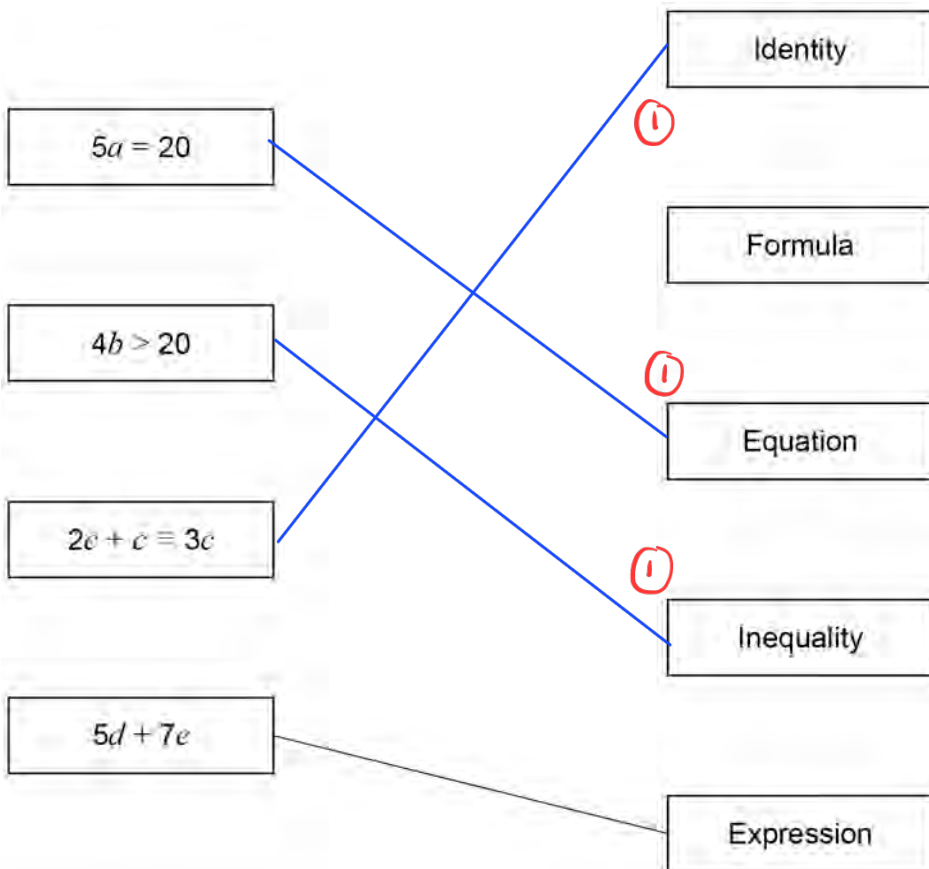
[2 marks]



Do not write outside the box

14 Match the algebra to the correct description.
One has been done for you.

[3 marks]



Turn over for the next question

5

Turn over ►



15

Popcorn is sold in bags.

8 small bags have a total mass of 496 g

5 small bags and 2 large bags have a total mass of 638 g

Work out the mass of a large bag.

[4 marks]

$$\text{small : } \frac{496 \text{ g}}{8} = 62 \text{ g each} \quad (1)$$

$$\text{let large bag} = x$$

$$5(62) + 2x = 638$$

$$310 + 2x = 638$$

$$(1) \quad 2x = 638 - 310$$

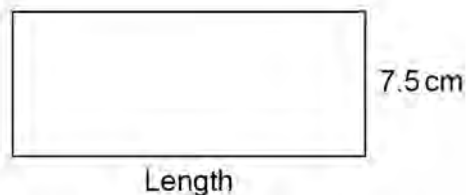
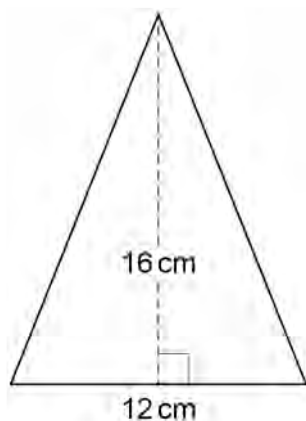
$$2x = 328 \quad (1)$$

$$x = \frac{328}{2} = 164 \text{ g} \quad (1)$$

Answer 164 g

16

The rectangle and the triangle have the same area.

