AQA

Please write clearly in block capitals.

Centre number ☐☐☐☐☐   Candidate number ☐☐☐☐

Surname _____

Forename(s) _____

Candidate signature _____
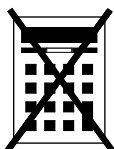
GCSE
MATHEMATICS

F

Foundation 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	
28–29	
TOTAL	

Answer **all** questions in the spaces provided

1 Circle the decimal which has the same value as $\frac{3}{5}$

[1 mark]

0.06   0.35   0.6   3.5

Dividing 3 by 5 converts the fraction into a decimal

2 How many millimetres are there in 7.5 centimetres?

Circle your answer.

[1 mark]

0.75   70.5   75   750   7500
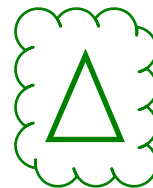
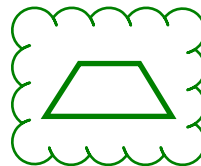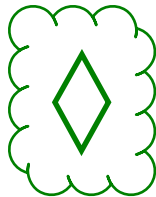There are 10mm in 1cm

3 Which of these shapes has two lines of symmetry?

Circle your answer.

[1 mark]

Semicircle   Rhombus   Trapezium   Isosceles triangle
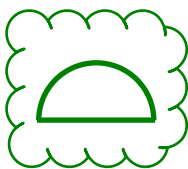
Lines of symmetry cut the shape in two so that both halves are a reflection of each other

4   Circle the number that is 7 less than –12

[1 mark]

| –19 | –5 | 5 | 19 |

Subtracting from a negative makes it more negative

5 (a)   Solve $x - 3 = 14$

[1 mark]

Adding 3 to both sides eliminates the -3 on the left and gets x on its own

$x =$ _____

5 (b)   Solve $5y = 45$

[1 mark]

Dividing both sides by 5 eliminates the 5 on the left and gets y on its own

$y =$ _____

5 (c)   Solve $8 + w = 6$

[1 mark]

Subtracting 8 from both sides eliminates the 8 on the left and gets w on its own

$w =$ _____

Turn over ▶

.CG Maths.

6 (a) Work out 9174 ÷ 11

[2 marks]

$$11 \overline{)9\,^9 1\, 7\, 4} \quad \overset{0}{}$$

Answer _____

6 (b) Work out $\dfrac{5}{6} + \dfrac{3}{7}$

Give your answer as a mixed number.

[3 marks]

> To add the fractions the denominators need to be the same. Find a common multiple of 6 and 7 then multiply both the numerators and denominators in each fraction by the same amount to get this as the denominators in both fractions. Then the numerators can be added. To convert into a mixed number, divide the numerator by the denominator to find out the whole number and leave the remainder in the fraction

Answer _____

7 The diagram shows the scores given by judges during a television show.
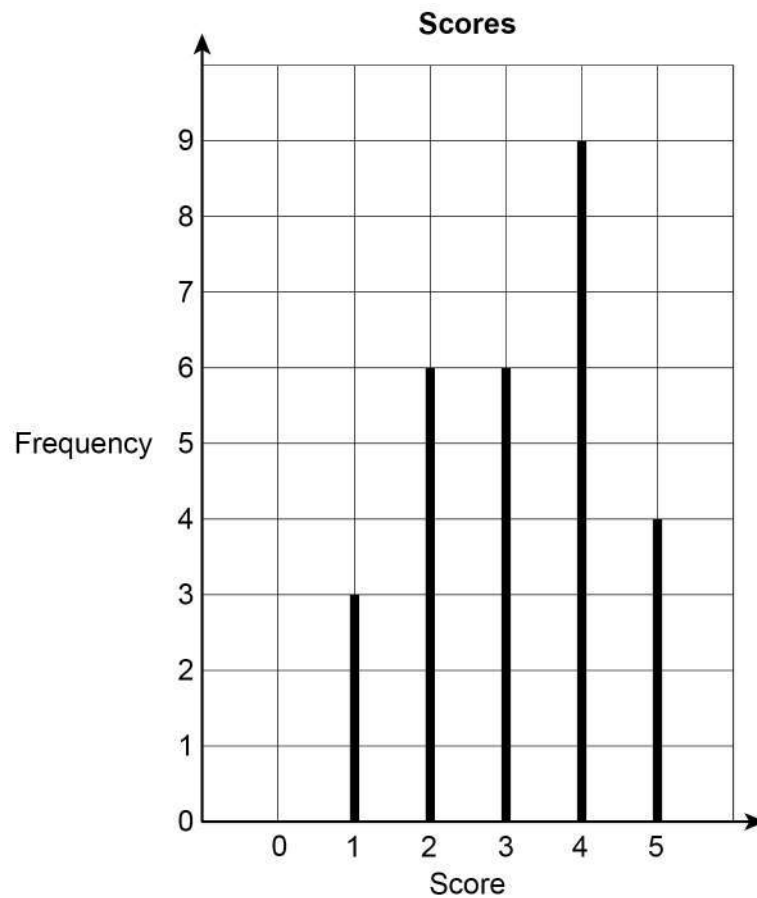
7 (a) Which score was the mode?

