OXFORD

INTERNATIONAL
AQA EXAMINATIONS

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

INTERNATIONAL GCSE

MATHEMATICS

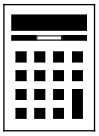
E

Extension Tier Paper 2E

Time allowed: 2 hours

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 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	
TOTAL	

Do not write outside the box

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

1 Circle the reciprocal of 0.5

[1 mark]

$\frac{1}{5}$ $\frac{1}{2}$ 2 5

2 Use your calculator to work out $\frac{2.5 \times 10^4 + 3 \times 10^{-1}}{5 \times 10^3}$

Circle your answer.

[1 mark]

5.000 06 25 000.000 06 25 060 5 000 060

3 The total cost of 4 tickets is x dollars.

Circle the total cost, in dollars, of n tickets.

[1 mark]

$\frac{n}{4x}$ $\frac{nx}{4}$ $\frac{4n}{x}$ $\frac{x}{4n}$

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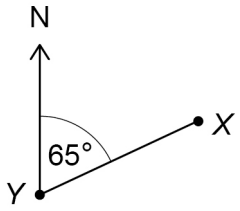
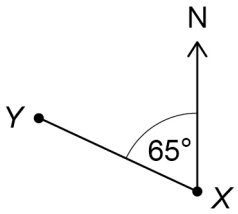
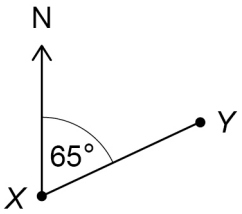
4 The bearing of X from Y is 065°

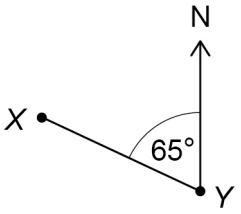
Circle the diagram that shows this.

[1 mark]









5 Factorise fully $5x^2y - 35xy^2$

[2 marks]

Answer _____

Turn over for the next question

6

Turn over ►

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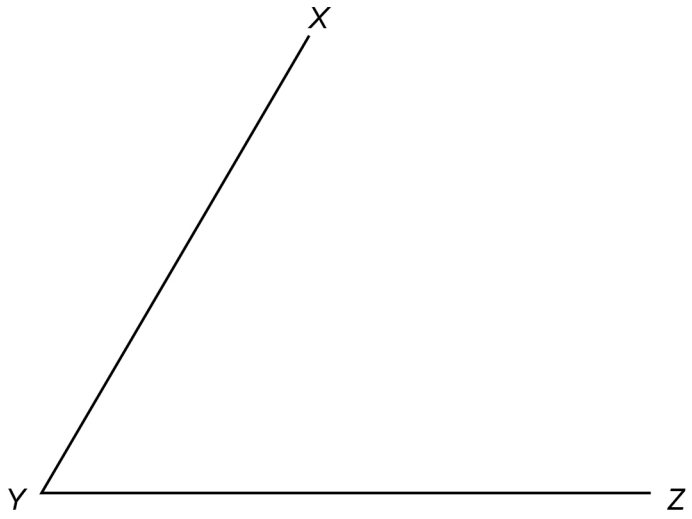
6 Using ruler and compasses, show the position of point *P* so that

PY bisects angle *XYZ*

PY = 6 cm

[3 marks]



