

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

I declare this is my own work.

E

Extension Tier Paper 2E

Thursday 29 May 2025

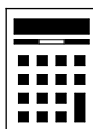
07:00 GMT

Time allowed: 2 hours

Materials

For this paper you must have:

- a calculator
- mathematical instruments.



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 100.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.
- If your calculator does not have a π button, take the value of π to be 3.142

Advice

Show all necessary working; otherwise marks for method may be lost.

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	
26–27	
28–29	
TOTAL	



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

1 (a) Factorise fully $a^3b^4 + ab^2$

[1 mark]

Answer _____

1 (b) $y = mx + c$

Work out the value of y when $m = -\frac{2}{3}$ $x = 4$ and $c = 9$

Write your answer as a mixed number.

[2 marks]

$y =$ _____

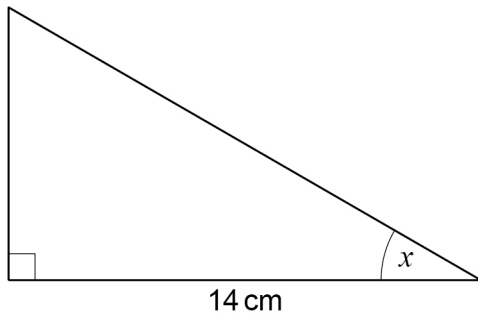
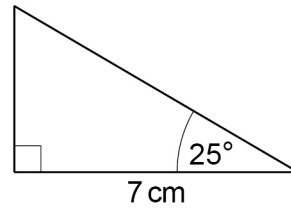
1 (c) Rearrange $3p - 1 = 7r + 5$ to make p the subject.

[2 marks]

Answer _____



2

Here are two **similar** triangles.Not drawn
accuratelyWrite down the size of angle x .

[1 mark]

Answer _____ °

3

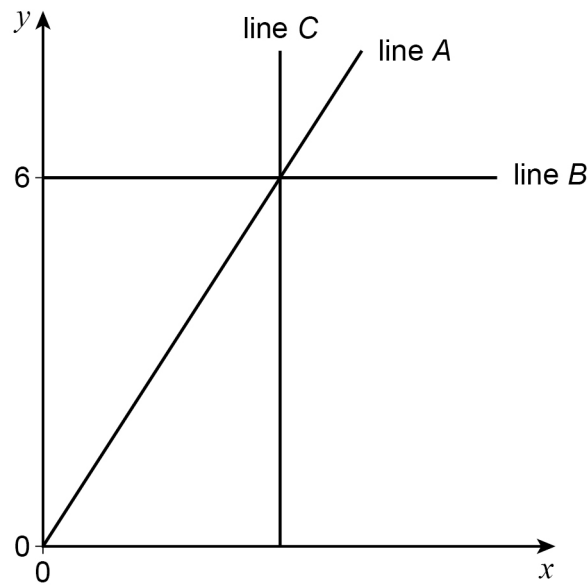
Work out 84 as a percentage of 60

[2 marks]

Answer _____ %



- 4** Here is a sketch of three lines, A , B and C , that intersect at a point.



- Line A has equation $y = 2x$
- Line B is horizontal and crosses the y -axis at $(0, 6)$
- Line C is vertical.

- 4 (a)** Write down the equation of line B .

[1 mark]

Answer _____

- 4 (b)** Work out the equation of line C .

[2 marks]

Answer _____



5 Li asks 100 people which colour they like best from red, blue, green and yellow.

Tick **one** box for each statement about the data.

[3 marks]

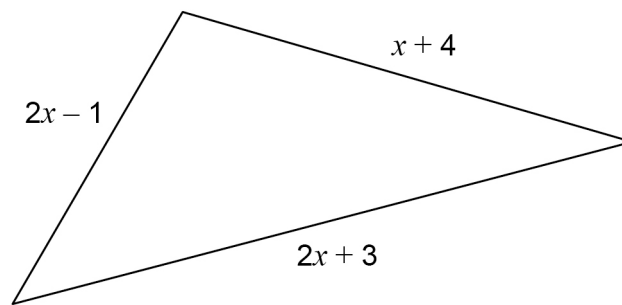
	True	False
The data is quantitative.	☐	☐
The data is primary.	☐	☐
Li could represent the data in a pie chart.	☐	☐
Li could represent the data in a stem-and-leaf diagram.	☐	☐

Turn over for the next question

Turn over ►



6

Not drawn
accurately

The perimeter of the triangle is 28.5 cm

Work out the length of the **shortest** side.