Not drawn
accurately

Work out the length of the rectangle.

[3 marks]

$$\text{Area of triangle: } \frac{1}{2} \times 16 \times 12 = 96 \text{ cm}^2 \quad (1)$$

$$\text{Area of rectangle: } 96 = 7.5 \times \text{length}$$

$$\text{length} = \frac{96}{7.5} = 12.8 \text{ cm} \quad (1) \quad (1)$$

Answer 12.8 cm

Turn over for the next question

Turn over ►



- 17 Match the name to the correct sequence.
One has been done for you.

[2 marks]

Name	Sequence
Quadratic sequence	4, 5, 9, 14, 23...
Linear sequence	-3, 1, 5, 9, 13...
Fibonacci-type sequence	-4, -1, 1, 5, 12...
	8, 11, 16, 23, 32...

Handwritten connections: A line from 'Linear sequence' to '-3, 1, 5, 9, 13...' and a line from 'Fibonacci-type sequence' to '4, 5, 9, 14, 23...'. Red circled '1' marks are next to the two connected boxes.

- 18 The number of hedgehogs in England is expected to **reduce** by 4% each year.
Assume there are now 1 000 000 hedgehogs in England.
Work out the expected number of hedgehogs in England after **five** years.
You **must** show your working.

[3 marks]

$$1 - 0.04 = 0.96 \quad (1)$$

$$1000000 \times 0.96^5 = 815372.70$$

$$\approx 815373 \quad (1)$$

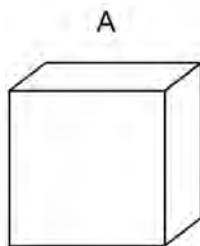
Answer

815 373 (1)

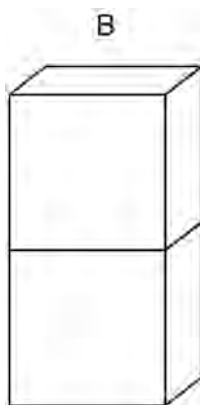


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19 Here is cuboid A.



Cuboid B is made from **two** of cuboid A.



volume of A : volume of B = 1 : 2

Matthew says,

“surface area of A : surface area of B must be 1 : 2 because B is made of 2 of A.”

Is Matthew correct?

Tick **one** box.

Yes

No

①

Cannot tell

Give a reason for your answer.

[2 marks]

2 faces are hidden . ①

7

Turn over ►



20 (a) Complete the table of values for $y = x^2 + 2x$

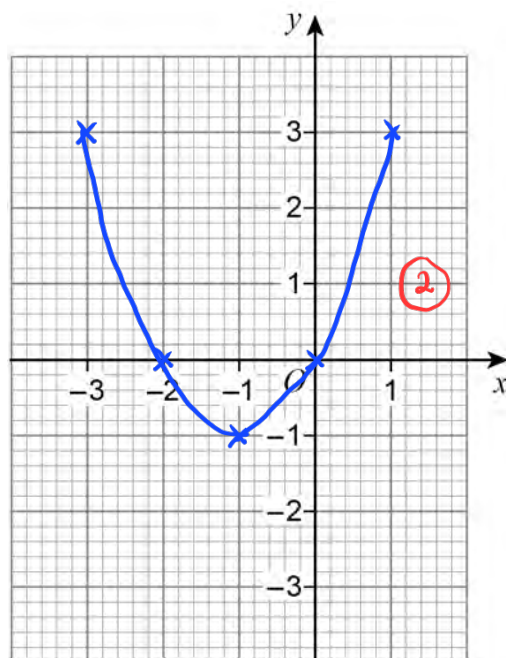
[2 marks]

x	-3	-2	-1	0	1
y	3	0	-1	0	3

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outside the
box

20 (b) Draw the graph of $y = x^2 + 2x$ for values of x from -3 to 1

[2 marks]



21

Jing has £2450

She saves some and gives the rest to her four brothers.

money saved : money given to brothers = 2 : 5

She gives each of her **four** brothers the **same** amount.

Does each brother receive more than £430 ?

You **must** show your working.**[4 marks]**

$$\text{Total ratio : } 2 + 5 = 7$$

$$\text{money she gives : } \frac{5}{7} \times 2450 = 1750$$

$$\text{Each brother receive : } \frac{1750}{4} = 437.50$$

Yes. Each receive £437.50.

