



Surname _____

Other Names _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

**GCSE
MATHEMATICS**

H

Higher Tier Paper 1 Non-Calculator

8300/1H

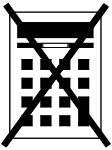
Thursday 24 May 2018 Morning

Time allowed: 1 hour 30 minutes

For this paper you must have:

- mathematical instruments

You must NOT use a calculator.



At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]



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INSTRUCTIONS

- **Use black ink or black ball-point pen. Draw diagrams in pencil.**
- **Answer ALL questions.**
- **You must answer the questions in the spaces provided. Do not write on blank pages.**
- **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.**

DO NOT TURN OVER UNTIL TOLD TO DO SO



Answer ALL questions in the spaces provided

1 Work out $\sqrt[3]{64 \times 1000}$

Circle your answer. [1 mark]

40

80

400

4000

2 The vector $\begin{pmatrix} -2 \\ 3 \end{pmatrix}$ translates A to B.

Circle the vector that translates B to A. [1 mark]

$$\begin{pmatrix} -2 \\ 3 \end{pmatrix}$$

$$\begin{pmatrix} -3 \\ 2 \end{pmatrix}$$

$$\begin{pmatrix} 3 \\ -2 \end{pmatrix}$$

$$\begin{pmatrix} 2 \\ -3 \end{pmatrix}$$

3 Circle the expression that is equivalent to $3a - a \times 4a + 2a$
[1 mark]

$$8a^2 + 2a$$

$$12a^2$$

$$5a - 4a^2$$

$$3a - 6a^2$$



4 Circle the number that is closest in value to

$$\frac{9.8}{0.0195}$$

[1 mark]

5

50

500

5000

5 Solve $5(x + 3) < 60$
[2 marks]

Answer _____

6

[Turn over]



6 The height of Zak is 1.86 metres.
The height of Fred is 1.6 metres.

Write the height of Zak as a fraction of the height of Fred.

Give your answer in its simplest form. [3 marks]

Answer _____



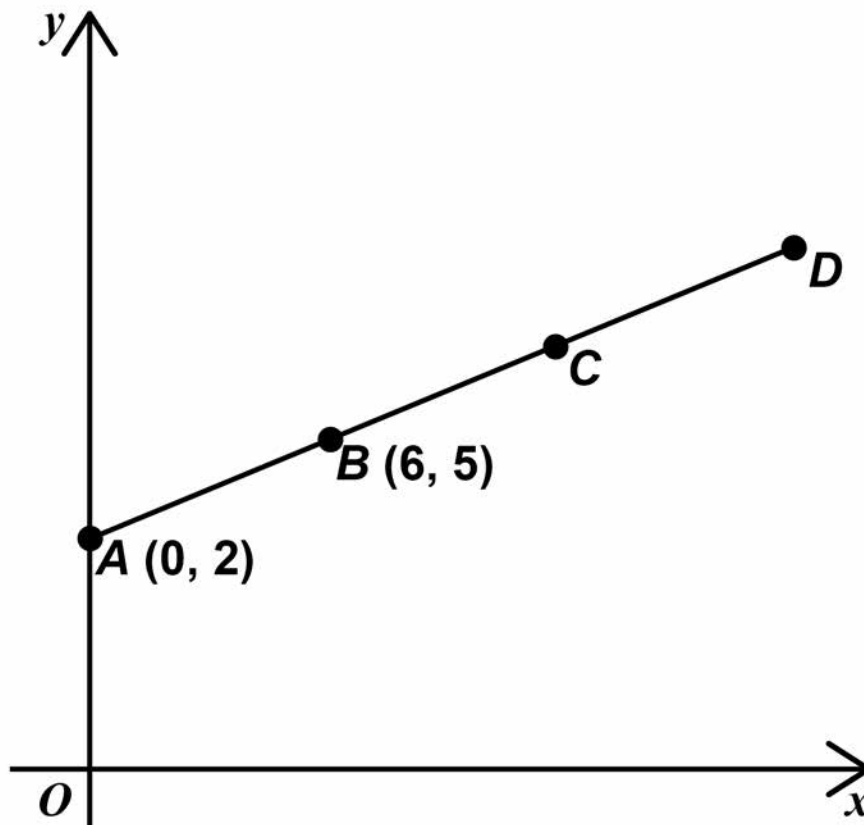
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[Turn over]



- 7 $A(0, 2)$ and $B(6, 5)$ are points on the straight line $ABCD$.

