AQA

GCSE   *Model Solutions*

MATHEMATICS   **F**

Foundation Tier   Paper 1 Non-Calculator

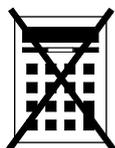**Thursday 2 November 2017**   **Morning**   **Time allowed: 1 hour 30 minutes**

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 $\frac{3}{5}$

$5\overline{)3.^30}$ = 0.6 , so $\frac{3}{5}$ = 0.6

[1 mark]

0.06   0.35   (0.6)   3.5

2 How many millimetres are there in 7.5 centimetres?   10mm in 1cm

Circle your answer.

so there are 10 × 7.5 = 75mm   **[1 mark]**

0.75   70.5   (75)   750   7500

3 Which of these shapes has two lines of symmetry?
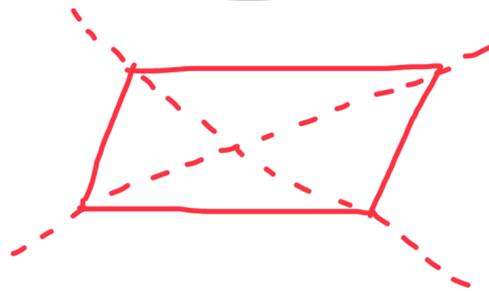
Circle your answer.

[1 mark]

Semicircle   (Rhombus)   Trapezium   Isosceles triangle

all sides are the same length and has two lines of symmetry.

Do not write outside the box

4 Circle the number that is 7 less than −12

$-12 - 7 = -19$

[1 mark]

$\boxed{-19}$ −5   5   19

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

[1 mark]

$x - 3 = 14$
$x = 3 + 14$
$x = 17$

$x =$ __17__

5 (b) Solve $5y = 45$

[1 mark]

$5y = 45$
$y = \dfrac{45}{5} = 9$

$y =$ __9__

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

[1 mark]

$w = 6 - 8$
$w = -2$

$w =$ __−2__

7

Turn over ▶

IB/M/Nov17/8300/1F

6 (a) Work out $9174 \div 11$

[2 marks]

bus stop method :

$$11 \overline{)9174}$$ $= 0834$

$$9174 \div 11 = 834$$

Answer _____ 834 _____

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

Give your answer as a mixed number.

[3 marks]

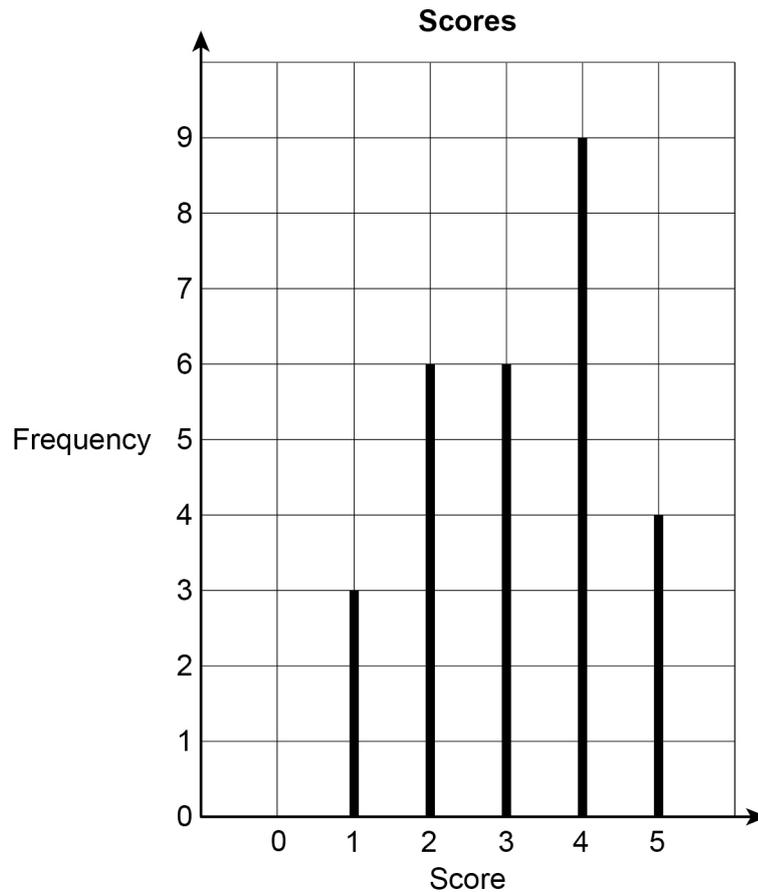$$\frac{5}{6} + \frac{3}{7}$$

common denominator : $6 \times 7 = 42$

$$\frac{5}{6} = \frac{35}{42} \quad \text{and} \quad \frac{3}{7} = \frac{18}{42}$$

$$\frac{35}{42} + \frac{18}{42} = \frac{53}{42} = 1\frac{11}{42}$$

Answer _____ $1\frac{11}{42}$ _____

7 The diagram shows the scores given by judges during a television show.

Scores

7 (a) Which score was the mode?

[1 mark]

Mode is the value that appears the most often.