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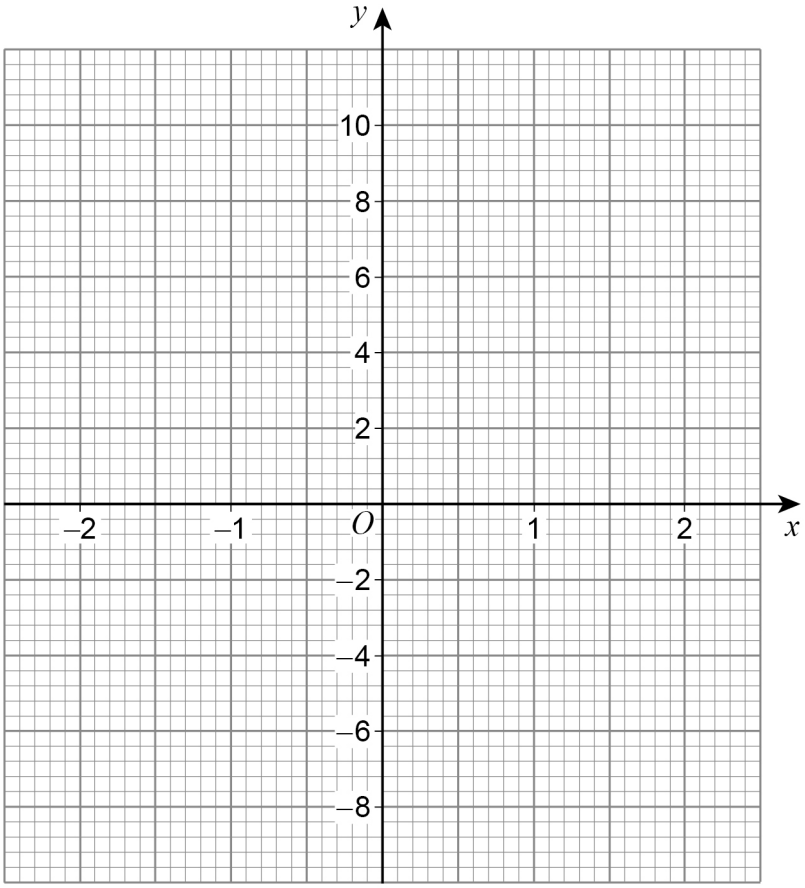
7 (a) Complete the table of values for $y = x^3 + 2$

[2 marks]

x	-2	-1	0	1	2
y		1			10

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

[2 marks]



7

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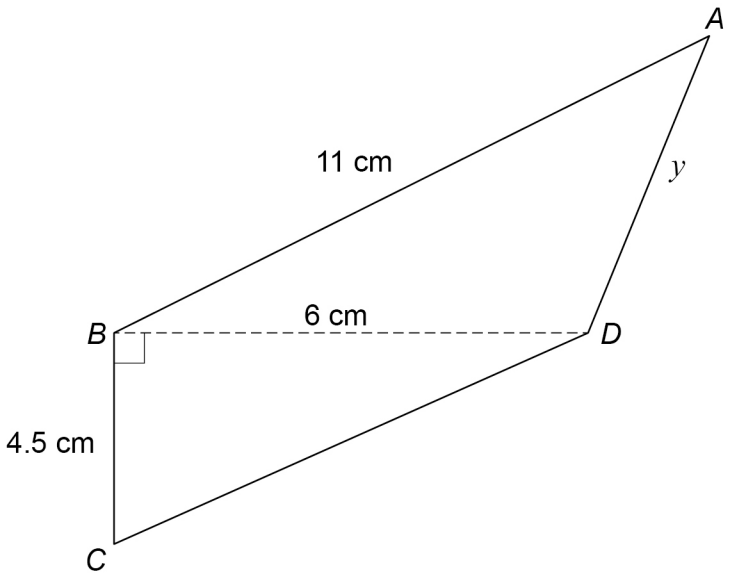
8 The perimeter of quadrilateral *ABCD* is 30 cm



Not drawn accurately

Work out the value of y.

[4 marks]

Answer _____ cm

Do not write outside the box

9 $9(p^2 + 5p) - 3(2p^2 + 8p) + 7p \equiv cp^2 + dp$

Work out the values of c and d.

[3 marks]

$c =$ _____ $d =$ _____

Turn over for the next question

7

Do not write outside the box

10 ξ is the set of single-digit positive integers.

A is the set of prime numbers.

B is the set of square numbers.

C is the set of cube numbers.

