A

AQA

Surname _____

Other Names _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

GCSE MATHEMATICS

H

Higher Tier Paper 1 Non-Calculator

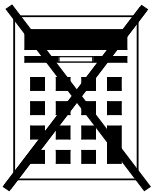
8300/1H

Thursday 2 November 2017 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 $\sqrt{2^6 + 6^2}$

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]

÷ 2 × 2 ÷ 5 × 5

5 (a) Factorise $x^2 - 100$ [1 mark]

_____

_____

Answer _____

[Turn over]

5 (b) Solve $7x + 6 > 1 + 2x$ **[2 marks]**

Answer _____

7

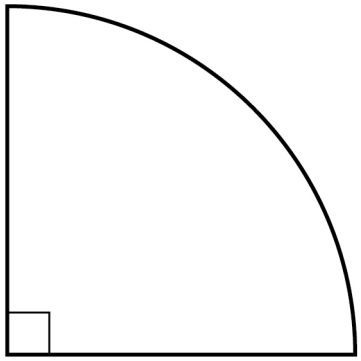
6 Work out the value of $\left(\sqrt{3}\right)^2 \times \left(\sqrt{2}\right)^2$ [2 marks]

Answer _____

[Turn over]

7 Here is a quarter circle of radius 6 cm

It is 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 _____

[Turn over]

9 Circle the expression for the range of n consecutive integers. [1 mark]

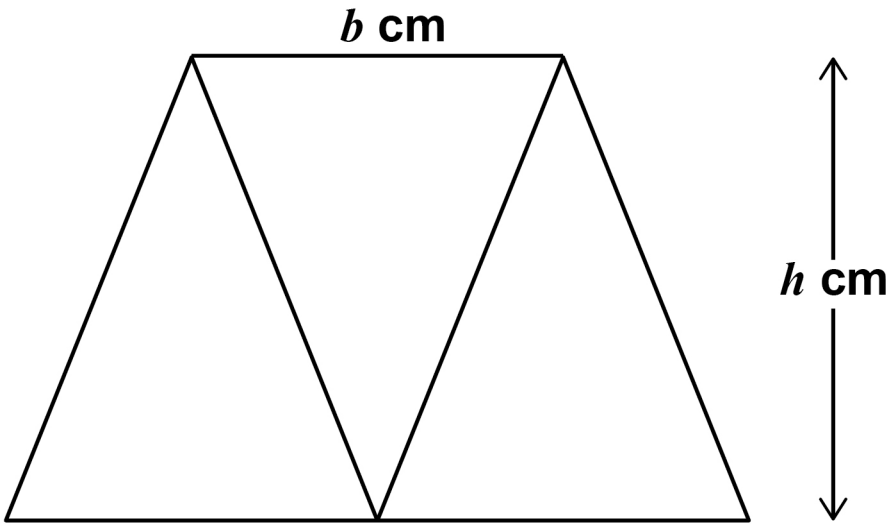
$\frac{n+1}{2}$ $n-1$ n $n+1$

7

10 Three identical isosceles triangles are joined to make this trapezium.

They are not drawn accurately.

Each triangle has base b cm and perpendicular height h cm



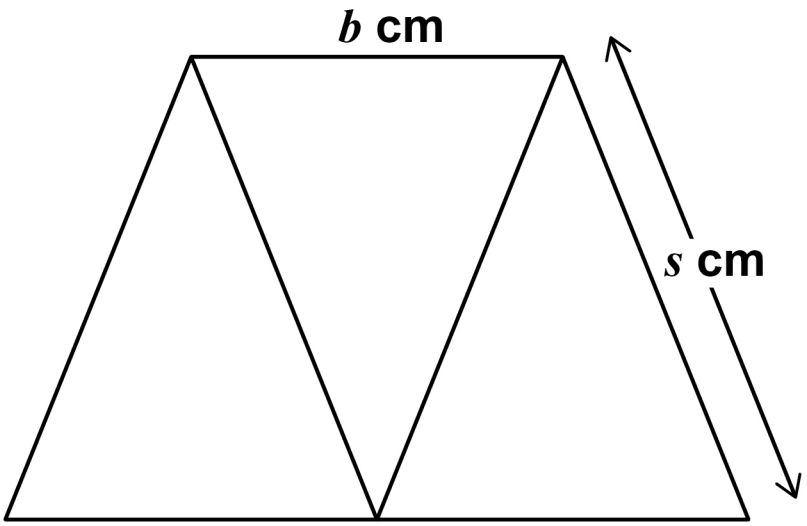
10 (a) Work out an expression, in terms of b and h, for the area of the trapezium.