[3 marks]

Answer _____ cm



- 7 The original value of a car was \$35 000
The value decreased
by 28% in the first year
and then
by 15% each year for 2 years.

After the 3 years, was the value of the car **less than** 50% of the original value?

You **must** show your working.

[3 marks]

8 $(2^a)^3 = 2^{17} \div 2^5$

Work out the value of a .

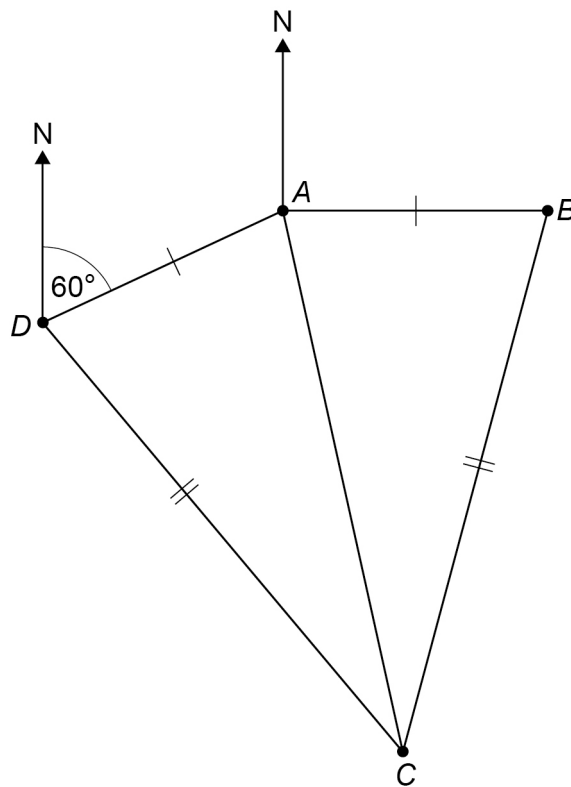
[2 marks]

$a =$ _____



9

A , B , C and D are four towns.



Not drawn
accurately

- B is due East of A .
- The bearing of A from D is 060°
- Angle $DAC = \text{angle } BAC$

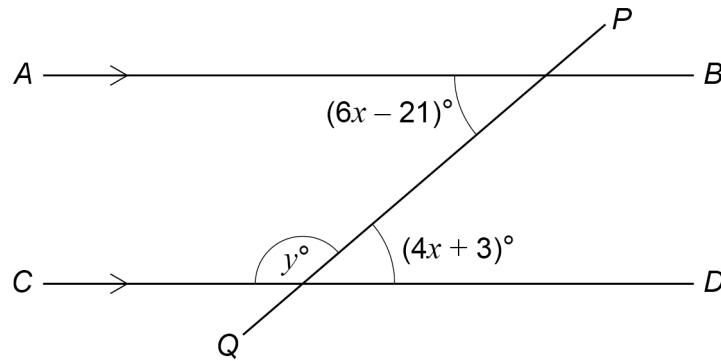
Work out the bearing of C from A .

[4 marks]

Answer _____^o



10

 AB , CD and PQ are straight lines. AB is parallel to CD .Not drawn
accuratelyWork out the value of y .**[3 marks]**

 $y =$ _____

Turn over for the next question

Turn over ►



- 11** ξ is the set of integers from 20 to 50
 A is the set of square numbers.
 B is the set of odd numbers.
 List the elements of $A \cap B$

[2 marks]

Answer _____

- 12** Fuad and Tia each have the same amount of money.
 Fuad spends 85% of his money.
 He has \$9 left.

Tia spends $\frac{49}{125}$ of her money.

How much money does Tia have left?

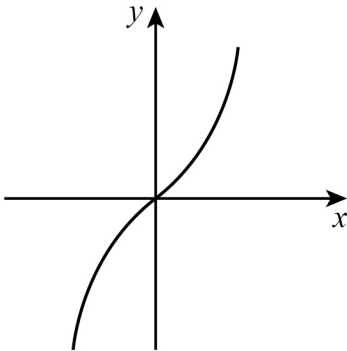
[3 marks]