10 (a) Circle the set A′

[1 mark]

{1, 4, 6, 8, 9} {2, 4, 6, 8, 9} {2, 3, 5, 7} {1, 3, 5, 7}

10 (b) Work out the value of $n(B \cup C)$

[2 marks]

Answer _____

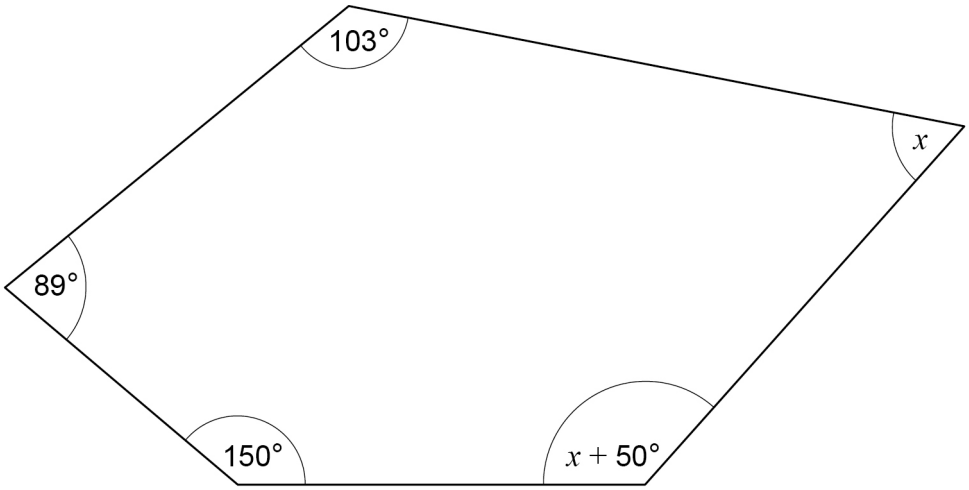
11 Solve $-\frac{2t}{3} < 8$

[2 marks]

Answer _____

Do not write outside the box

12 Here is a pentagon.



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Work out the size of angle x.

[4 marks]

Answer _____ °

9

Turn over ►

Do not write outside the box

13 At a shop, the normal price of one kitchen roll is $1.40

The shop had the following offers over three different weeks.

Week 1	**Week 2**	**Week 3**
Buy six rolls get 15% off the total price	Buy two rolls get a 3rd roll half price	Buy one roll get 25% off the price of a 2nd roll

In which week was it cheapest to buy 6 rolls?

You **must** show your working.

[4 marks]

Answer _____

Do not write outside the box

14 The angles in a triangle are in the ratio $3 : 4 : x$

x is greater than 4

The smallest angle is 36°

Work out the value of x.

[4 marks]

Answer _____

15 n is an integer less than zero.

Circle the inequality that is always true.

[1 mark]

$n^2 + n < 0$ $\quad$ $n^2 + n \leqslant 0$ $\quad$ $n^2 + n > 0$ $\quad$ $n^2 + n \geqslant 0$

9

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16 Here is a frequency table.

x	**Frequency**
0	25
1	c
2	26
3	d
4	9
5	3
	Total = 120

The mean of the data is 2

Work out the values of c and d.

[5 marks]