Answer 4

7 (b) There were 4 judges.

Each judge gave one score in each round.

How many rounds were there?

[3 marks]

total number of scores given:
$$3 + 6 + 6 + 9 + 4 = 28$$
$$\frac{28}{4} = 7 \text{ rounds}$$

Answer 7

Turn over ▶

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]

September   October

27, 28, 29, 30   1, 2, 3, 4, 5, 6, 7, 8,
                                9, 10, 11, 13, 14

so returned 17 days late

17 × 8 = 136p = £1.36

Answer £ __1.36__

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]

$5 \times 5 = 25$ squares 3/25 chance
3 stars so

Answer $\dfrac{3}{25}$

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. ⟵ see table above

[2 marks]

⭐ = E2
⭐ = E1 and E3
⭐ = C2 and D2
⭐ = E3 and E4

Answer E1 and E3, E3 and E4, C2 and D2.

6

Turn over ▶

10 Complete the table to show equivalent fractions and percentages.

[3 marks]

Fraction	Percentage
$\frac{1}{2}$	50%
$\frac{3}{10} = 0.3$	30%
$\frac{43}{100}$	43%
$\frac{5}{2} = 2.5$	250%

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.

$2 : 3 \rightarrow 2 + 3 = 5$

[1 mark]

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

11 (b) A different pack has 72 cards.

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

Work out the number of yellow cards.

[2 marks]

$$72 \times \frac{5}{9} = \frac{72 \times 5}{9} = \frac{360}{9}$$

$$= 40$$

Answer   40

Turn over for the next question

6

Turn over ▶

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

Circle your answer.
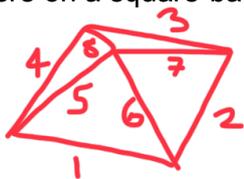
[1 mark]

4   5   **8**   12

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

Circle your answer.
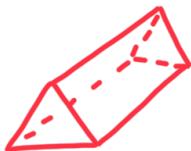
[1 mark]

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]

$$1 = 0.1 + 0.6 + P(\text{bus is late})$$
$$P(\text{bus is late}) = 1 - 0.1 - 0.6$$
$$= 1 - 0.7$$
$$= 0.3$$

Answer _____ 0.3 _____

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

[2 marks]

x	-3	-2	-1	0	1	2	3
y	5	4	3	2	1	0	-1

Turn over for the next question

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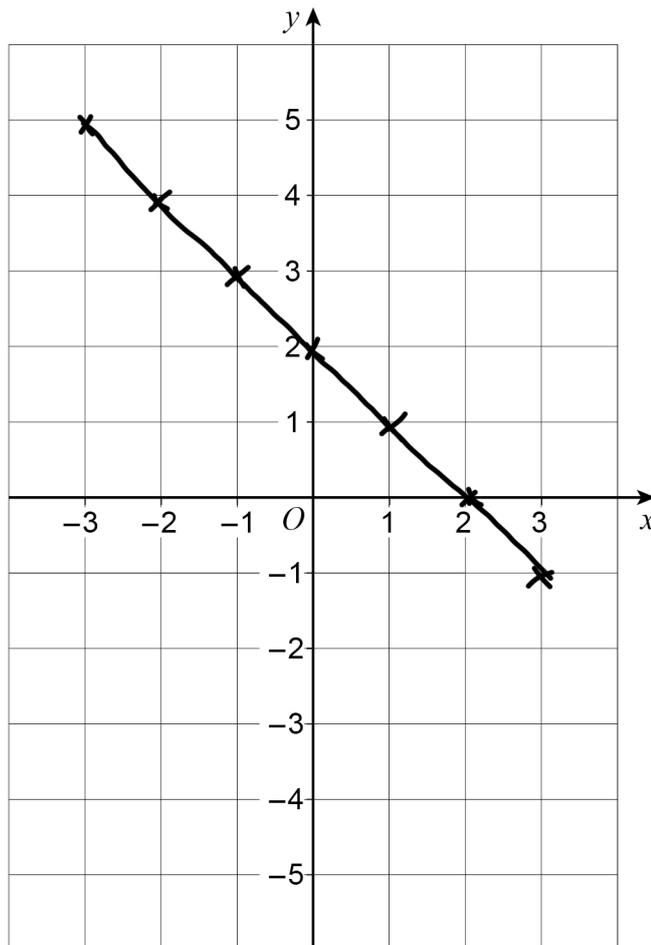
Turn over ▶

15   5% of a number is 31

1% of the same number is 6.2

Work out 13% of the number.