Answer \$ _____

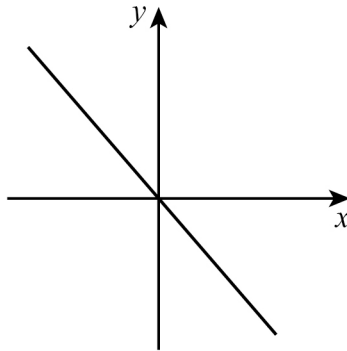


13 Here are sketches of six graphs.

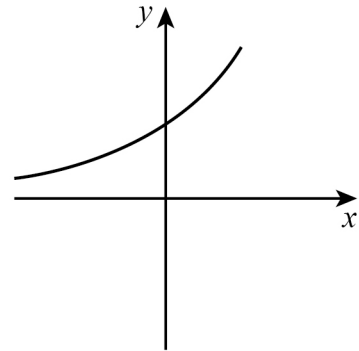
Graph A



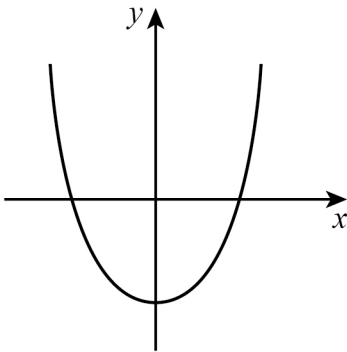
Graph B



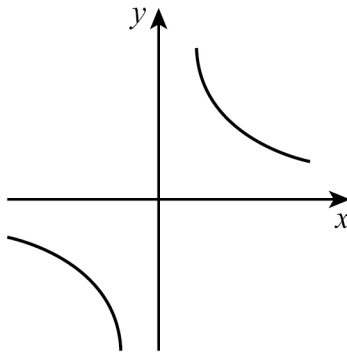
Graph C



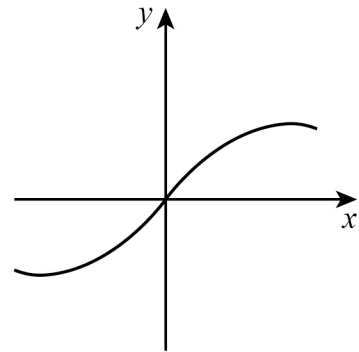
Graph D



Graph E



Graph F



Write the letter of each graph next to the equation it represents.

[4 marks]

$$y = \sin x \quad \underline{\hspace{2cm}}$$

$$y = \frac{1}{x} \quad \underline{\hspace{2cm}}$$

$$y = 2^x \quad \underline{\hspace{2cm}}$$

$$y = \tan x \quad \underline{\hspace{2cm}}$$



14

A glass can hold 380 ml of water, correct to the nearest 10 ml

Can 50 of these glasses definitely hold 19 litres of water?

Show working to support your answer.

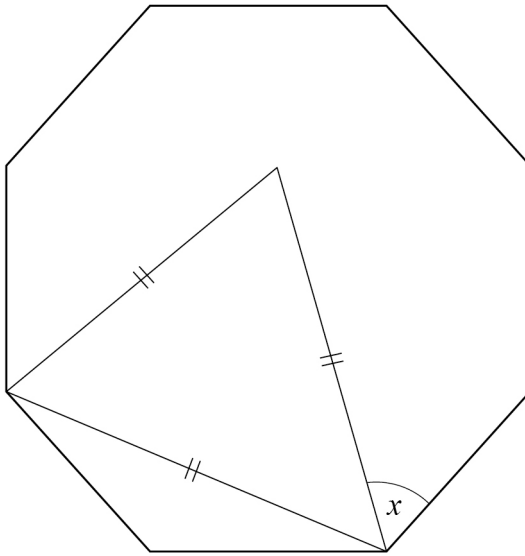
[3 marks]



15

An **equilateral** triangle is drawn from two vertices of a regular octagon.

Not drawn
accurately



Work out the size of angle x .

[4 marks]

$x =$ _____ $^{\circ}$



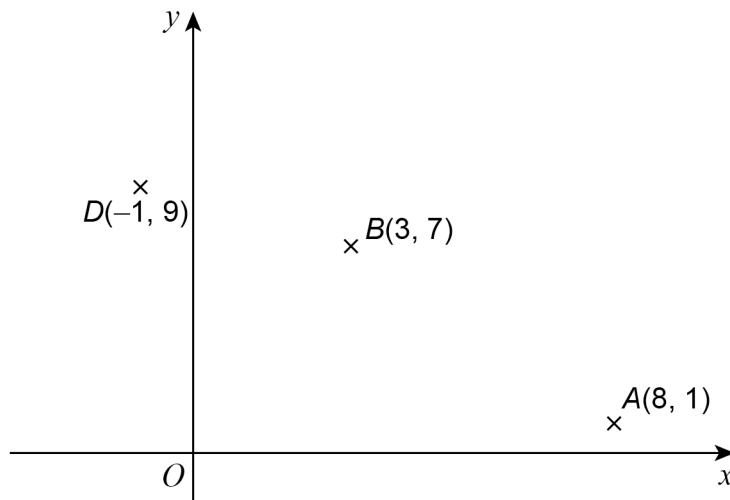
16 Expand and simplify fully $(x - 5)(x - 4)(x + 3)$

