AQA

Surname

Other Names

Centre Number

Candidate Number

Candidate Signature

I declare this is my own work.

GCSE
MATHEMATICS

H

Higher Tier   Paper 3 Calculator

8300/3H

Monday 8 June 2020   Morning

Time allowed: 1 hour 30 minutes

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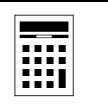
[Turn over]

For this paper you must have:
- **a calculator**
- **mathematical instruments.**

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.**

- **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 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 **What does A U B represent in P(A U B) ?**

Circle your answer. [1 mark]

A or B or both   **A but not B**

not A and not B   **A and B**

2 **Circle the equation of the line that is parallel to**
$y = \dfrac{1}{2}x + 3$ **[1 mark]**

$y = -2x$ $y = 2x$ $y = \dfrac{1}{2}x$ $y = -\dfrac{1}{2}x$

3 **Work out 320 as a percentage of 80**

Circle your answer. [1 mark]

25%   **75%**   **300%**   **400%**

4   A fair coin is spun four times.

Circle the probability of getting four Heads.
[1 mark]

$\dfrac{1}{2}$ **2** $\dfrac{1}{8}$ $\dfrac{1}{16}$

5   To the nearest 1000, there are 18 000 people at a festival.

5 (a) Write down the minimum possible number of people at the festival. [1 mark]

Answer _____

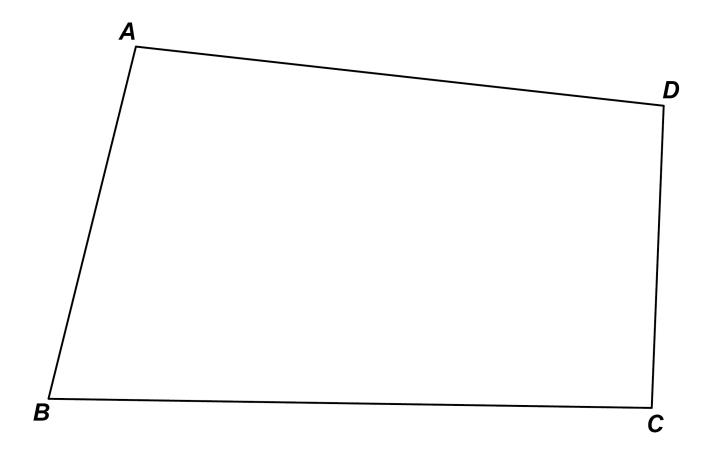**5 (b)** Write down the maximum possible number of people at the festival. [1 mark]

Answer _____

[Turn over]