[1 mark]

Answer _____

The mode score is the one with the highest frequency

7 (b) There were 4 judges.

Each judge gave one score in each round.

How many rounds were there?

[3 marks]

Adding the frequency for each score works out the total number of scores. Dividing the total number of scores by the number of scores per round works out the number of rounds

Answer _____

.CG Maths.

8 A library book was due to be returned on 27 September.

It was actually returned on 14 October.

There is a fine of 8p for every day the book is late.

Work out the total fine.

[3 marks]

There are 30 days in September. October is the month after September. Work out how many days the book was late. Multiplying this by the 8p fine for each day the book is late works out the total fine in pence. There is 100p in £1. Use this fact to convert the total fine in pence into pounds

Answer £ _____

9 In a game, three stars are hidden at random.

Each star is behind a different square on this board.

	A	**B**	**C**	**D**	**E**
1					
2					
3					
4					
5					

9 (a) A square is chosen at random.

What is the probability that there is a star behind it?

[1 mark]

Answer _____

3 out of the 25 total squares have a star behind them

9 (b) In one game, the stars are behind three consecutive squares.

The squares are in one row or one column.

One of the squares is E2

Write down **all** the possible pairs for the other two squares.

[2 marks]

Consecutive means that the squares are next to each other

Answer _____E1, E3_____

Turn over ▶

6

10 Complete the table to show equivalent fractions and percentages.

[3 marks]

Fraction	Percentage
$\dfrac{1}{2}$	50%
$\dfrac{3}{10}$	
	43%
$\dfrac{5}{2}$	

Multiplying a fraction by 100 converts it into a percentage. Percentage is out of 100

.CG Maths.

11 (a)   Cards in a pack are red or blue in the ratio

red : blue = 2 : 3

What fraction of the cards are **red**?
Circle your answer.

[1 mark]

$$\frac{5}{6} \qquad \frac{2}{3} \qquad \frac{2}{5} \qquad \frac{3}{5}$$

2 + 3 = 5 so there are 5 parts in total in the ratio. Out of these, 2 parts are red

11 (b)   A different pack has 72 cards.

$\frac{5}{9}$ are yellow.

Work out the number of yellow cards.

[2 marks]

To work out a fraction of an amount, divide it by the denominator then multiply by the numerator

Answer _____

Turn over for the next question

6

Turn over ▶

12 (a) How many edges are there on a square-based pyramid?

Circle your answer.

[1 mark]

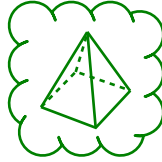   4   5   8   12

12 (b) How many faces of a triangular prism are triangles?

Circle your answer.

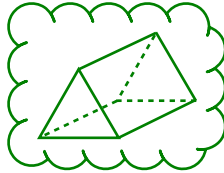**[1 mark]**

     2   3   4   5

13 A bus can be early, on time or late.

The probability that the bus is early is 0.1

The probability that the bus is on time is 0.6

Work out the probability that the bus is late.