$c =$ _____ $d =$ _____

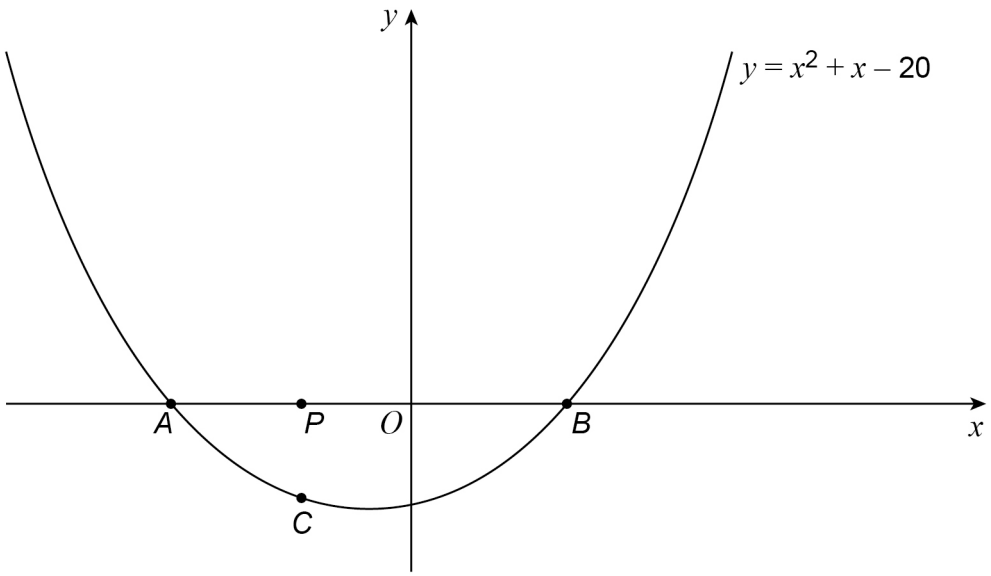
Do not write outside the box

17 A sketch of the curve $y = x^2 + x - 20$ is shown.

A, *B* and *C* are points on the curve.

A, *B* and *P* are points on the x-axis.

C has the same x-coordinate as *P*.



$AP = \frac{1}{3} AB$

Work out the coordinates of *C*.

[4 marks]

Answer (_____ , _____)

9

Turn over ►

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18 Ali completes a journey in three stages.

Stage 1 Drives at 52 km/h for 2 hours.

Stage 2 Drives at 30 km/h for 45 minutes.

Stage 3 Drives for 1 hour.

Ali's average speed for the whole journey is 48 km/h

How many kilometres does he drive in stage 3?

[4 marks]

Answer _____ km

19 The equation of a straight line is $x + 5y = 15$

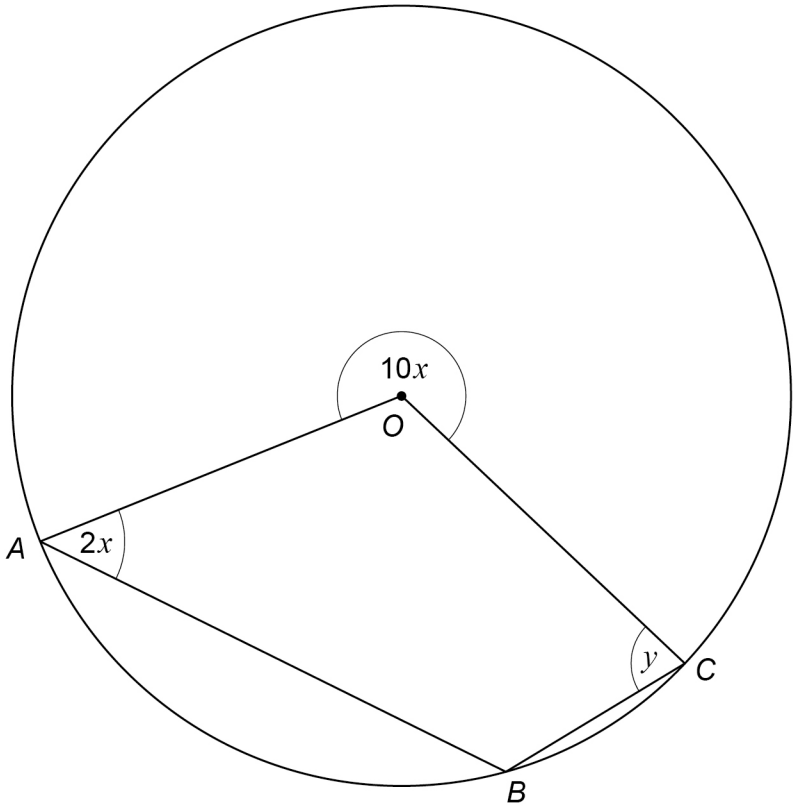
Circle the point where the line crosses the ***x*-axis**.

[1 mark]

(0, 3) (3, 0) (0, 15) (15, 0)

Do not write outside the box

20 *A, B* and *C* are points on a circle, centre *O*.