6

6   *ABCD* **represents the plan of a field.**

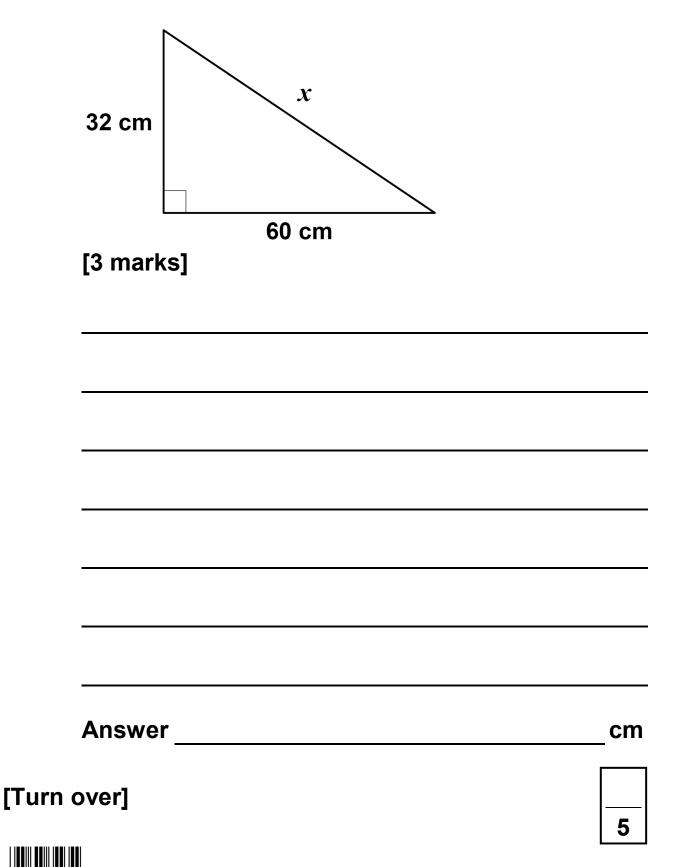There is a path across the field that

starts at *B*

is the same distance from *BA* and *BC*.

Using ruler and compasses, show the position of the path. [2 marks]

7   Use Pythagoras' theorem to work out the value of x.

The diagram is not drawn accurately.

32 cm

x

60 cm

[3 marks]

_____

_____

_____

_____

_____
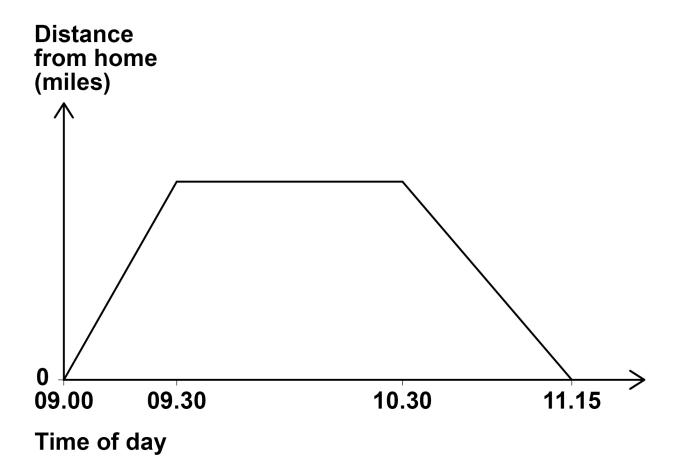
_____

_____

Answer _____ cm

[Turn over]

5

8   Chris visits a library.

He cycles to the library in half an hour at a speed of 12 miles per hour.

He stays at the library for one hour.

He then cycles home.

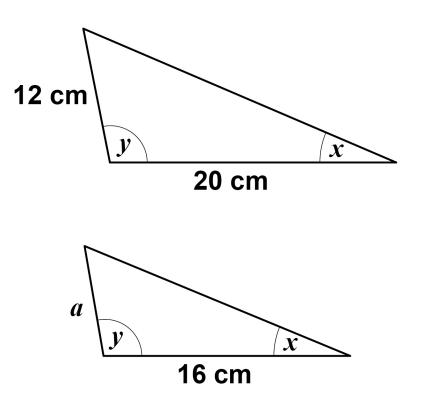The sketch graph represents his visit.

Distance
from home
(miles)

Time of day

Work out the speed, in miles per hour, at which Chris cycles home. [3 marks]

_____

_____

_____

_____

_____

_____

Answer _____ **mph**

[Turn over]

0 9

9 These two triangles are similar.

The diagrams are not drawn accurately.

Work out the value of a. [2 marks]

_____

_____

_____

_____

Answer _____ **cm**

10   **Expand and simplify fully   4(2c + 3) – (5c – 1)**
[2 marks]

Answer _____

[Turn over]

7

11   A spinner can land on red, blue or green.

After 350 spins

relative frequency of red = 0.18

relative frequency of blue = 0.62

Work out the number of times the spinner landed on green. [3 marks]

_____

_____

_____

_____

_____

Answer _____

BLANK PAGE

[Turn over]

12 **Here is some information about 26 houses.**

a, b and c are all DIFFERENT numbers.