Give your answer in its simplest form. [2 marks]

Answer _____ cm^2

10 (b) **This diagram shows the same trapezium.**

It is not drawn accurately.



$b : s = 2 : 3$

Work out an expression, in terms of b, for the perimeter of the trapezium. [2 marks]

Answer _____ cm

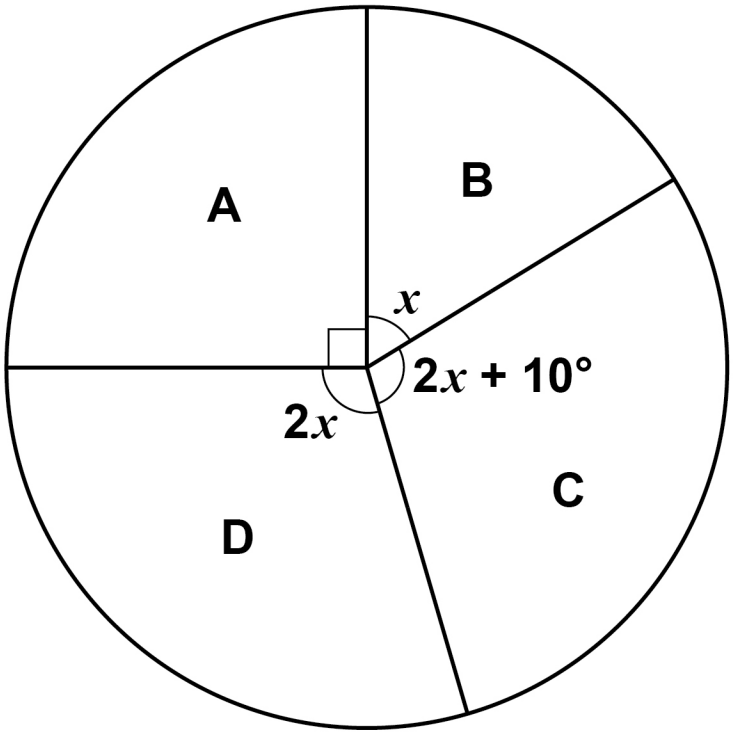
4

11 The four candidates in an election were A, B, C and D.

The pie chart shows the proportion of votes for each candidate.

It is not drawn accurately.

Proportion of votes



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 _____

7

13 $x : y = 7 : 4$

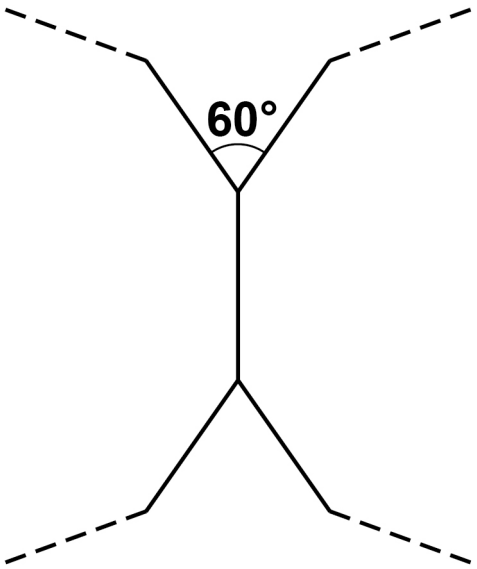
$x + y = 88$

Work out the value of $x - y$ [3 marks]

Answer _____

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

They are not drawn accurately.



Work out the number of sides on each polygon.
[3 marks]

Answer _____

6

[Turn over]

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.