The diagram is not drawn accurately.



$AB = BC = CD$

Work out the coordinates of D . [3 marks]

Answer (_____ , _____)

6

[Turn over]



**8 A coin is thrown 50 times.
It lands on heads 31 times.**

8 (a) Write down the relative frequency it lands on heads. [1 mark]

Answer _____

**8 (b) Raj says,
“The coin is biased towards heads.”**

Use the data to give a reason why he might be correct. [1 mark]



10 y is inversely proportional to x .

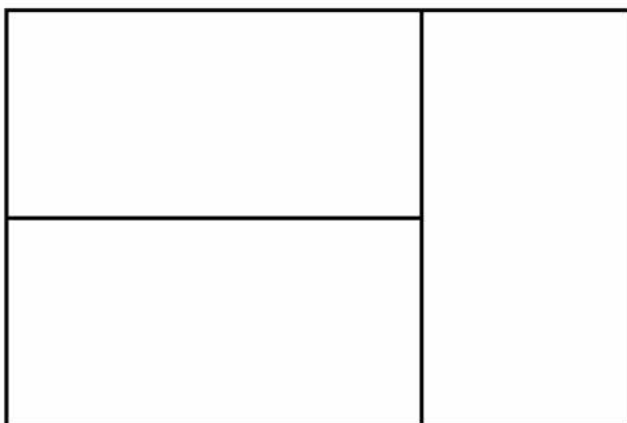
Complete the table. [2 marks]

x	12	6	
y		4	8

7

11 A large rectangle is made by joining three identical small rectangles as shown.

The diagram is not drawn accurately.



12 Put these numbers in order from smallest to largest. [2 marks]

$$8 \times 10^{-4} \quad 4 \times 10^{-2} \quad 6 \times 10^{-4} \quad 0.07$$

Smallest

Largest



13 Circle the volume that is the same as 15 cm^3
[1 mark]

15 000 mm^3

1.5 mm^3

0.0015 mm^3

150 mm^3

[Turn over]

7

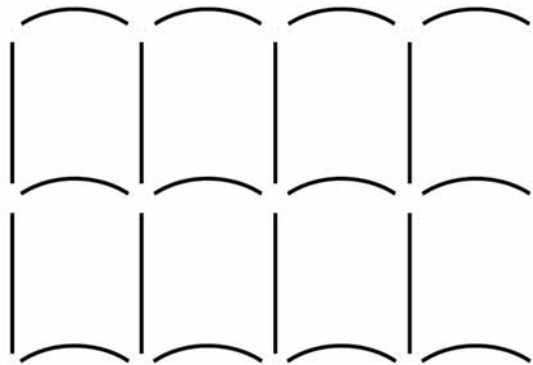


14 Patterns are made using straight lines and arcs.

14 (a) **PATTERN A (one row)**



PATTERN B (two rows)



**More rows are added to PATTERN B so that
number of straight lines : number of arcs = 10 : 9**

How many rows are added? [2 marks]



Answer _____

[Turn over]



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- 15 A biased dice is thrown.
Here are the probabilities of each score.

Score	1	2	3	4	5	6
Probability	0.25	0.05	0.15	0.05	0.3	0.2

The dice is thrown 200 times.

Work out the expected number of times the score will be odd. [3 marks]

Answer _____

- 16 The value of y is 20% more than the value of x .