[3 marks]

Answer _____



17

The sketch shows points A , B and D . B is the midpoint of AC .Work out the coordinates of the midpoint of CD .**[4 marks]**

Answer (_____ , _____)



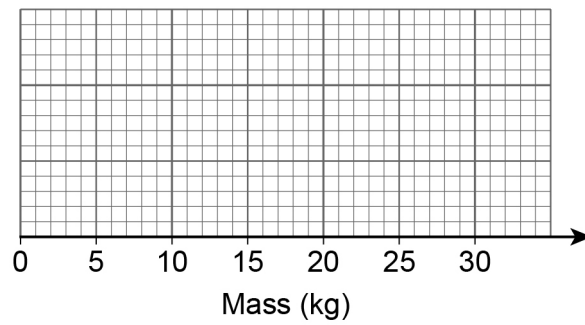
18

Here is some information about the masses of dogs in a dog show.

	Mass (kg)
Lowest	4
Range	25
Upper quartile	23
Interquartile range	9
Median	17

Draw a box plot for this information.

[3 marks]



19

Simplify fully

$$\frac{2x-3}{4} + \frac{7-x}{5}$$

[3 marks]

Answer _____

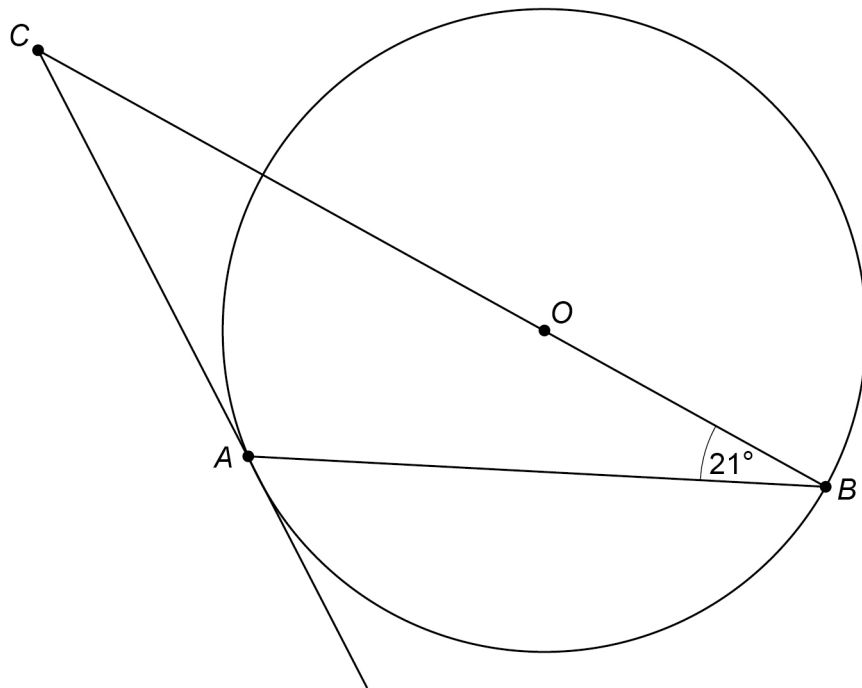
Turn over for the next question**Turn over ►**

20

A and B are points on a circle.

O is the centre of the circle and lies on BC .

AC is a tangent to the circle.



Work out the size of angle ACB .

[4 marks]

Answer _____ °



21

Two boxes are similar.

The ratio of their heights is $2 : 5$

Write the volume of the smaller box as a fraction of the volume of the larger box.