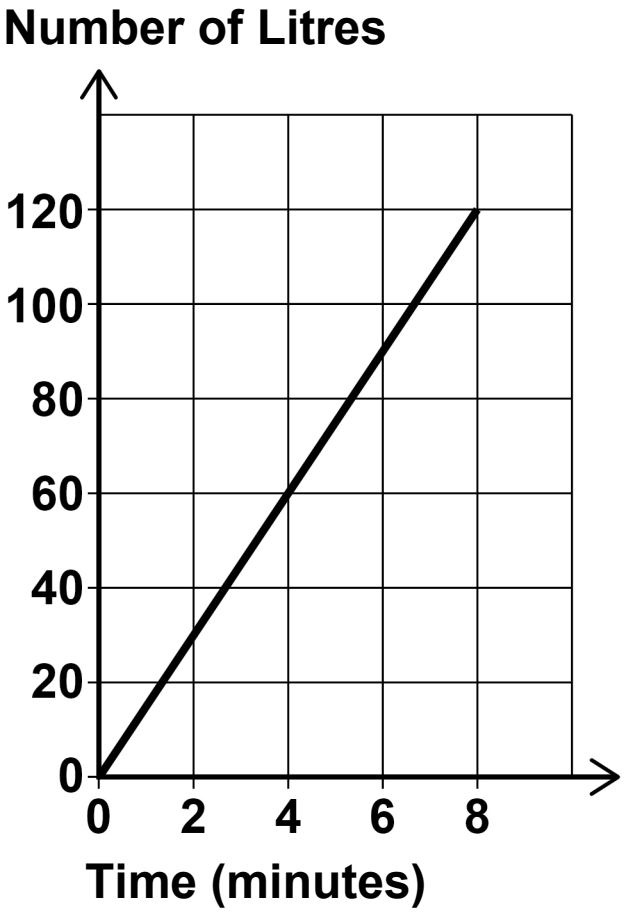
Give your answer as a fraction. [2 marks]

Answer _____

[Turn over]

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

5

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]

_____

_____

_____

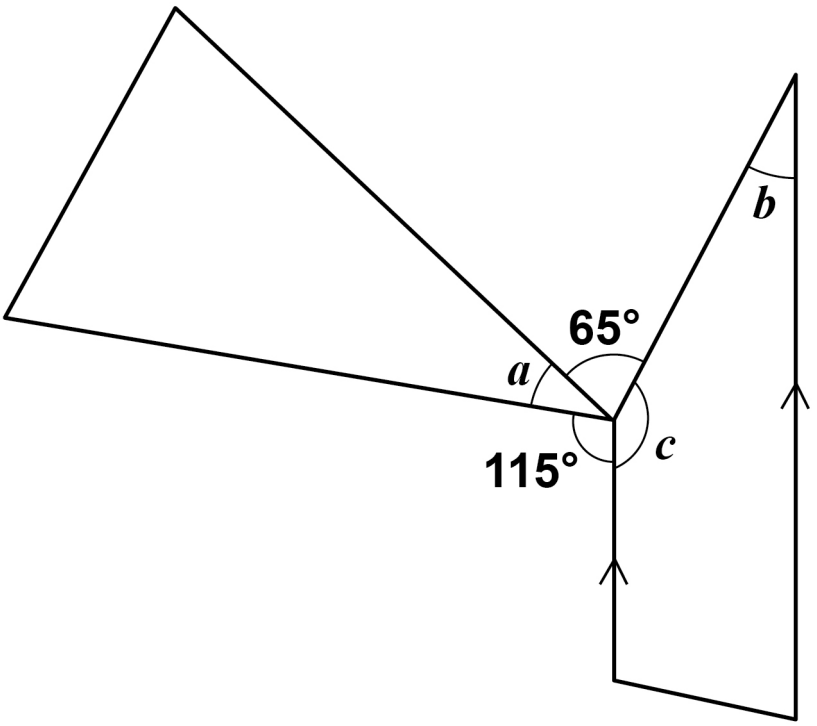
[Turn over]

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.

It is not drawn accurately.



Prove that $a = b$ [3 marks]

5

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 _____

_____

_____

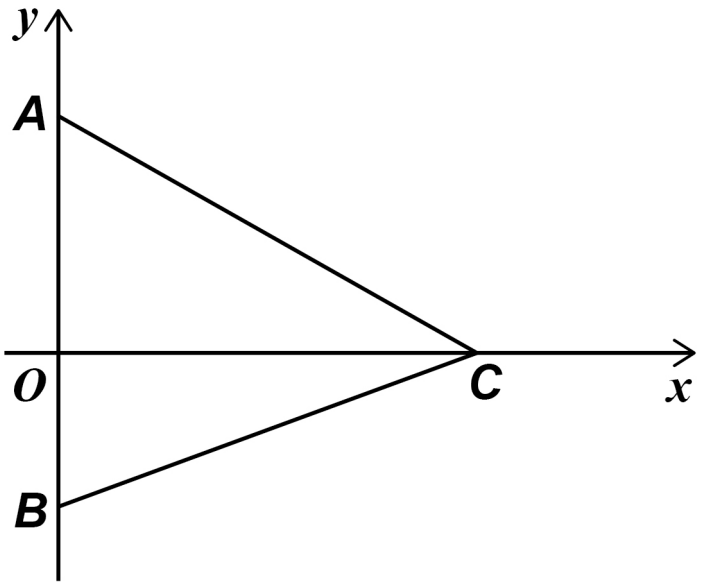
Reason 2 _____

_____

_____

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

The diagram is 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 (_____ , _____)