Circle the ratio $x : y$
[1 mark]

5 : 6

6 : 5

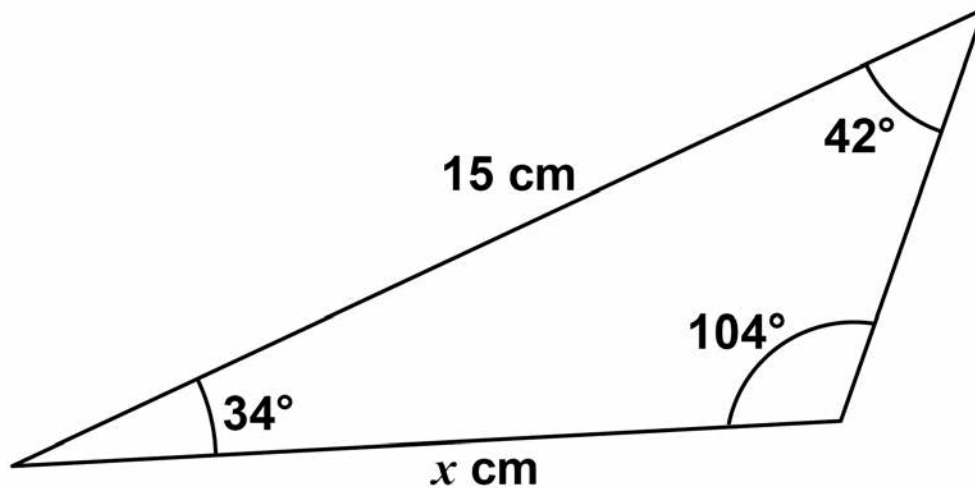
4 : 5

5 : 4



17 Here is a triangle.

The diagram is not drawn accurately.



Circle the correct equation. [1 mark]

$$\frac{\sin x}{42} = \frac{\sin 15^\circ}{104}$$

$$\frac{x}{\sin 42^\circ} = \frac{15}{\sin 104^\circ}$$

$$\frac{\sin x}{34} = \frac{\sin 15^\circ}{104}$$

$$\frac{x}{\sin 42^\circ} = \frac{15}{\sin 34^\circ}$$

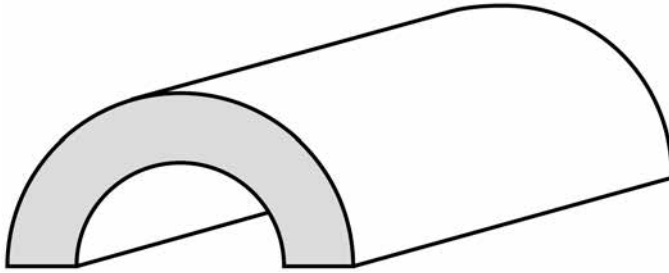
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5



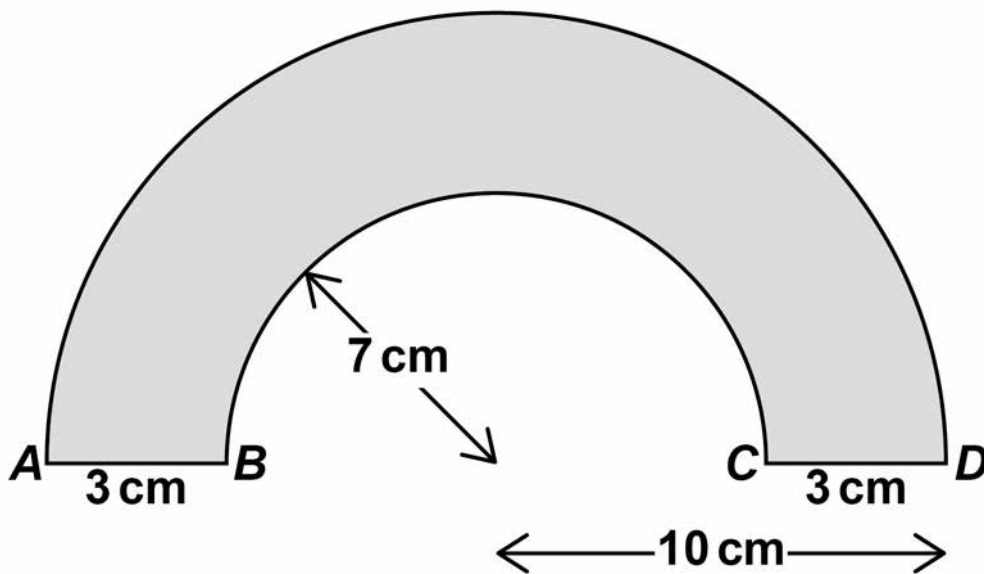
18 Here is a tunnel for a toy train.