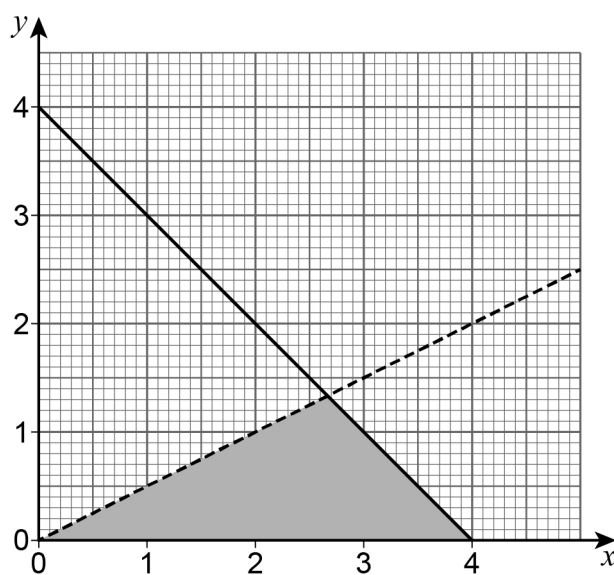
[2 marks]

Answer _____

Turn over for the next question

22

The diagram shows a shaded region.



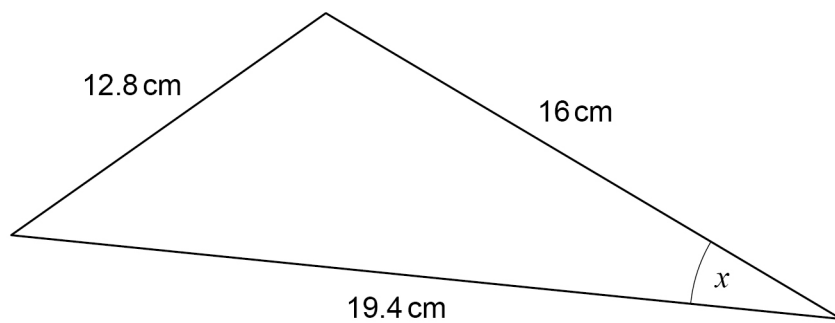
Work out the three inequalities that describe the shaded region.

[3 marks]

Answer _____



23

Not drawn
accuratelyWork out the size of angle x .**[3 marks]**

 $x =$ _____ °

Turn over for the next question

Turn over ►



24

Show that $\sqrt{72} + 3\sqrt{20}$ can be written in the form $6(\sqrt{a} + \sqrt{b})$

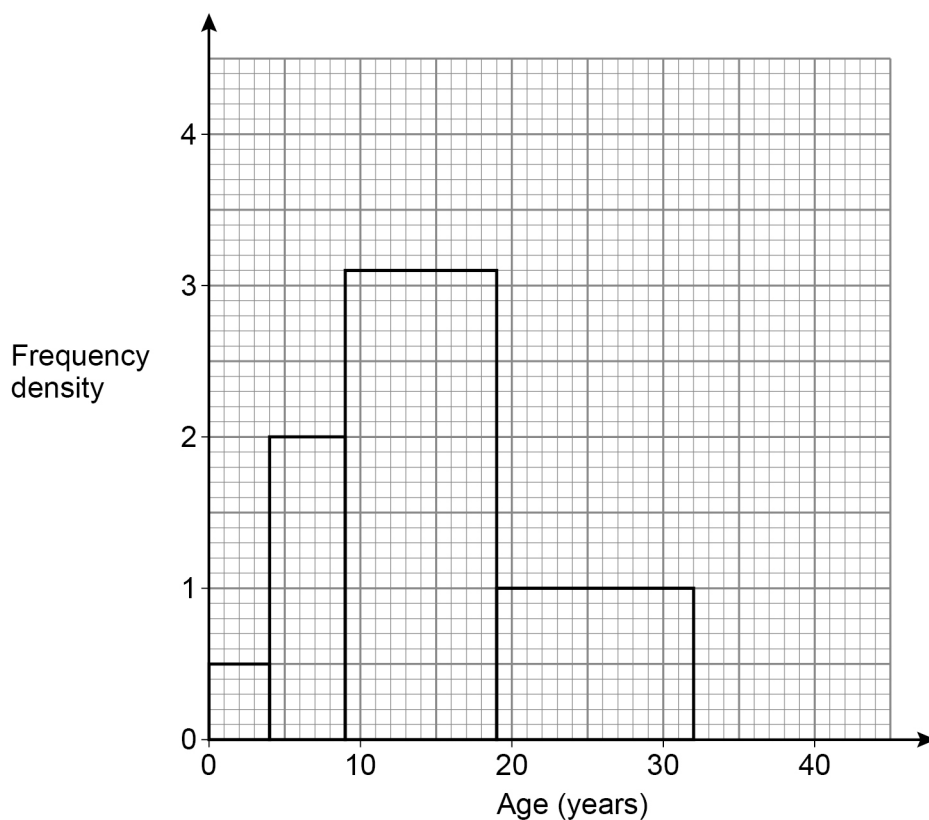
where a and b are integers.