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Work out y in terms of x.

[4 marks]

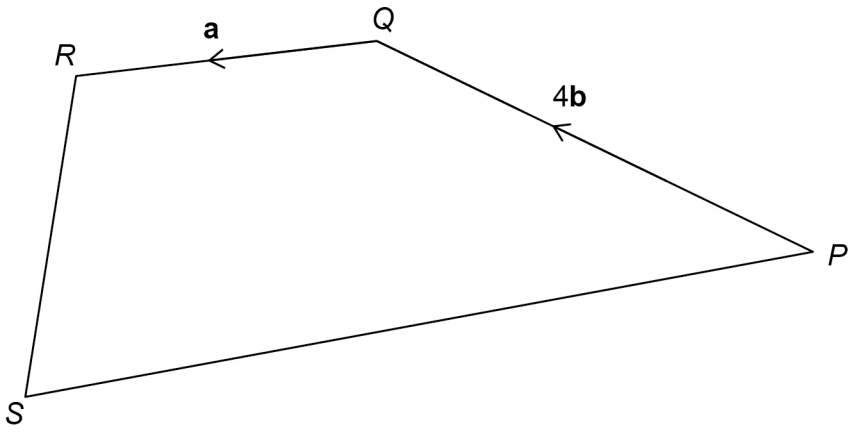
Answer _____

9

Turn over ►

Do not write outside the box

21 Here is trapezium *PQRS*.



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$\overrightarrow{PS} = 2\overrightarrow{QR}$

Work out $\overrightarrow{SR}$ in terms of **a** and **b**.

Give your answer in its simplest form.

[3 marks]

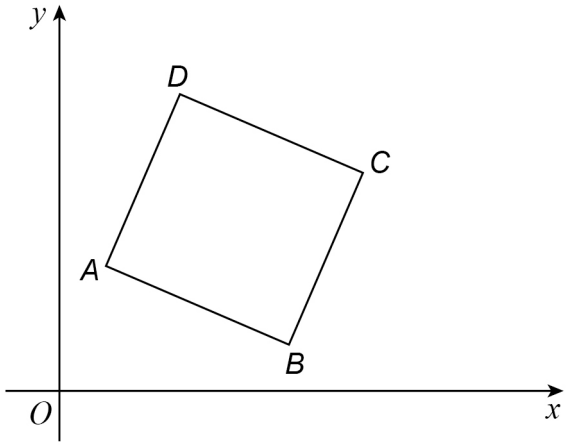
Answer _____

Do not write outside the box

22 *ABCD* is a square.

A is the point (1, 4)

B is the point (7, 2)



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Work out the equation of the line *BC*.

Give your answer in the form $y = mx + c$

[4 marks]