The diagram is not drawn accurately.



The diagram below shows the cross section of the tunnel.

The diagram is not drawn accurately.



AD is a semicircular arc of radius 10 cm

BC is a semicircular arc of radius 7 cm

The length of the tunnel is 30 cm

Work out the total area of all SIX faces of the tunnel.

Give your answer in terms of π . [5 marks]



Answer _____ cm²

[Turn over]

5



19 Type A batteries and type B batteries were tested.
The cumulative frequency diagram shows information about the battery life of type A, on page 27.

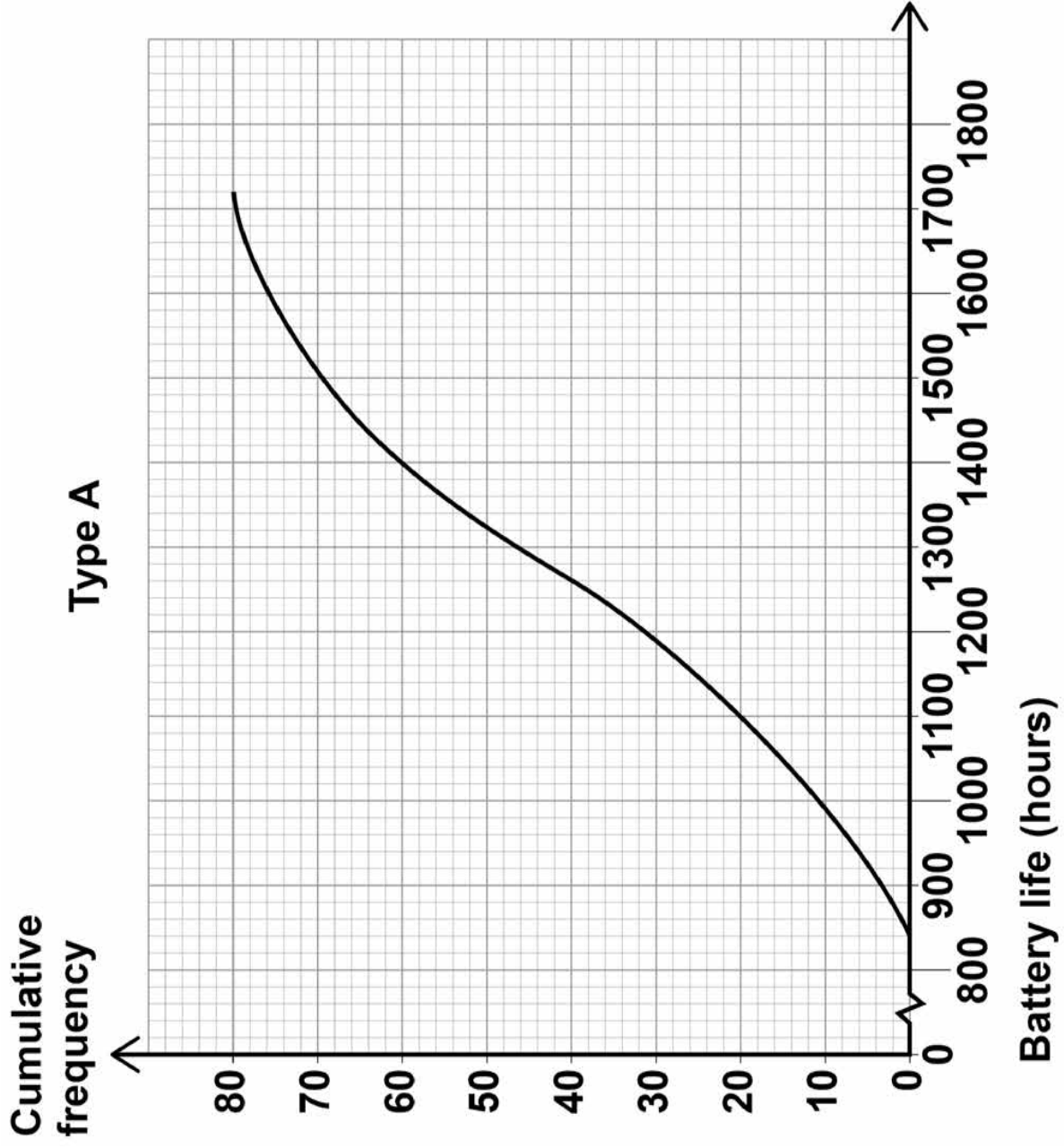
19 (a) Estimate the interquartile range for type A. [2 marks]

