

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

GCSE MATHEMATICS

H

Higher Tier Paper 1 Non-Calculator

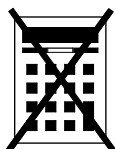
Thursday 2 November 2017 Morning Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- mathematical instruments

You must **not** use a calculator.



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 outside the box around each page or 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.

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	



N 0 V 1 7 8 3 0 0 1 H 0 1

Answer **all** questions in the spaces provided

- 1** Work out $\sqrt{2^6 + 6^2}$
Circle your answer.

[1 mark]

10

14

50

100

- 2** What is 800 million in standard form?
Circle your answer.

[1 mark] 800×10^6 8×10^8 8×10^9 0.8×10^{10}

- 3** Circle the expression that is equivalent to $(4a^5)^2$

[1 mark] $16a^{10}$ $16a^7$ $8a^{10}$ $8a^7$ 

4 $y = \frac{10}{x}$

If the value of x doubles, what happens to the value of y ?

Circle your answer.

[1 mark]

$\div 2$

$\times 2$

$\div 5$

$\times 5$

5 (a) Factorise $x^2 - 100$

[1 mark]

Answer _____

5 (b) Solve $7x + 6 > 1 + 2x$

[2 marks]

Answer _____



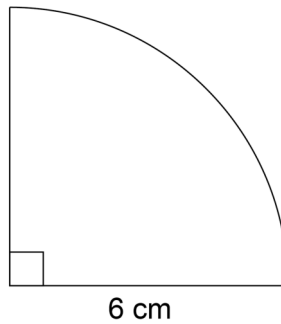
6

Work out the value of $(\sqrt{3})^2 \times (\sqrt{2})^2$ **[2 marks]**

Answer _____

7

Here is a quarter circle of radius 6 cm

Not drawn
accurately

Work out the area of the quarter circle.

Give your answer in terms of π .**[2 marks]**

Answer _____ cm^2 

- 8 Three **whole** numbers are each rounded to the nearest 10
The sum of the rounded numbers is 70
Work out the **maximum** possible sum for the original three numbers.

[2 marks]

Answer _____

- 9 Circle the expression for the range of n consecutive integers.

[1 mark]

$$\frac{n+1}{2}$$

$$n-1$$

$$n$$

$$n+1$$

Turn over for the next question

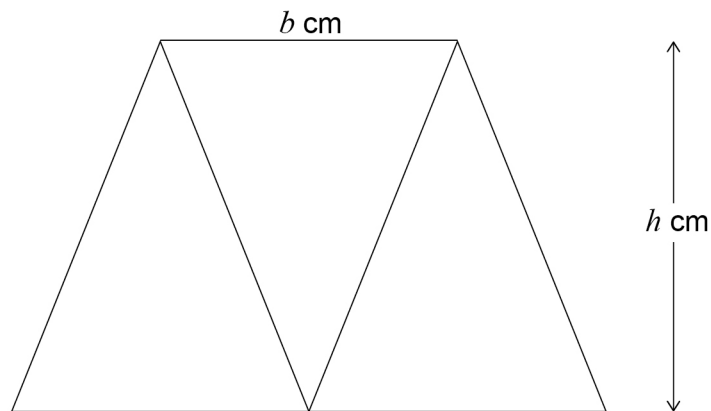
Turn over ►



10

Three identical isosceles triangles are joined to make this trapezium.

Each triangle has base b cm and perpendicular height h cm



Not drawn
accurately

10 (a)

Work out an expression, in terms of b and h , for the area of the trapezium.

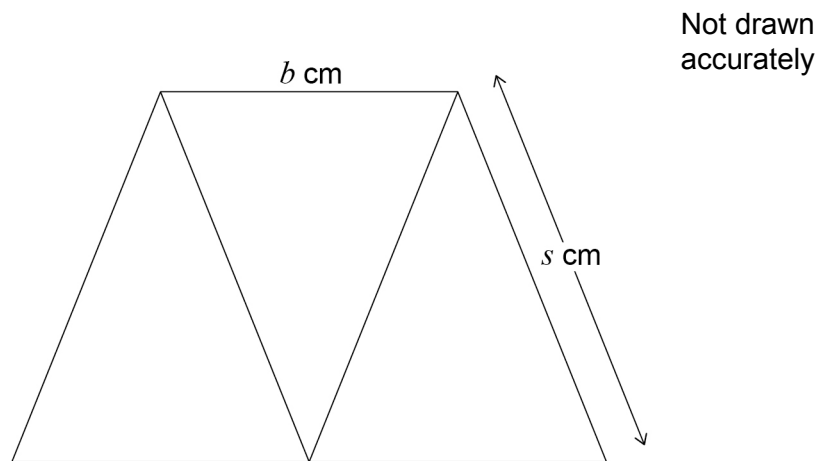
Give your answer in its simplest form.