[2 marks]

It is certain that it is either early, on time or late.
Therefore the probabilities must add up to 1

Answer _____

14 On the grid, draw the graph of $x + y = 2$ for values of x from –3 to 3

[2 marks]

When x = 0, y = 2 as 0 + 2 = 2. Plotting the point (0 , 2). Work out another point on the graph and plot it. The graph is a straight line as there are no powers of x or y and they are not denominators so a straight line can be drawn through both of these points

Turn over for the next question

6
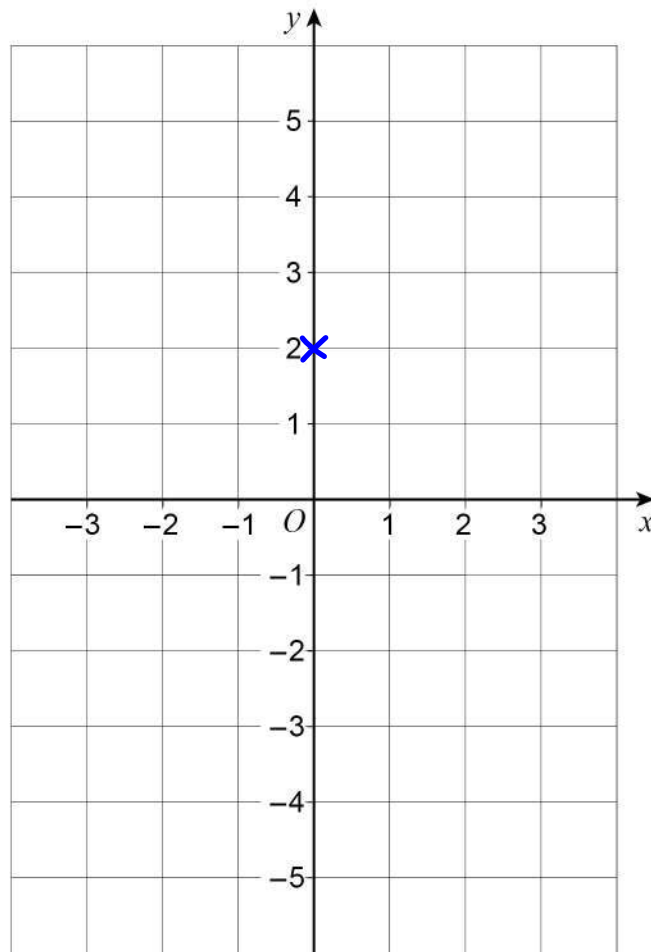
Turn over ▶

15 5% of a number is 31

1% of the same number is 6.2

Work out 13% of the number.

[3 marks]

$$\begin{array}{r} 6.2 \\ \times 1\ 3 \\ \hline \ \ \ . \\ \hline \ \ \ . \\ \hline \ \ \ . \end{array}$$

Multiplying the value of 1% by 13 works out 13%. It is fine to use this method with one decimal number as long as the decimal point is repeated below

Answer _____

16   Complete the grid so that when you

multiply the three numbers in any column, row or diagonal the answer is 1

[3 marks]

10 x 1/2 = 10/2 = 5, which must be divided by 5 to get 1. Multiplying by a certain fraction does this

10		$\frac{1}{2}$
$\frac{1}{20}$		20
2	5	

To divide by 2, multiply by 1/2.
To divide by 3, multiply by 1/3

Turn over for the next question

Turn over ▶

.CG Maths.

17 A sequence has three terms.

The term-to-term rule for the sequence is

| multiply by 8 and then add 11 |

17 (a) The first term of the sequence is –1

Work out the third term.

[2 marks]

-1×8

$-8 + 11$ ← This is the same as 11 - 8 and works out the second term

Answer _____

17 (b) The order of the three terms is reversed to make a new sequence.