Number of bedrooms	Number of houses
1	7
2	a
3	b
4	c
5	8

The median number of bedrooms is 3.5

Work out a possible set of values for a, b and c.
[3 marks]

_____

_____

_____

_____

_____

$a =$ _____

$b =$ _____

$c =$ _____

[Turn over]

6

13 (a) **Simplify** $\dfrac{25a}{8} \times \dfrac{2a}{5}$

Give your answer as a single fraction in its simplest form. [2 marks]
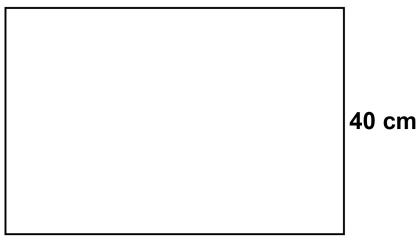
_____

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_____

Answer _____

13 (b) Sofia is trying to simplify $\dfrac{6c + 10}{2}$

Her method is

divide 6c by 2

then

add 10

Evaluate her method. [1 mark]

_____

_____

_____

_____

[Turn over]

14 **A rectangle has length 60 cm and width 40 cm**

The diagram is not drawn accurately.

40 cm

60 cm

The length decreases by 15%

The width decreases by 10%

Sue says,

"The perimeter decreases by 25% because 15% + 10% is 25%"

Is she correct?

You MUST show calculations to support your answer. [4 marks]

7

15 Solve $4 > 11 - \dfrac{x}{3}$ [2 marks]

_____

_____

_____

_____

_____

_____

Answer _____

16 The number of goals scored by 20 players in a season is shown.

Number of goals	Frequency	Midpoint	
0 to 4	6		
5 to 9	11		
10 to 14	3		
	Total = 20		

Work out an estimate of the mean number of goals per player.

Give your answer as a decimal. [3 marks]

Answer _____

[Turn over]

17   **Here are two rectangles.**

The diagram is not drawn accurately.

The area of the shaded rectangle is $\dfrac{1}{4}$ the area of the large rectangle.

Work out the value of x. [4 marks]

_____

_____

_____

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Answer _____

9

18 The pressure in a tyre is 30 pounds per square inch.

Convert the pressure into kilograms per square centimetre.

Use

1 pound = 0.45 kilograms
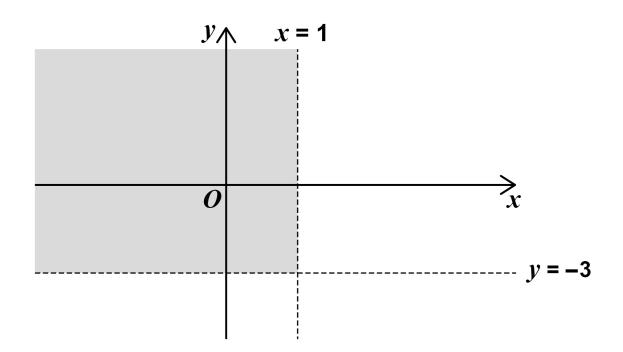
and

1 inch = 2.54 centimetres

[3 marks]

_____

_____

_____

Answer _____ **kg/cm^2**

[Turn over]

BLANK PAGE

19   **The sketch shows the lines** $x = 1$ **and** $y = -3$

Which pair of inequalities describes the shaded region?

Tick ONE box. [1 mark]

☐ $x < 1$ **and** $y < -3$

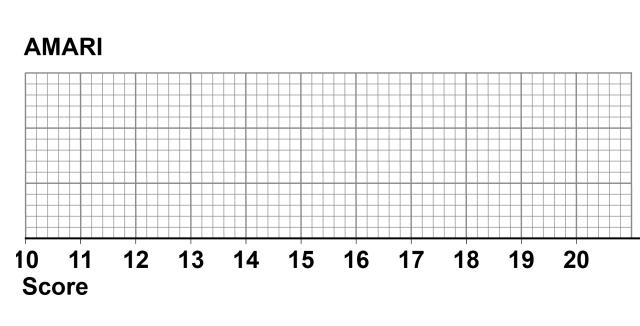☐ $x < 1$ **and** $y > -3$

☐ $x > 1$ **and** $y > -3$

☐ $x > 1$ **and** $y < -3$

[Turn over]

4

20 **Amari and Ben each play a game.**

20 (a) **Here is some information about Amari's scores.**

Lowest 12

Highest 20

Lower quartile 13

Upper quartile 19

Median 17

Draw a box plot to represent his scores.
[2 marks]

AMARI

20 (b) **The box plot, on the opposite page, represents Ben's scores.**

BEN

10   11   12   13   14   15   16   17   18   19   20
Score

Who had more consistent scores, Amari or Ben?