[2 marks]

Answer _____ cm^2



10 (b) This diagram shows the same trapezium.



$$b : s = 2 : 3$$

Work out an expression, in terms of b , for the perimeter of the trapezium.

[2 marks]

Answer _____ cm

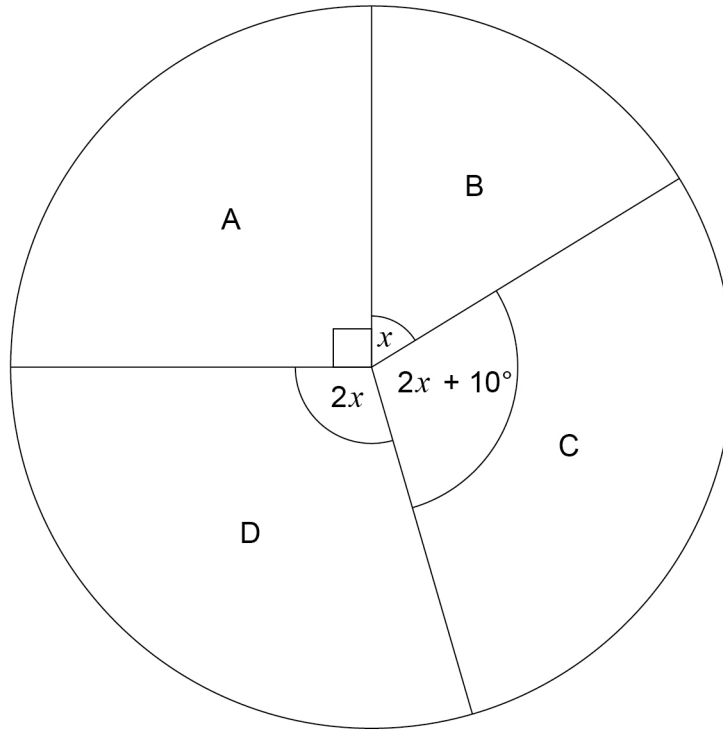
Turn over for the next question



11

The four candidates in an election were A, B, C and D.
The pie chart shows the proportion of votes for each candidate.

Proportion of votes

Not drawn
accurately

Work out the probability that a person who voted, chosen at random, voted for C.

[4 marks]

Answer _____



12

Use approximations to 1 significant figure to estimate the value of

$$\frac{0.526 \times 39.6^2}{\sqrt{97.65}}$$

You **must** show your working.**[3 marks]**

Answer _____

Turn over for the next question

7**Turn over ►**

13 $x : y = 7 : 4$

$$x + y = 88$$

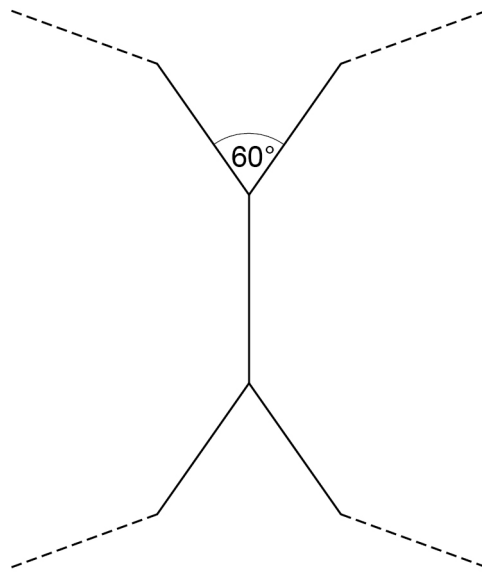
Work out the value of $x - y$

[3 marks]

Answer _____



- 14** Two congruent regular polygons are joined together.