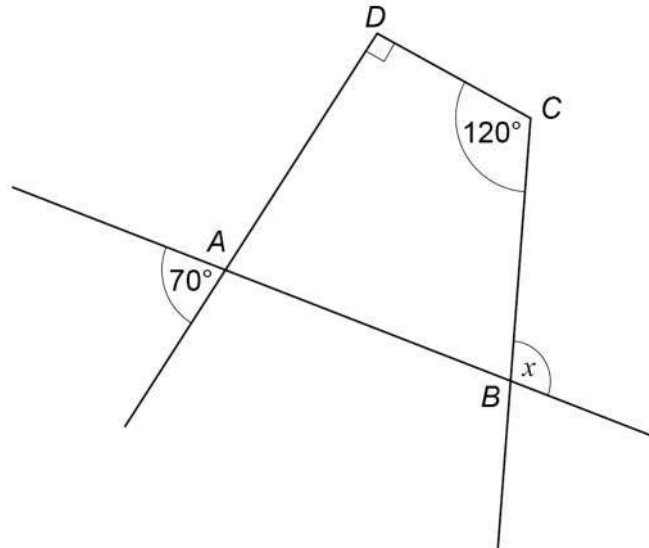Work out the term-to-term rule for this sequence.

[1 mark]

Do the exact opposite operations in the opposite order

Answer _____

18   *ABCD* is a quadrilateral.

Sides are extended as shown.

Not drawn accurately

Show that $x = 100°$

[3 marks]

Vertically opposite angles are equal. Angles in a quadrilateral add up to 360°. Angles around a point on a straight line add up to 180°

Turn over for the next question

6

Turn over ▶

.CG Maths.

19   Use   2 gallons = 9 litres   to convert 17 gallons into litres.

[3 marks]

Divide 17 by 2 to work out how many lots of 2 gallons the 17 gallons is. Multiply this many lots by 9 as every lot of 2 gallons is 9 litres

Answer _____ litres

.CG Maths.

20 n is an odd number.

          p is a prime number.

          In each part write down possible values of n and p so that

20 (a) $n + p$ is a square number.

                                               [1 mark]

> Go through the square numbers in order and subtract primes which are smaller than the square number until an odd result is found. Square numbers are the result of squaring a positive whole number. Prime numbers only have two factors, themselves and 1 (factors are whole numbers which they can be divided by). Odd numbers end in 1, 3, 5, 7, 9

                  $n = $ _____ $p = $ _____

20 (b) np is a square number.

                                                 [1 mark]
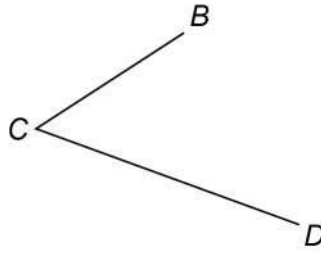
> Go through the square numbers in order and divide by primes which are smaller than the square number until an odd result is found

                  $n = $ _____ $p = $ _____
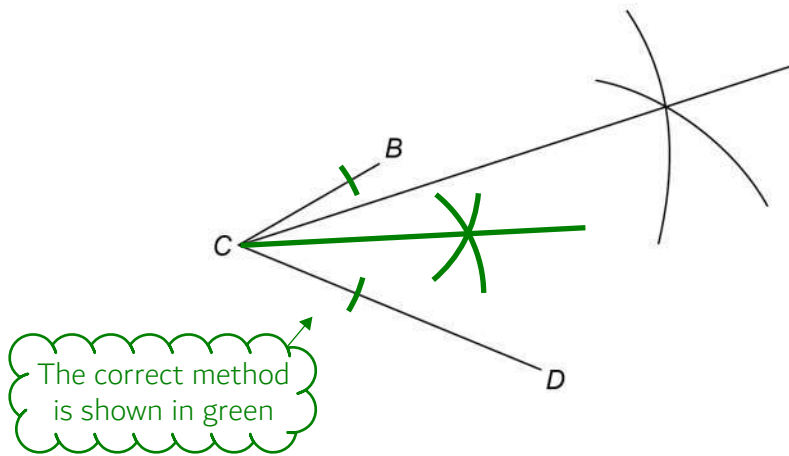
Turn over for the next question

5

.CG Maths.