Work out the interquartile ranges to support your answer. [2 marks]

_____

_____

_____

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_____

4

21 (a) *A* and *B* are points on a circle.

PA and *PB* are tangents.

The diagram is not drawn accurately.
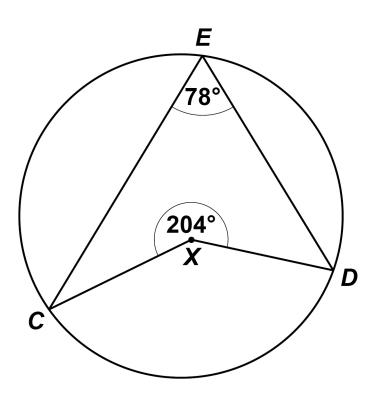

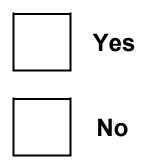**Work out the size of angle *APB*. [2 marks]**

_____

_____

_____

_____

_____

Answer _____ **degrees**

[Turn over]

21 (b) *C*, *D* and *E* are points on a different circle.

The diagram is not drawn accurately.

Is *X* the centre of the circle?

Tick a box.

☐ **Yes**

☐ **No**

Show working to support your answer.
[2 marks]

_____

_____

_____

_____

_____

_____

[Turn over]

4

22 **Visitors to a museum buy a child ticket or an adult ticket.**

Here is some information about two groups of visitors.

Group X	250 visitors, including 120 children
Group Y	number of children : number of adults = 17 : 15

One visitor from each group is picked at random. Is this statement correct?

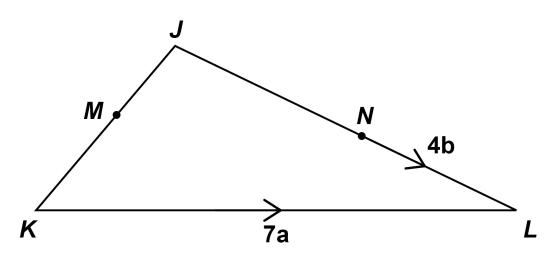| Probability of picking two children > probability of picking two adults |
|---|

You MUST show your working. [4 marks]

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[Turn over]

23 **In triangle *JKL***

M is the midpoint of *JK*

JN : NL = 3 : 2

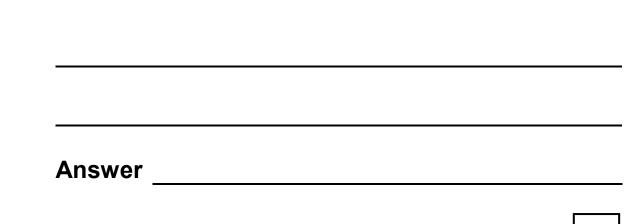$\overrightarrow{KL}$ = 7a $\overrightarrow{NL}$ = 4b

The diagram is not drawn accurately.