Answer _____ hours

19 (b) Estimate the number of type A batteries that had a battery life of more than 1600 hours. [1 mark]

Answer _____



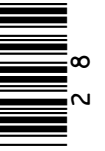
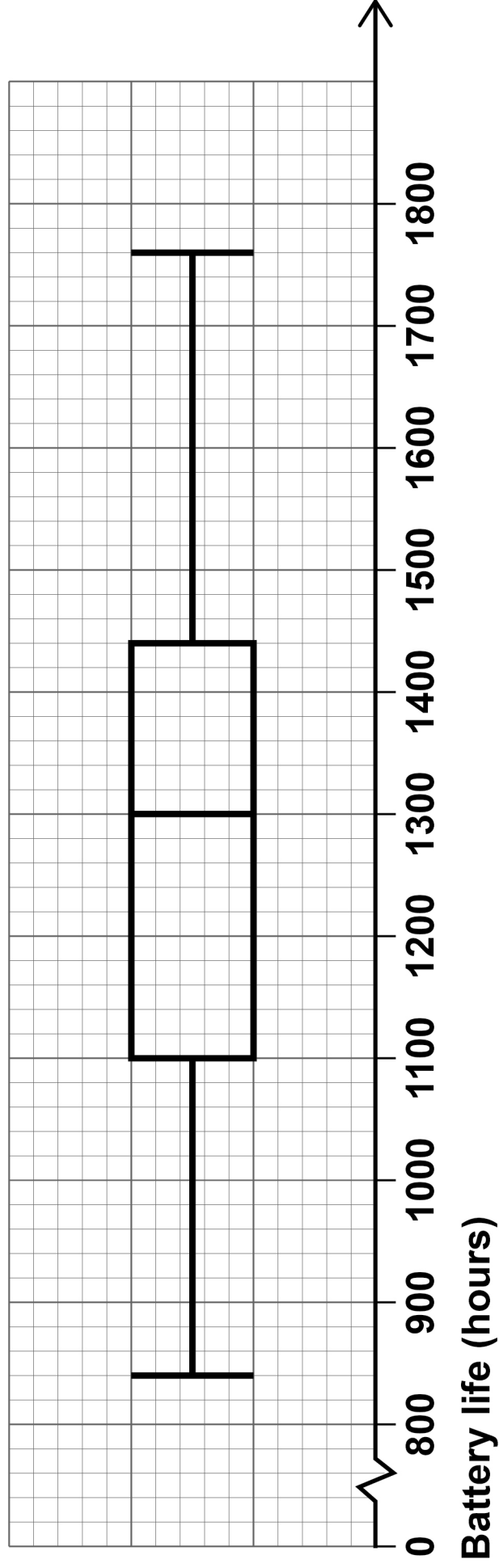


[Turn over]



19 (c) The box plot shows information about the battery life of type B.

Type B



On average, which type had the greater battery life?

Tick a box.

type A

type B

Using data from BOTH diagrams, state how you chose your answer.