Not drawn
accurately

Work out the number of sides on each polygon.

[3 marks]

Answer _____

Turn over for the next question



15

Meal Deal

Choose one sandwich, one drink and one snack

There are

7 different sandwiches

5 different drinks

and

3 different snacks.

15 (a) How many different Meal Deal combinations are there?**[2 marks]**

Answer _____

15 (b) Two of the sandwiches have cheese in them.

Three of the drinks are fizzy.

Eva picks a Meal Deal at random.

Work out the probability that the sandwich has cheese in it **and** the drink is fizzy.

Give your answer as a fraction.

[2 marks]

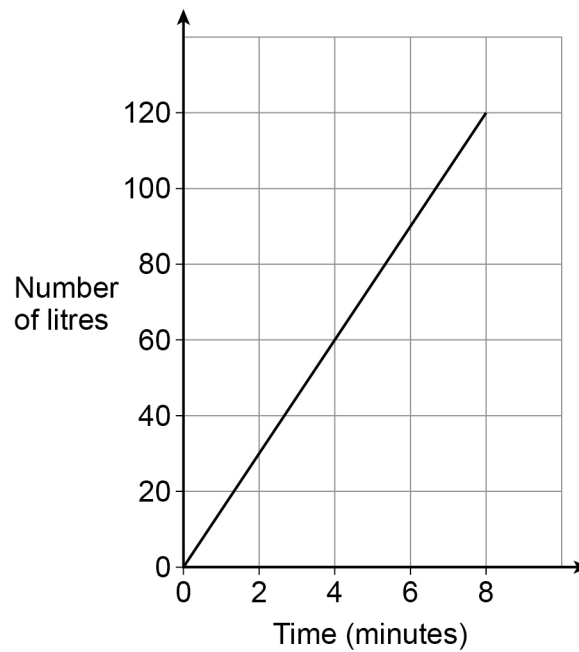
Answer _____



16

Water is poured into a tank.

The graph shows the number of litres of water in the tank.



How much water is poured into the tank each minute?

Circle your answer.

[1 mark]

1.5 litres

15 litres

30 litres

120 litres

Turn over for the next question

Turn over ►



- 17 A and B are **similar** solids.

Solid	length (cm)
A	l
B	$2l$

Alex says,

“The volume of B is double the volume of A
because the length of B is double the length of A.”

Is he correct?

Tick a box.

Yes

☐

No

☐

Give a reason for your answer.

[1 mark]

- 18 Circle the **two** roots of $(2x + 3)(5x - 2) = 0$

[1 mark]

$$-\frac{3}{2}$$

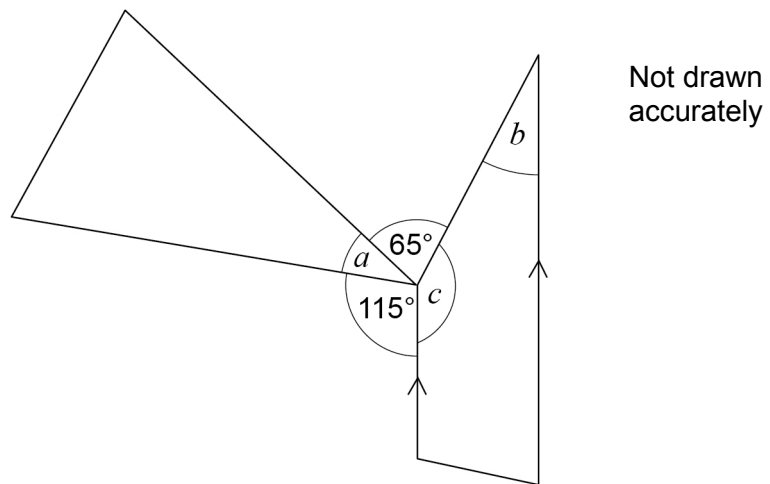
$$-\frac{2}{5}$$

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

$$\frac{3}{2}$$



- 19 The diagram shows a triangle and a trapezium.



Prove that $a = b$

[3 marks]

Turn over for the next question



20

In one month, the number of hours of exercise taken by 10 people are

4 7 2 8 6 5 1 82 3 9

Which is the appropriate average to use in this situation?

Tick a box.

☐

Mean

☐

Median

☐

Mode

Give one reason for each of the other two averages as to why they are **not** appropriate.