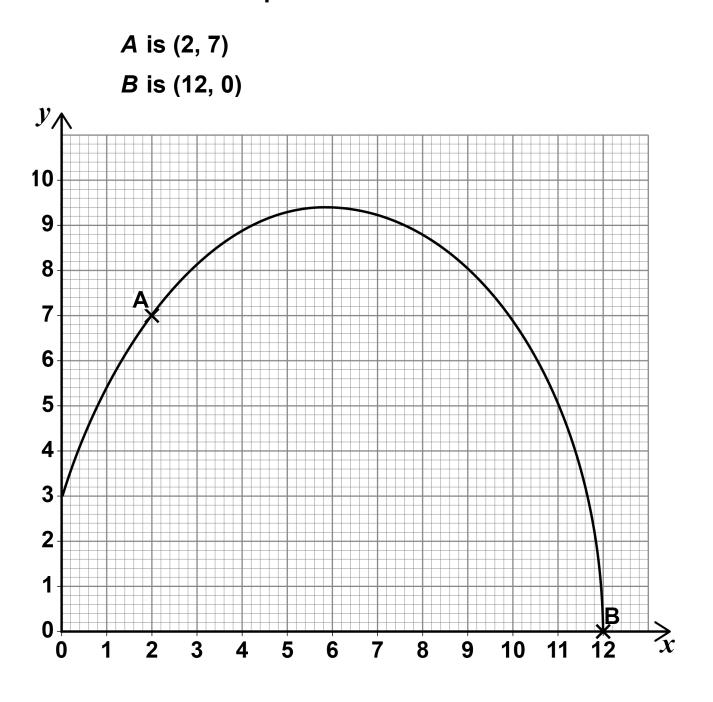**Work out $\overrightarrow{JM}$ in terms of a and b.**

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

_____

_____

_____

_____

Answer _____

7

24   *A* and *B* are points on a curve.

A is (2, 7)

B is (12, 0)

24 (a) Work out the instantaneous rate of change of y with respect to x at point *A*. [2 marks]

_____

_____

_____

_____

_____

_____

Answer _____

24 (b) **The average rate of change of y with respect to x between points *A* and *B* is worked out.**

Which statement is correct?

Tick ONE box. [1 mark]

☐ **It is positive.**

☐ **It is zero.**

☐ **It is negative.**

☐ **You cannot tell if it is positive or negative.**

[Turn over]

25 **The equation of a circle is** $x^2 + y^2 = 9$

Work out the length of the DIAMETER.

Circle your answer. [1 mark]

3   **6**   **9**   **18**

$\boxed{}$
$\boxed{4}$

26 **Prove algebraically that** $3.4\dot{7} = \dfrac{313}{90}$ **[3 marks]**

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_____

27 **The equation of a curve is** $y = (x - 1)^2 - 6$

Circle the coordinates of the turning point.

[1 mark]

(−1, −6)   **(1, 6)**   **(−1, 6)**   **(1, −6)**

[Turn over]

28 Line A has equation $y = 4x - 1$

Line B is

perpendicular to line A

and

passes through the point (8, 5)

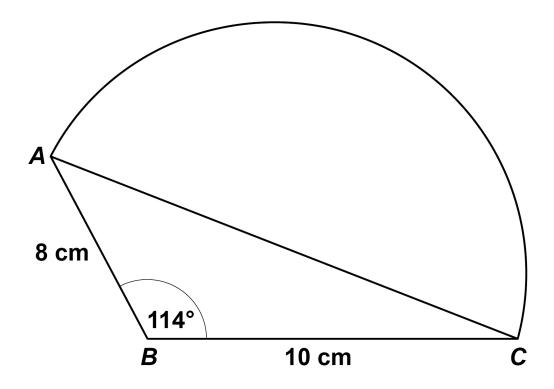Work out the coordinates of the point where line B intersects the x-axis. **[4 marks]**

_____

_____

_____

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_____

_____

_____

_____

Answer (_____ , _____)

[Turn over]

| 8 |

29 A shape is made by joining triangle *ABC* to a semicircle with diameter *AC*.

The diagram is not drawn accurately.

A

8 cm

114°

B

10 cm

C

Work out the TOTAL area of the shape.
[5 marks]

_____

_____

_____

_____

_____

Answer _____ cm^2

[Turn over]

30 $f(x) = \dfrac{1}{2}x$ $g(x) = x - x^2$

Solve $f^{-1}(x) = gf(x)$ **[4 marks]**

Answer _____

END OF QUESTIONS

9

Additional page, if required.
Write the question numbers in the left-hand margin.

49

Additional page, if required.
Write the question numbers in the left-hand margin.

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5 0

2 0 6 G 8 3 0 0 / 3 H