21 (a) Joe wants to bisect angle *BCD*.

Here is his method.

Use a pair of compasses to draw arcs of the same radius from *B* and *D*.

Draw a straight line from *C* through the intersection of the arcs.

The correct method is shown in green

Write down the error in his method.
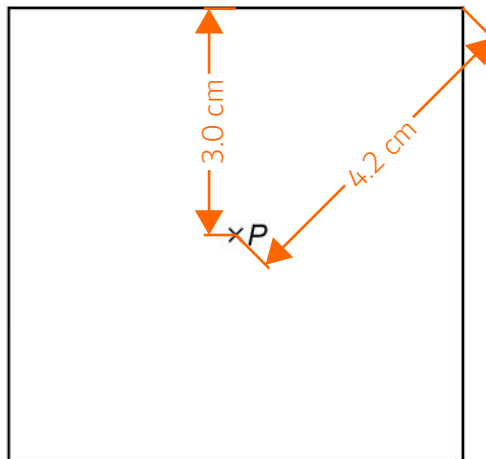
[1 mark]

.CG Maths.

21 (b) Kay wants to show all the points 3 km from point *P*.

Scale: 1 cm represents 1 km
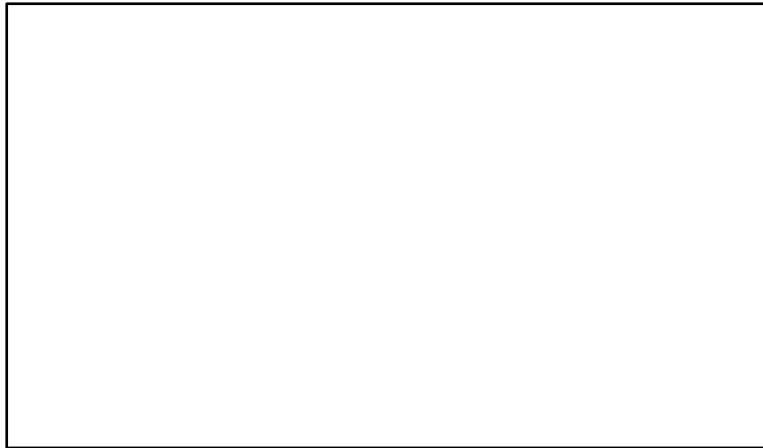
×*P*

Here is her answer.

Scale: 1 cm represents 1 km

What is wrong with her answer?

[1 mark]

_____

_____

_____

Question 21 continues on the next page

.CG Maths.

2

21 (c)   Here is a rectangle.

Construct a perpendicular bisector to one of the edges. To do this, scribe arcs from each of the ends of the line which have a radius of at least half of the length of the line. Draw a straight line through the two points the arcs meet

Using a pair of compasses and a straight edge, construct **one** line of symmetry.

Show clearly your construction arcs.

[2 marks]

.CG Maths.

22 $x : y = 7 : 4$

$x + y = 88$

Work out the value of $x - y$

[3 marks]

> Work out how many parts there are in total in the ratio. These represent a total of 88. Work out what 1 part represents then multiply it by 7 and 4 to work out what x and y are. Then subtract y from x

Answer _____

Turn over for the next question
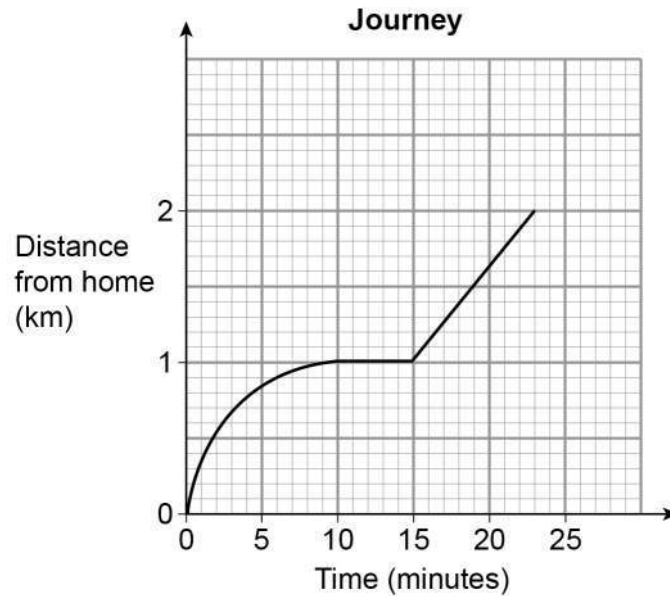
5

Turn over ▶

.CG Maths.