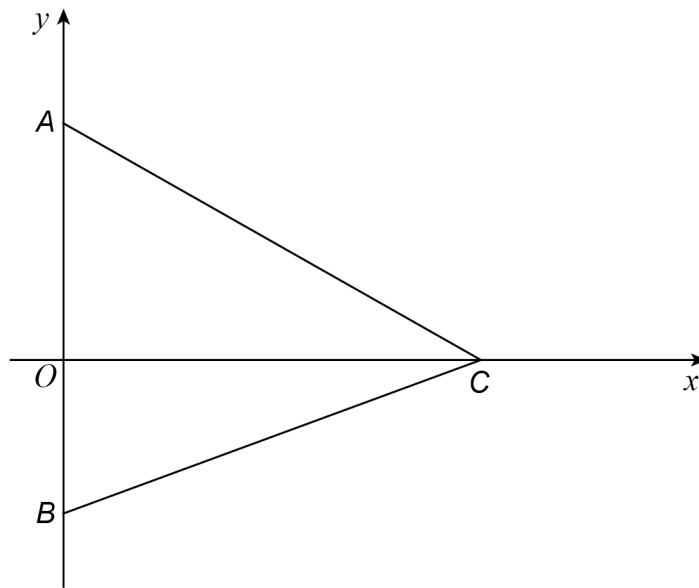
[2 marks]

Reason 1 _____

Reason 2 _____



- 21 A , B and C are points on the axes as shown.



Not drawn
accurately

The area of triangle ABC is 28 square units.

Work out possible coordinates for A , B and C .

[2 marks]

A (_____ , _____) B (_____ , _____) C (_____ , _____)

Turn over for the next question

Turn over ►

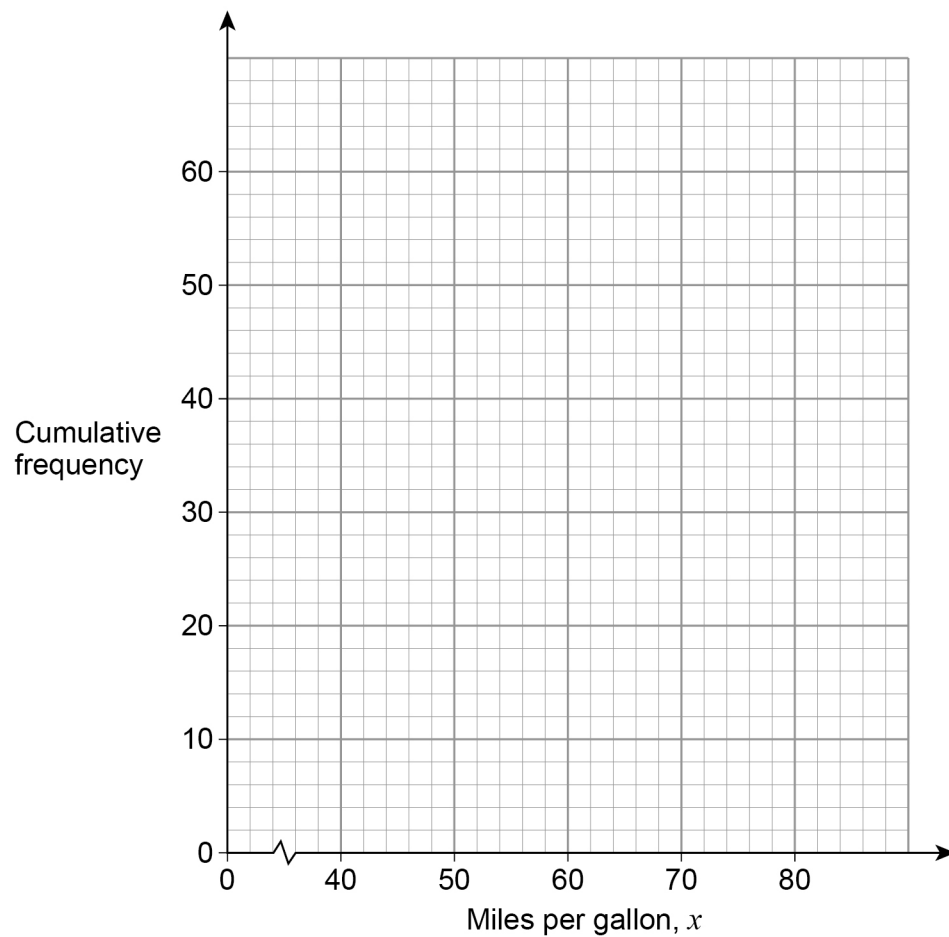


- 22** Here is some information about the miles per gallon of 60 cars.