[2 marks]

[Turn over]



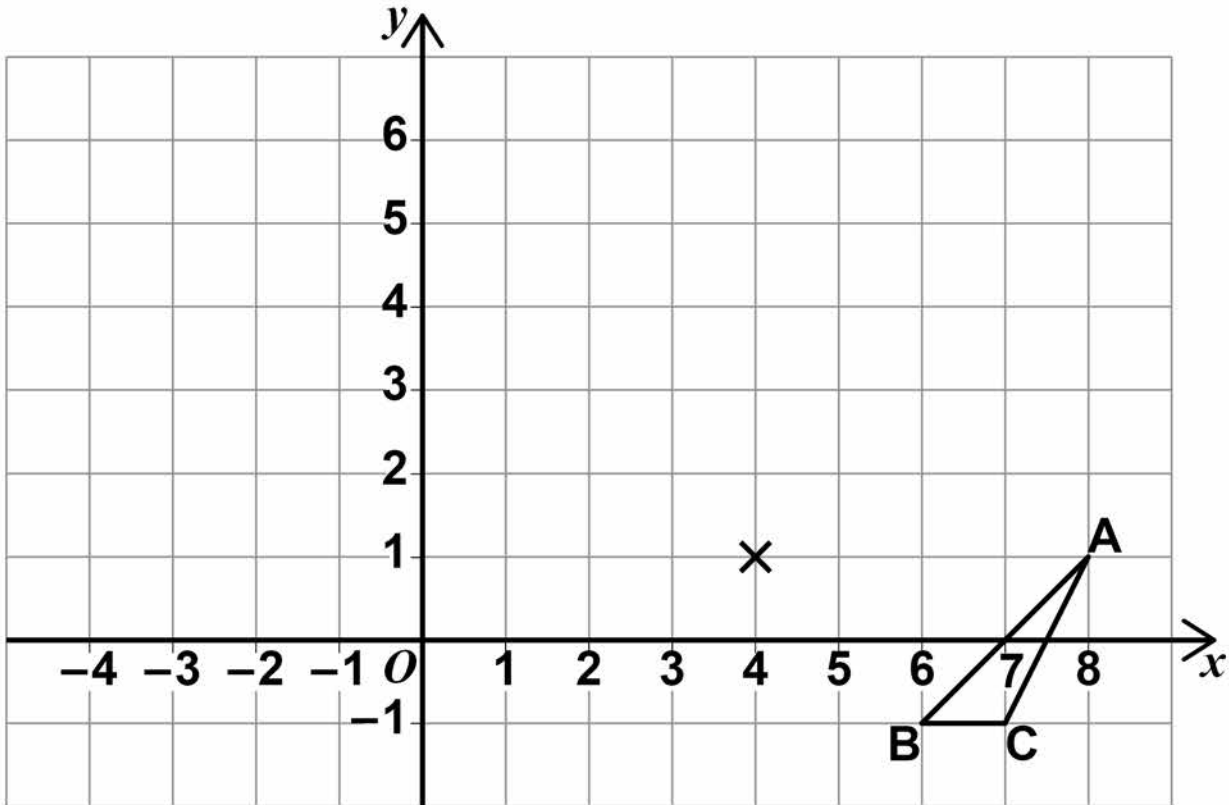
$a =$ _____

$b =$ _____

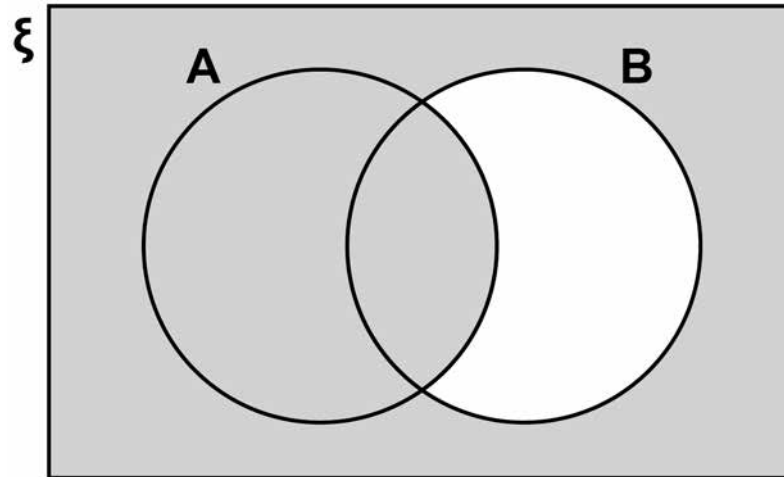
[Turn over]



- 21 Enlarge triangle ABC by scale factor -2 ,
centre $(4, 1)$
[2 marks]



22



Which of these represents the shaded region?
Circle your answer. [1 mark]

$A \cap B'$

B'

$A \cup B'$

$A' \cup B'$

[Turn over]

7



- 23 A shopkeeper compares the income from sales of a laptop in March and April.