Turn over for the next question

Turn over ►

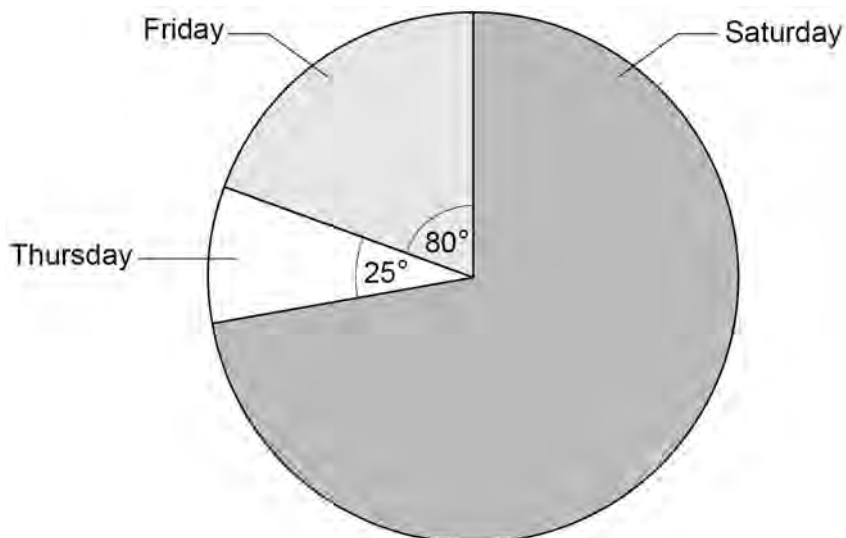


22

The pie chart shows information about people at a fair during three days.

Do not write
outside the
box

Not drawn
accurately



There were 132 **more** people on Friday than on Thursday.

Work out the number of people on Saturday.

[3 marks]

$$80 - 25 = 55 \quad (1)$$

$$\frac{132}{55} = 2.4 \text{ people per 1 degree}$$

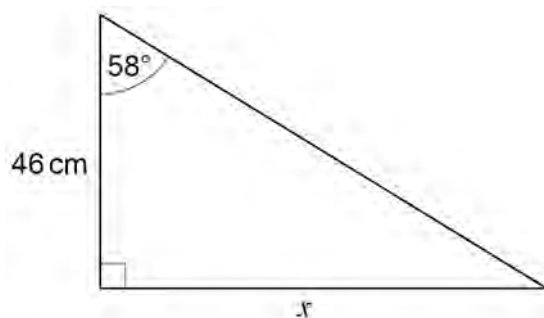
$$\text{Saturday} = 360 - 80 - 25 = 255 \text{ degree} \quad (1)$$

$$\text{No. of people on Saturday} = 255 \times 2.4 = 612 \quad (1)$$

Answer 612



23

Use trigonometry to work out the value of x .Do not write
outside the
boxNot drawn
accurately

$$\textcircled{1} \quad \tan 58^\circ = \frac{x}{46}$$

[3 marks]

$$x = 46 \tan 58^\circ \quad \textcircled{1}$$

$$= 73.6 \quad \textcircled{1}$$

$$x = \underline{73.6} \text{ cm}$$

Turn over for the next question

Turn over ►



24 Millie is estimating the value of $\frac{1}{(\sqrt[3]{8.34})^2 \times 10.21}$

She rounds each decimal number to 1 significant figure.

24 (a) Work out Millie's estimate.

You **must** show your working.

$$\frac{1}{(\sqrt[3]{8})^2 \times 10} = \frac{1}{2^2 \times 10} = \frac{1}{40}$$

[2 marks]

Answer $\frac{1}{40}$

24 (b) Millie says,

"My estimate must be more than the exact value."

Without working out the exact value, give a reason how she can know this.

[1 mark]

Both numbers are rounded down.

①



Do not write
outside the
box25 (a) Factorise $x^2 + 8x + 15$

[2 marks]

$$(x+3)(x+5)$$

Answer $(x+3)(x+5)$ ②25 (b) Write down the **two** solutions of $(y+2)(y-4) = 0$

[1 mark]

Answer -2 and 4
①

END OF QUESTIONS



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ANSWER IN THE SPACES PROVIDED**