Miles per gallon, x	Frequency
$40 < x \leq 50$	6
$50 < x \leq 60$	16
$60 < x \leq 70$	28
$70 < x \leq 80$	10

- 22 (a)** Draw a cumulative frequency graph.

[3 marks]



22 (b) Use the graph to work out the interquartile range.

[2 marks]

Answer _____ miles per gallon

23 The equation of a curve is $y = (x + 3)^2 + 5$

Circle the coordinates of the turning point.

[1 mark]

(5, 3)

(5, -3)

(3, 5)

(-3, 5)

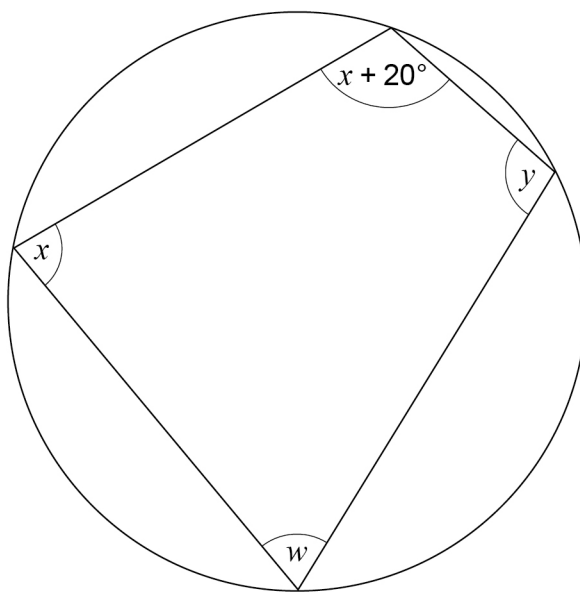
Turn over for the next question

Turn over ►



24

Here is a cyclic quadrilateral.

Not drawn
accurately

$$x : y = 5 : 7$$

Work out the size of angle w .**[4 marks]**

Answer _____ degrees



25

15 machines work at the same rate.

Together, the 15 machines can complete an order in 8 hours.

3 of the machines break down after working for 6 hours.

The other machines carry on working until the order is complete.

In total, how many hours does **each** of the other machines work?

[3 marks]

Answer _____ hours

Turn over for the next question



26 (a) $0.\dot{7} = \frac{7}{9}$

Use this fact to show that $0.0\dot{7} = \frac{7}{90}$

[1 mark]

26 (b) Using part (a) or otherwise, convert $0.2\dot{7}$ to a fraction.
Give your answer in its simplest form.

[3 marks]

Answer _____



27

There are 11 pens in a box.

8 are black and 3 are red.

Two pens are taken out at random **without** replacement.

Work out the probability that the two pens are the **same** colour.

[4 marks]

Answer _____



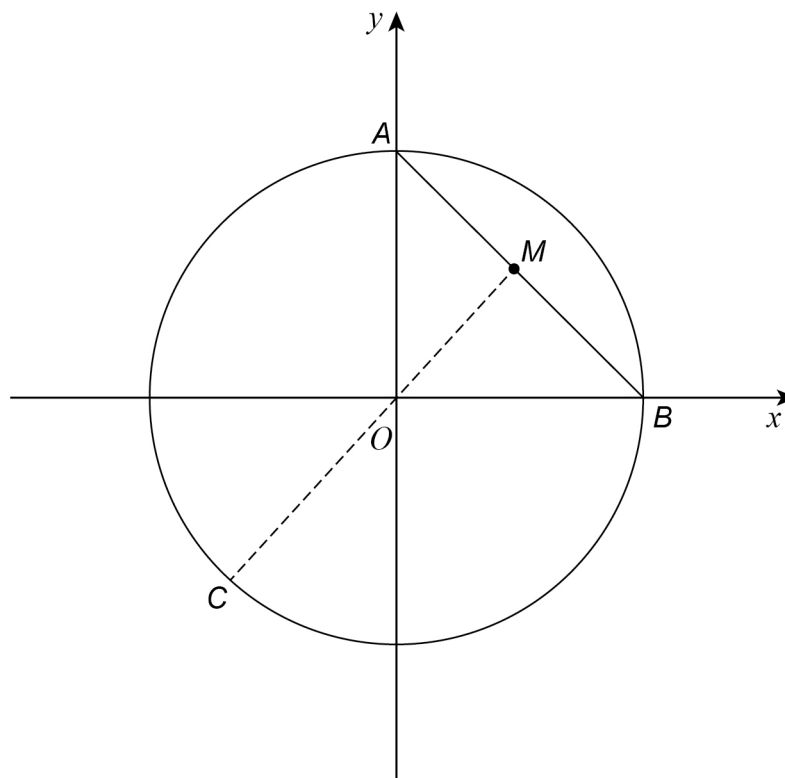
28 A , B and C are points on the circle $x^2 + y^2 = 36$ as shown.