Answer _____

7

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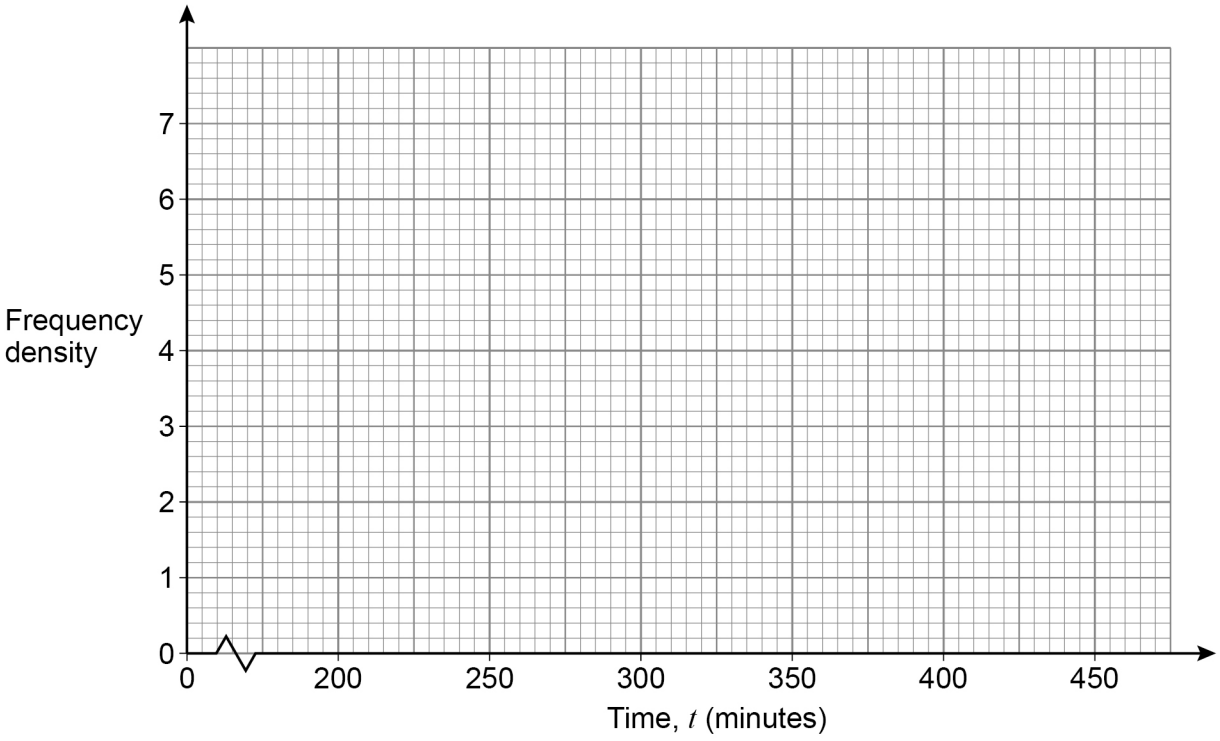
23 364 runners completed a marathon.

The table shows information about the times taken.

Time, t (minutes)	**Frequency**		
$200 \leqslant t < 250$	15		
$250 \leqslant t < 280$	150		
$280 \leqslant t < 300$	124		
$300 \leqslant t < 450$	75		

23 (a) Draw a histogram to represent the data.

[3 marks]



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23 (b) Estimate how many runners took less than 260 minutes to run the marathon.

[2 marks]

Answer _____

24 Solve $81^{7x} = 9^{6x} \times 81^2$

[3 marks]