April

Price	$\frac{1}{5}$ more than March
Number sold	$\frac{1}{4}$ less than March

By what fraction does the income from these sales decrease in April? [3 marks]



Answer _____

[Turn over]



- 24 (a) Work out the value of $2^{14} \div (2^9)^2$
Give your answer as a fraction in its simplest form. [3 marks]

Answer _____

- 24 (b) Work out the value of $25^{\frac{3}{2}}$
[2 marks]

Answer _____

8

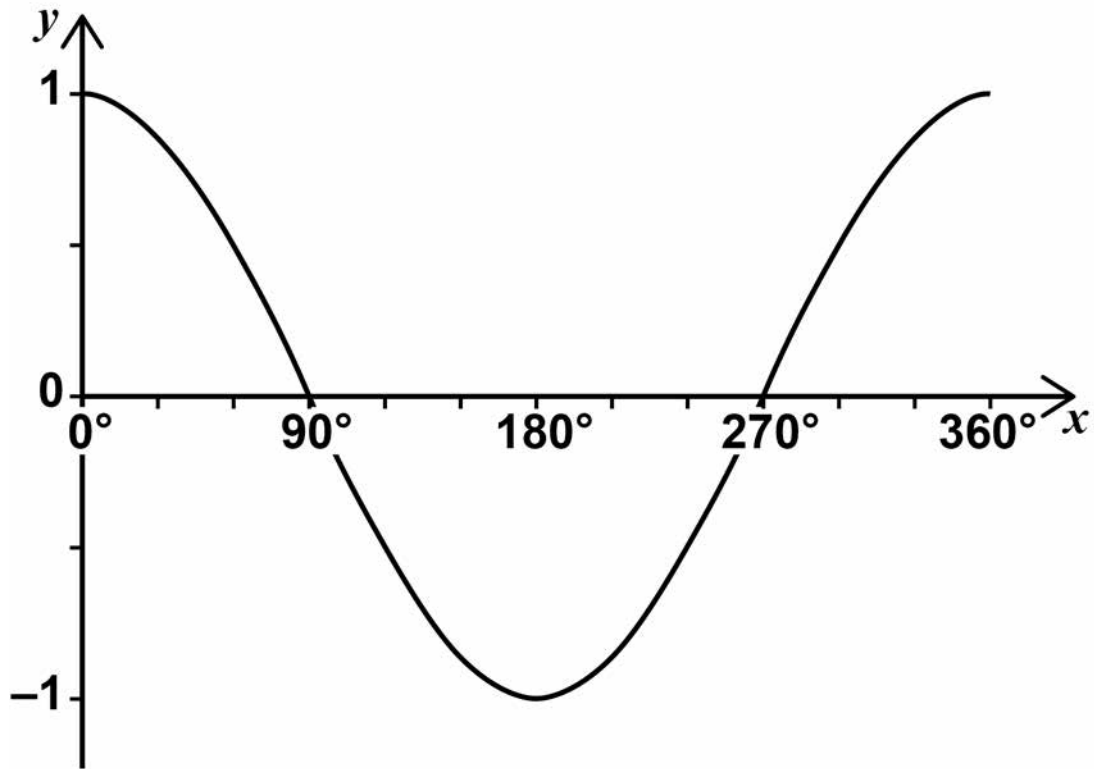


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- 25 Here is a sketch of the graph of $y = \cos x$ for values of x from 0° to 360°



25 (a) $\cos x = \cos 60^\circ$

Work out the value of x when $90^\circ \leq x \leq 360^\circ$
[1 mark]

Answer _____ degrees

25 (b) $\cos x = -\cos 60^\circ$

Work out the value of x when $180^\circ \leq x \leq 360^\circ$
[1 mark]

Answer _____ degrees

[Turn over]



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[Turn over]



27 (a) Jo wants to work out the solutions of
 $x^2 + 3x - 5 = 0$

She says,

“The solutions CANNOT be worked out because
 $x^2 + 3x - 5$ does NOT factorise to $(x + a)(x + b)$
where a and b are integers.”