A is on the y -axis.

B is on the x -axis.

M is the midpoint of AB .

COM is a straight line.



28 (a) Show that the coordinates of A are $(0, 6)$

[1 mark]

28 (b) Work out the coordinates of B .

[1 mark]

Answer (_____ , _____)



28 (c) Show that the equation of the straight line passing through C , O and M is $y = x$

[2 marks]

28 (d) Work out the coordinates of C .
Give your answers in surd form.

[3 marks]

Answer (_____ , _____)

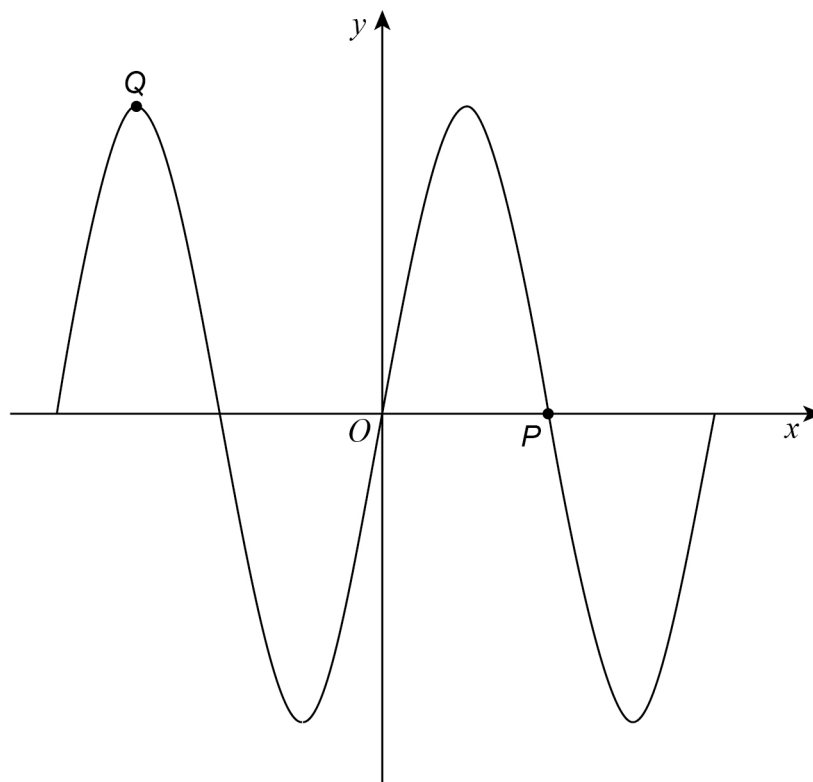
Turn over for the next question

7

Turn over ►



29 Here is a sketch of $y = \sin x^\circ$ for $-360 \leq x \leq 360$



29 (a) Write down the coordinates of P .

[1 mark]

Answer (_____ , _____)

29 (b) Write down the coordinates of Q .

[1 mark]

Answer (_____ , _____)



30 (a) Work out the value of $81^{-\frac{1}{4}}$

[2 marks]

Answer _____

30 (b) Write 16×8^{2x} as a power of 2 in terms of x .

[3 marks]

Answer _____

END OF QUESTIONS



There are no questions printed on this page

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