$x =$ _____

8

Do not write outside the box

25 A café sells hot chocolate.

Hot chocolate

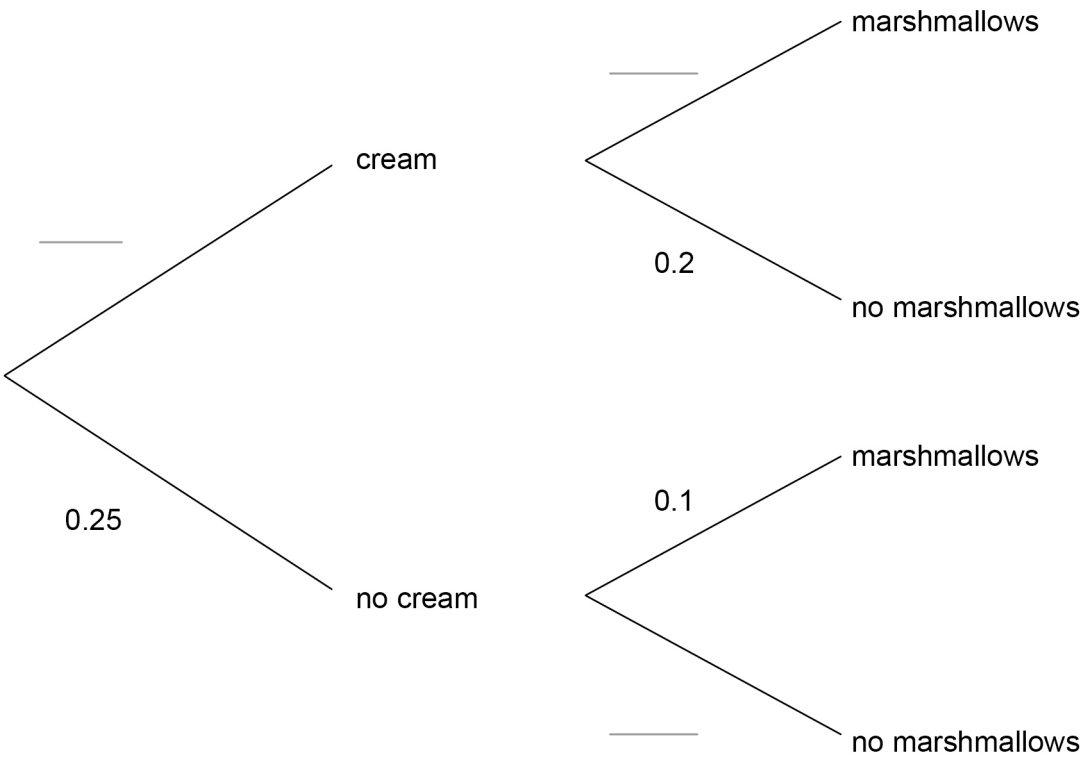
Toppings

- cream
- marshmallows

25 (a) The tree diagram shows some of the probabilities of customers choosing the toppings.

Complete the tree diagram.

[2 marks]



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25 (b) A customer is chosen at random.

Work out the probability that the customer has marshmallows on their hot chocolate.

[3 marks]

Answer _____

26 18 people work on a job.

After 15 days, they have only completed 30% of the job.

The rest of the job has to be completed in 10 more days.

How many **extra** workers are needed?

Assume all of the people work at the same rate.

[3 marks]

Answer _____

8

Do not write outside the box

27 (a) Circle the value that is **not** equivalent to $\sqrt{320}$

[1 mark]

$8\sqrt{5}$ $16\sqrt{10}$ $4\sqrt{20}$ $2\sqrt{80}$

27 (b) By rationalising the denominator, show that $\dfrac{7-\sqrt{3}}{2+\sqrt{3}}$ simplifies to $a+b\sqrt{3}$

where a and b are integers.

You **must** show your working.

[3 marks]