Is Jo correct?

Tick a box.

Yes

No

Give a reason for your answer. [1 mark]



- 27 (b) **WITHOUT** expanding any brackets,
show how to work out the **EXACT** solutions of
 $9(x + 3)^2 = 4$
Give the solutions. [3 marks]

[Turn over]

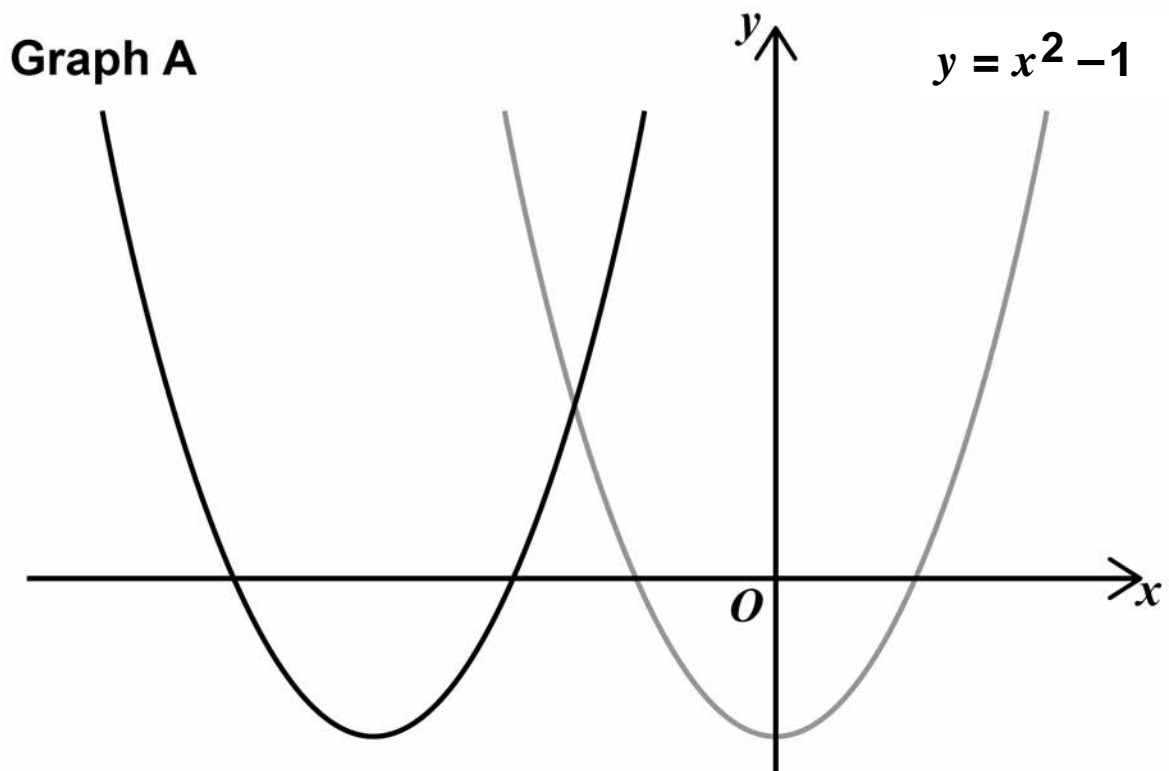


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[Turn over]



29 Here are sketches of two graphs.



The graph of $y = x^2 - 1$ is translated 3 units to the left to give graph A.

29 (a) The equation of graph A can be written in the form $y = x^2 + bx + c$

Work out the values of b and c . [3 marks]



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For Examiner's Use	
Pages	Mark
4–5	
6–9	
10–12	
12–15	
16–19	
20–21	
22–25	
26–29	
30–33	
34–36	
38–40	
42–44	
46–48	
TOTAL	

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