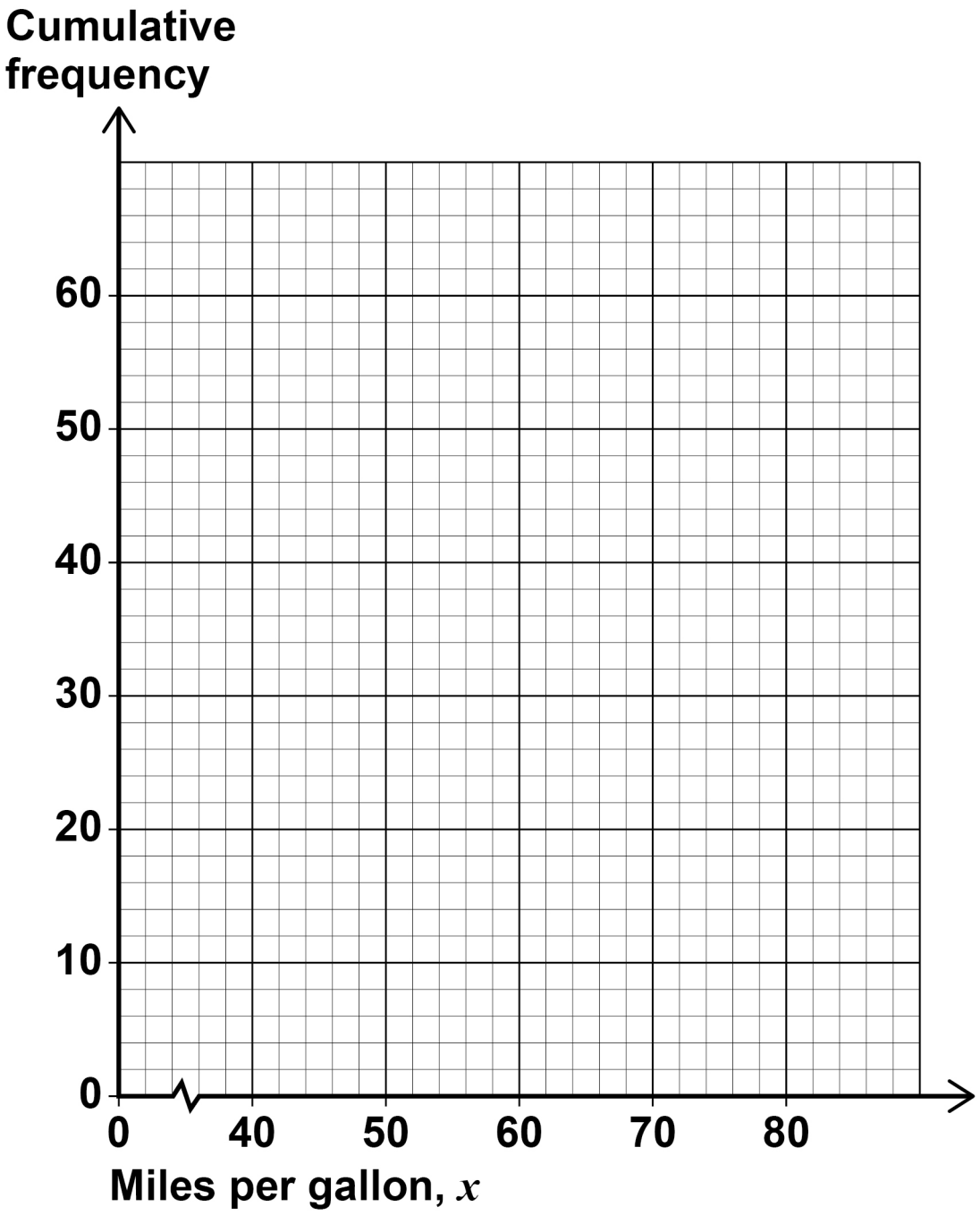
C (_____ , _____)