23 Anil's home is 1 km from a shop.

He walked from home to the shop at a constant speed in 10 minutes.

He stayed at the shop for 5 minutes.

He walked home at a constant speed in 8 minutes.

Anil drew this distance-time graph to represent his journey.

Journey

Distance from home (km)

Time (minutes)

Make **two** criticisms of his graph.

[2 marks]

Criticism 1 _____

_____

Criticism 2 _____

_____

Gradient on a distance-time graph represents the speed. Consider that it is distance from home and not distance travelled. The last 8 minutes...

.CG Maths.

24   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]

Whole numbers include 0, 1, 2, 3, 4, 5… not negative numbers, decimals or fractions. Start by considering which three multiples of 10 can be added together to give 70. Then consider the highest each of these could be and still round down to the multiple of 10. Add the maximum they could have been together to get the maximum possible sum for the original three numbers

Answer _____

25   Circle the expression for the range of n consecutive integers.

[1 mark]
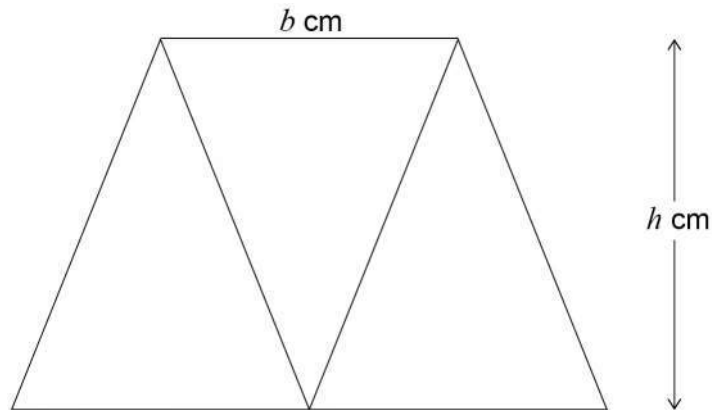
$$\frac{n+1}{2} \qquad\qquad n-1 \qquad\qquad n \qquad\qquad n+1$$

Take for example the consecutive integers 4, 5, 6, 7. There are 4 of them so n is 4. The range is largest - smallest = … Only one of the expressions will work

Turn over for the next question

5

Turn over ▶

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

Each triangle has base b cm and perpendicular height h cm

Not drawn accurately

b cm

h cm

26 (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]
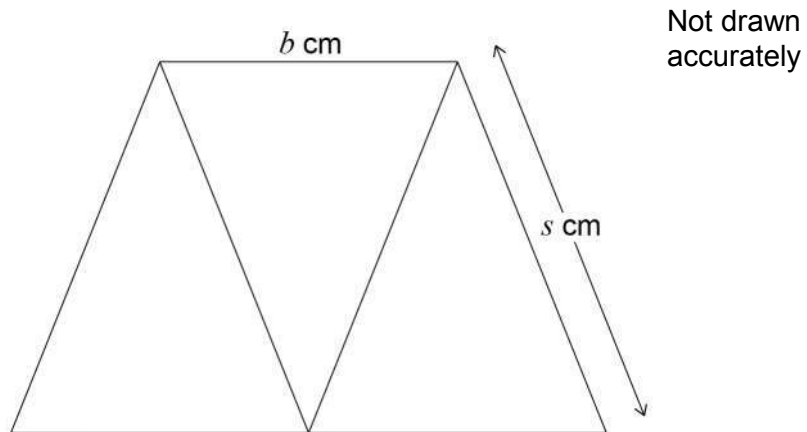
Area of triangle = 1/2 x base x height. b is the base and h is the height. Multiplying the area of one of the triangles by 3 expresses the area of the trapezium as it is made of 3 identical triangles

Answer _____ cm^2

CG Maths.