[3 marks]



25

The histogram shows information about the ages of people in a cinema.



Work out an estimate of the **percentage** of people in the cinema who are aged **less than 16** years.

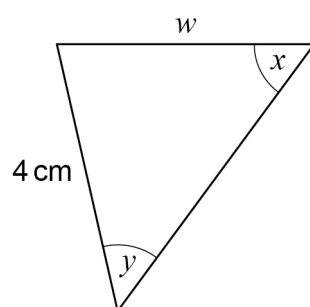
You **must** show your working.

[5 marks]

Answer _____ %



26

Not drawn
accurately

$$\sin x = \frac{1}{\sqrt{2}}$$

$$\sin y = \frac{\sqrt{3}}{2}$$

Work out length w .Give your answer in the form $c\sqrt{d}$ where c and d are integers.**[3 marks]**

 $w =$ _____ cm

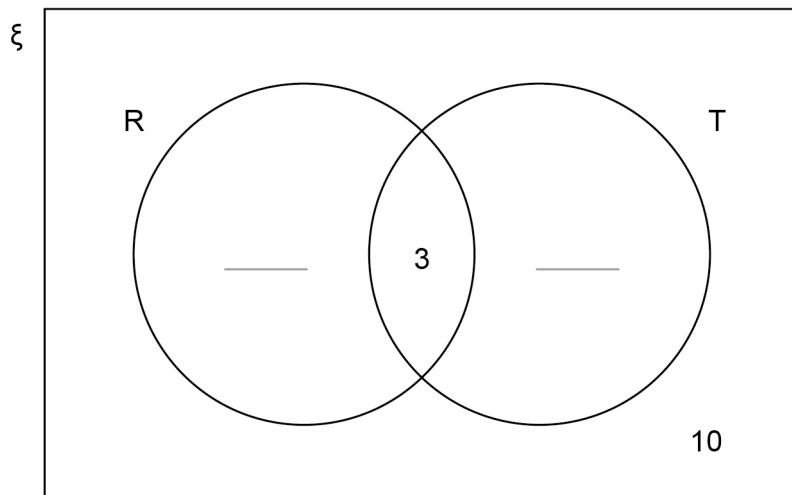
27

Here is a Venn diagram.

 ξ = a group of shapes

R = red shapes

T = triangles



When one of the shapes is chosen at random, the probability it is a **red triangle** is $\frac{1}{15}$

When one of the **red** shapes is chosen at random, the probability it is a **red triangle** is $\frac{1}{7}$

Complete the Venn diagram.

[3 marks]



Here are the first four terms of a quadratic sequence.

51

[4 marks]

[illegible]

Answer _____



29 $f(x) = 4x - 2$

29 (a) Work out $f^{-1}(x)$ **[2 marks]**

$$f^{-1}(x) = \underline{\hspace{10cm}}$$

29 (b) Solve $f(x^2) = 7$ **[3 marks]**

$$x = \underline{\hspace{10cm}}$$

Turn over for the next question**Turn over ►**

30

Convert $0.4\dot{3}\dot{9}$ to a fraction in its simplest form.
You **must** show your working.

[3 marks]

Answer _____



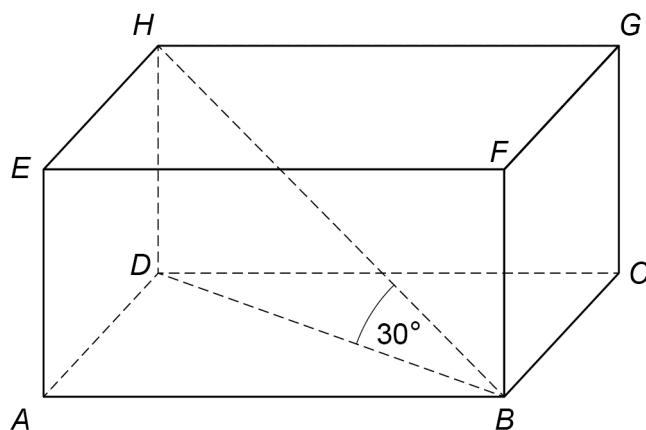
31

Here is a cuboid.

$$AB = 20 \text{ cm}$$

$$BD = 25 \text{ cm}$$

$$\text{Angle } HBD = 30^\circ$$



Work out the volume of the cuboid.

[4 marks]

Answer _____ cm^3 **END OF QUESTIONS**

There are no questions printed on this page

*Do not write
outside the
box*

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**



[illegible]

[illegible]