4

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

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

22 (a) Draw a cumulative frequency graph. [3 marks]



[Turn over]

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22 (b) Use the graph, on page 31, to work out the interquartile range. [2 marks]

Answer _____ miles per gallon

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

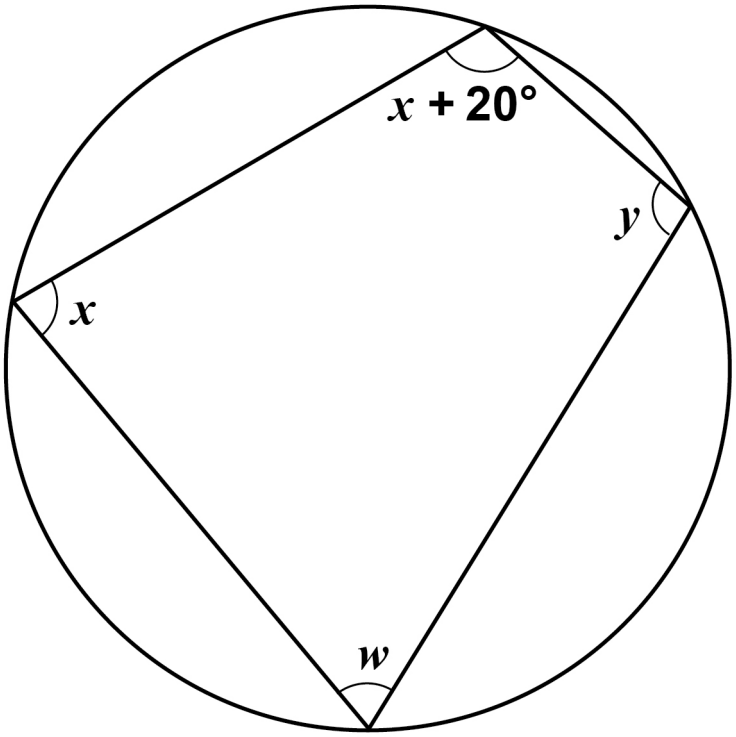
Circle the coordinates of the turning point.
[1 mark]

(5, 3) (5, –3) (3, 5) (–3, 5)

6

24 Here is a cyclic quadrilateral.

It is not drawn accurately.



$x : y = 5 : 7$

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

Answer _____ degrees

[Turn over]

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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

7

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 _____ [8]

[Turn over]

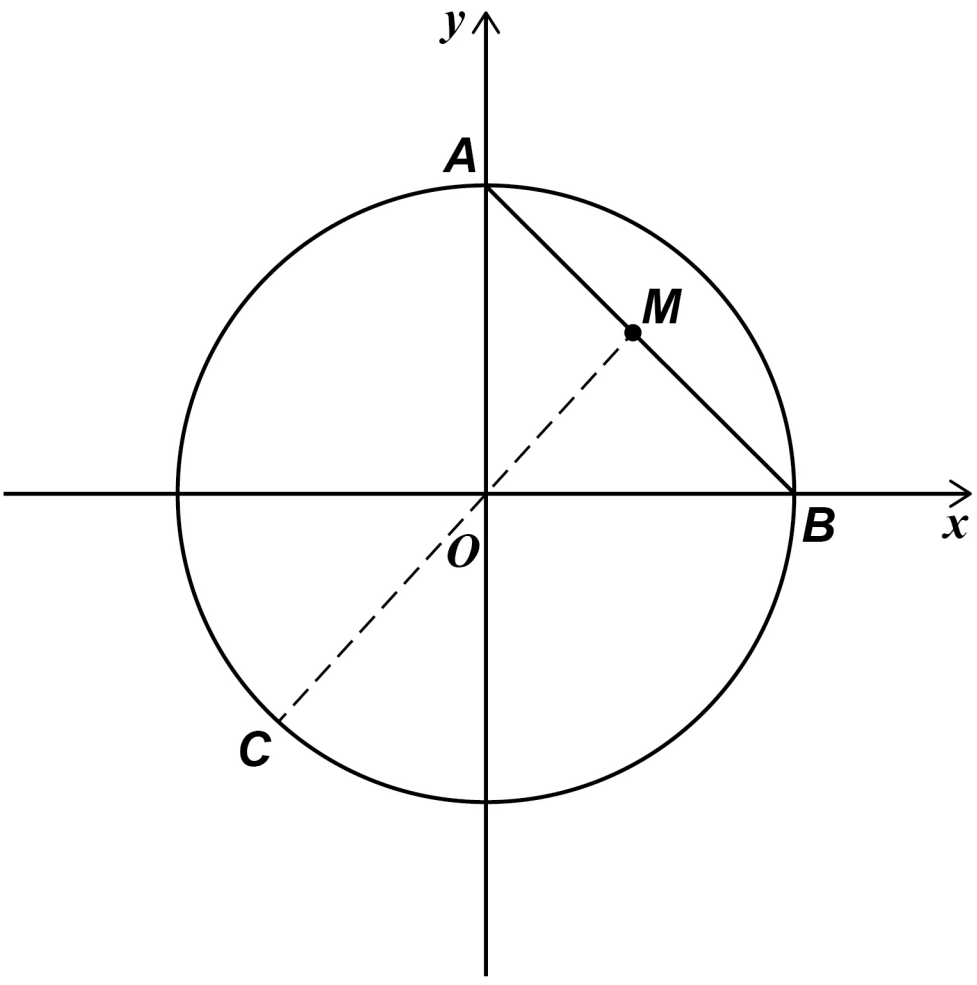
28 *A*, *B* and *C* are points on the circle $x^2 + y^2 = 36$ as shown.