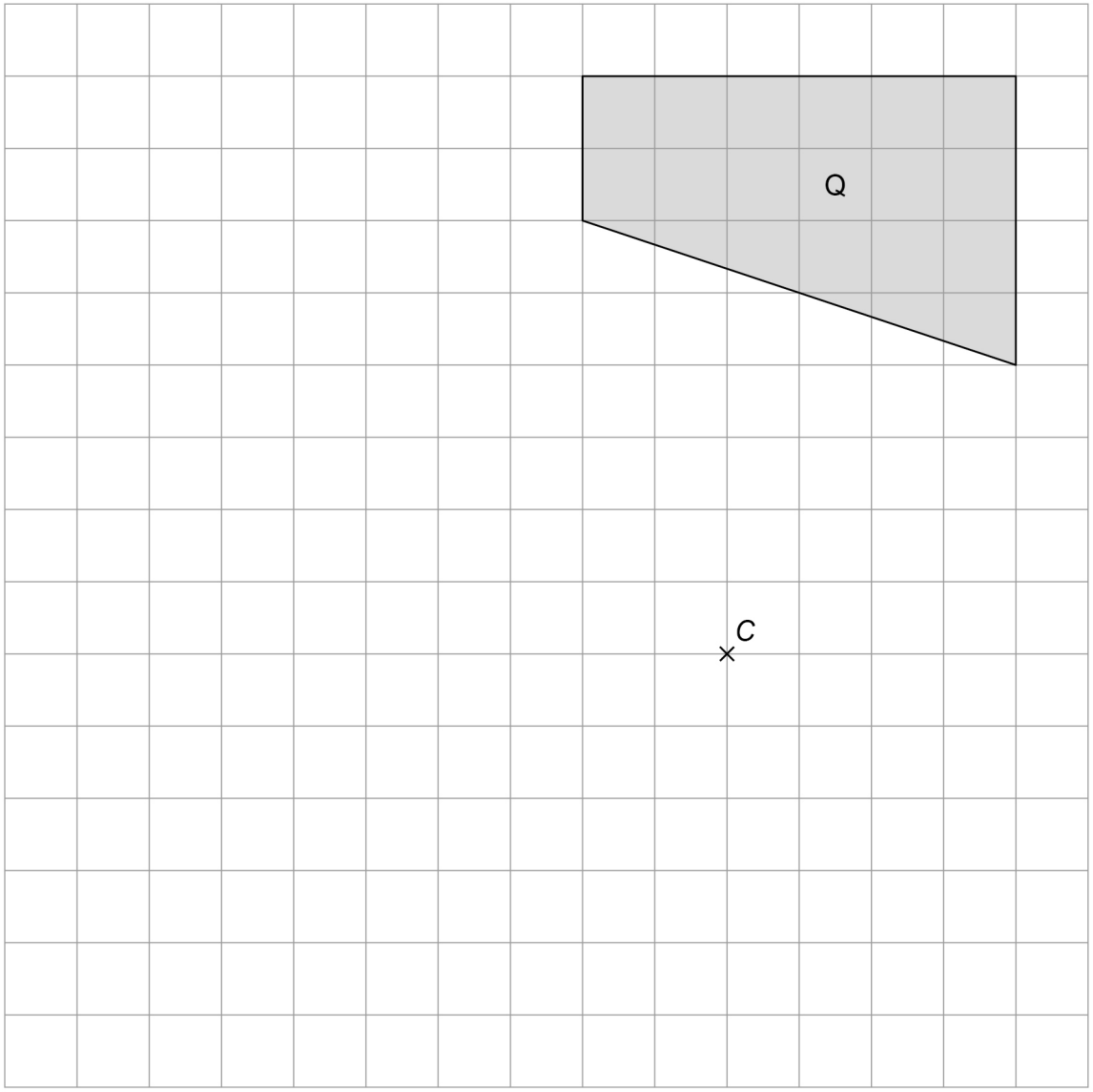
Do not write outside the box

28 Shape Q is an enlargement of a shape P.

The enlargement has scale factor −2 and centre *C*.

Draw shape P on the grid.

[2 marks]



6

Turn over ►

Do not write outside the box

29 $f(x) = x + 2$

$g(x) = x^3$

Work out $fg(3) + gf(2)$

[3 marks]

Answer _____

Do not write outside the box

30 The first four terms of a quadratic sequence are

25 20 11 −2

Work out the nth term of the sequence.

[3 marks]

Answer _____

Turn over for the next question

6

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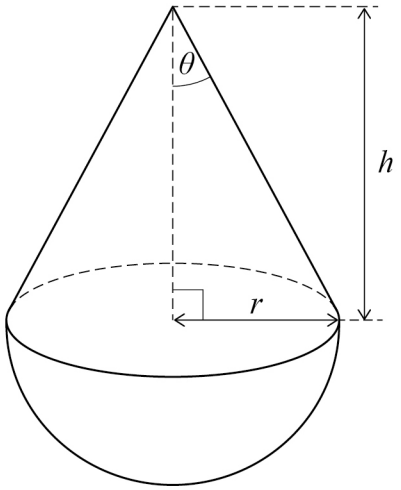
31 A toy is made by joining a cone to a hemisphere.

The radius of the hemisphere is r.

The cone has base radius r and perpendicular height h.



Volume of a hemisphere $= \frac{2}{3}\pi r^3$	Volume of a cone $= \frac{1}{3}\pi r^2 h$

The total volume of the toy is $\frac{17}{12}\pi r^3$

Work out the size of angle θ.

[5 marks]

Answer _____ °

Do not write outside the box

32 Work out the values of x for which $y = 4x^3 - 3x$ is a decreasing function.

Give your answer as an inequality.

[4 marks]

Answer _____

END OF QUESTIONS

9

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