26 (b) This diagram shows the same trapezium.

b cm

Not drawn
accurately

s cm

$b : s = 2 : 3$

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

[2 marks]

s is 3/2 x b as 3 is 3/2 x 2. Adding all of the
outside edges together expresses the perimeter.
There is no need to simplify the expression

Answer _____ cm

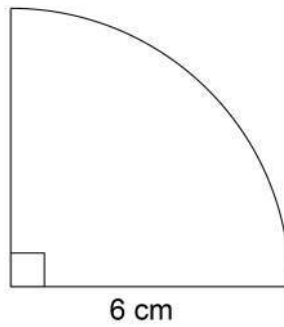**Turn over for the next question**

Turn over ▶

.CG Maths.

4

27   Here is a quarter circle of radius 6 cm

Not drawn
accurately

6 cm

Work out the area of the quarter circle.

Give your answer in terms of π.

[2 marks]

Area of circle = π x radius². Do a
quarter of this as it is a quarter circle

Answer _____ cm²

.CG Maths.

28 (a) Write in standard form   12 500

[1 mark]

Answer _____

Standard form is a x 10ⁿ, where 1 ≤ a < 10 and n is an integer

28 (b) Write as an ordinary number 3.4×10^{-2}

[1 mark]

Answer _____

x 10⁻² means to divide by 10 twice

29 Work out the value of $\left(\sqrt{3}\right)^2 \times \left(\sqrt{2}\right)^2$

[2 marks]

The square and the square root cancel out as they are opposites

Answer _____

Turn over for the next question

6

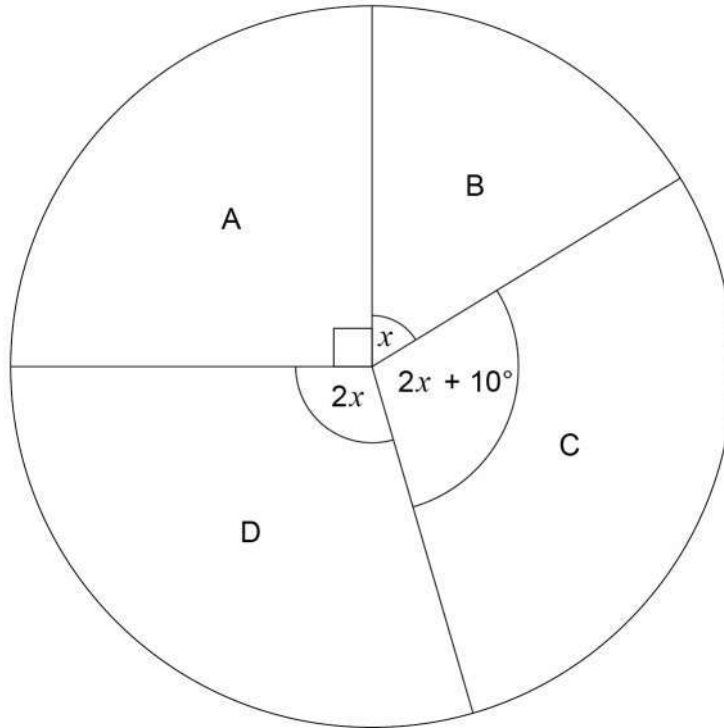**Turn over ▶**

30 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]

Adding all of the angles must give 360. Create an equation using this fact then collect like terms to simplify. Rearrange to find x. Then work out how many degrees represent C. Express the number of degrees representing C as a fraction of the 360 degrees in total

Answer _____

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

[1 mark]

Factorise using difference of two squares. $A^2 - B^2 = (A + B)(A - B)$

Answer _____

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

[2 marks]

This solves in a similar way to an equation. Collect the x terms on the side with the most and get rid of everything else. Do the opposite operations to rearrange to get x on its own

Answer _____

END OF QUESTIONS

7