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 (_____ , _____)

[Turn over]

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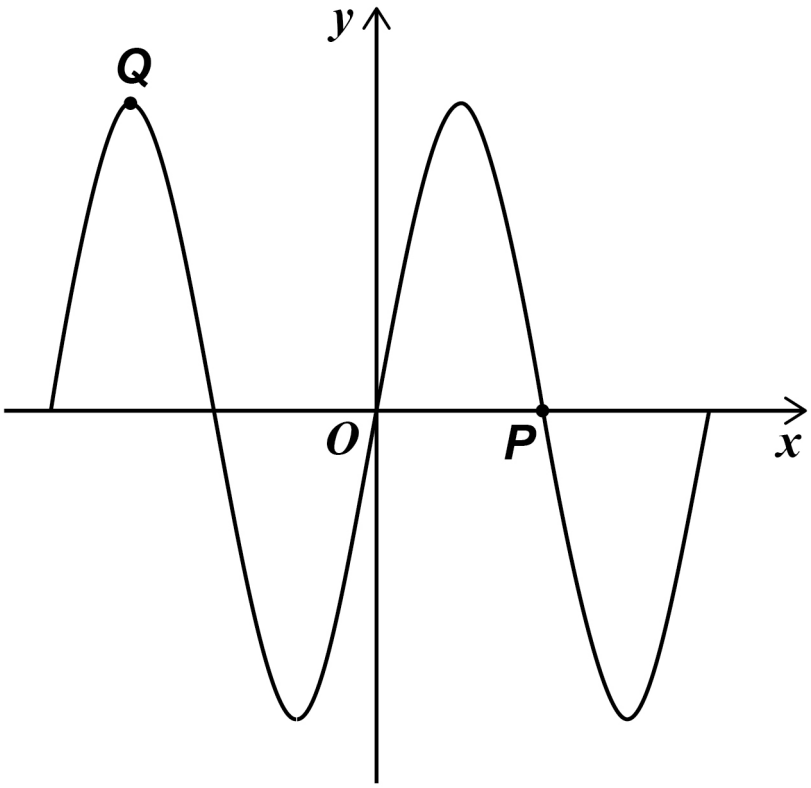
28 (c) **Show that the equation of the straight line passing through *C*, *O* and *M* is $y = x$ [2 marks]**

28 (d) **Work out the coordinates of *C*.**
Give your answers in surd form. [3 marks]

Answer (_____ , _____)

7

29 Here is a sketch of $y = \sin x°$ for $-360 \leqslant x \leqslant 360$



29 (a) Write down the coordinates of *P*. [1 mark]

Answer (_____ , _____)

29 (b) Write down the coordinates of *Q*. [1 mark]

Answer (_____ , _____)

[Turn over]

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 _____

7

END OF QUESTIONS

There are no questions printed on this page

For Examiner's Use	
Pages	Mark
4-6	
7-10	
10-13	
14-16	
17-19	
20-22	
23-25	
26-29	
30-33	
34-37	
38-41	
42-45	
46-49	
TOTAL	