[3 marks]

$$13\% = 5\% + 5\% + 1\% + 1\% + 1\%$$

$$13\% = 31 + 31 + 6.2 + 6.2 + 6.2$$

$$= 80.6$$

Answer _____ 80.6 _____

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

10	x	$\frac{1}{2}$
$\frac{1}{20}$	y	20
2	5	z

top row : $10 \times x \times \frac{1}{2} = 1$

$x = \frac{2}{10} = \frac{1}{5}$

middle row : $\frac{1}{20} \times y \times 20 = 1$

$y = 1$

bottom row : $2 \times 5 \times z = 1$

$10 \times z = 1$

$z = \frac{1}{10}$

Turn over for the next question

6

Turn over ▶

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outside the
box

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]

second term = $(-1 \times 8) + 11$
= $-8 + 11$
= 3
third term = $(3 \times 8) + 11$
= 35

Answer _____35_____

17 (b) The order of the three terms is reversed to make a new sequence.
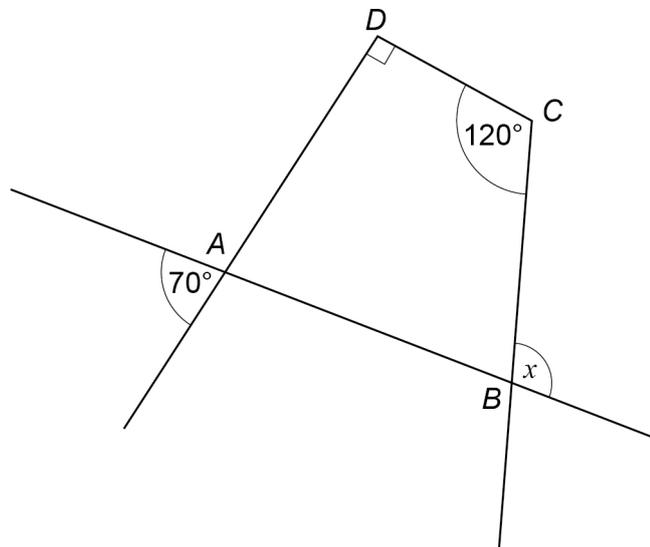
Work out the term-to-term rule for this sequence.

[1 mark]

35, 3, –1

–11 then –11 then
÷ 8   ÷ 8

Answer _____ subtract 11 and then divide by 8.

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18 *ABCD* is a quadrilateral.

Sides are extended as shown.

Not drawn accurately

Show that $x = 100°$

[3 marks]

$$D\hat{A}B = 70° \text{ (vertically opposite angles are equal)}$$

$$360° = 90 + 70 + 120 + A\hat{B}C$$

$$A\hat{B}C = 80°$$

$$180° = x + 80°$$

$$x = 100°$$

(angles in a quadrilateral equal 360°)

(angles on a straight line equal 180°)

Turn over for the next question

6

Turn over ▶

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

[3 marks]

1 gallon = $\frac{9}{2}$ = 4.5 litres

17 gallons = 76.5 litres

Answer ____76.5____ litres

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]

$n = 1$ $n + p = 1 + 3 = 4$
$p = 3$ $4 = 2 \times 2 = 2^2$

$n =$ __1__ $p =$ __3__

20 (b) np is a square number.

[1 mark]

$n = 3$ $np = n \times p = 3 \times 3 = 9$
$p = 3$ $9 = 3^2$

$n =$ __3__ $p =$ __3__

Turn over for the next question

5

Turn over ▶

21 (a) Joe wants to bisect angle *BCD*.
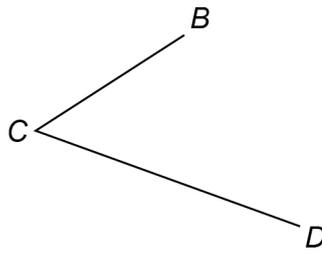
Here is his method.

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.
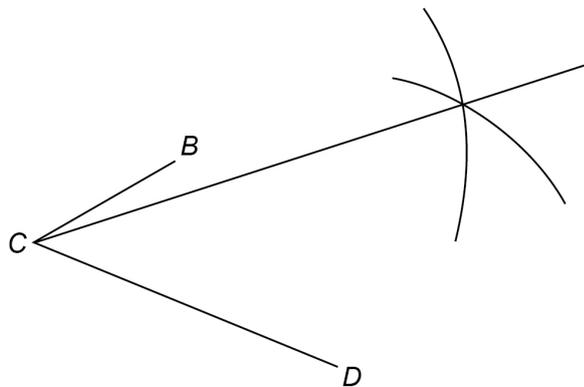
Write down the error in his method.

[1 mark]

The arcs should be drawn
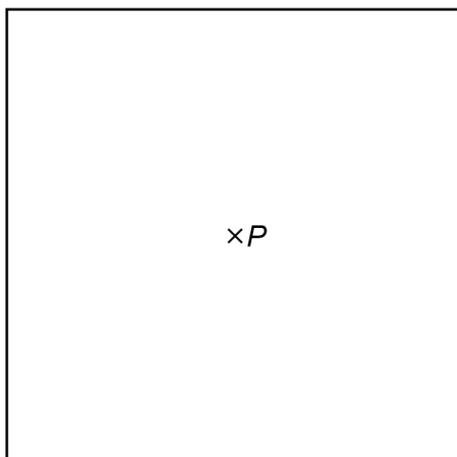from C so that they are the
same distance from C.

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

×*P*

What is wrong with her answer?

[1 mark]

It should be a circle, centre P with radius 3cm.

Question 21 continues on the next page

2

Turn over ▶

21 (c)   Here is a rectangle.
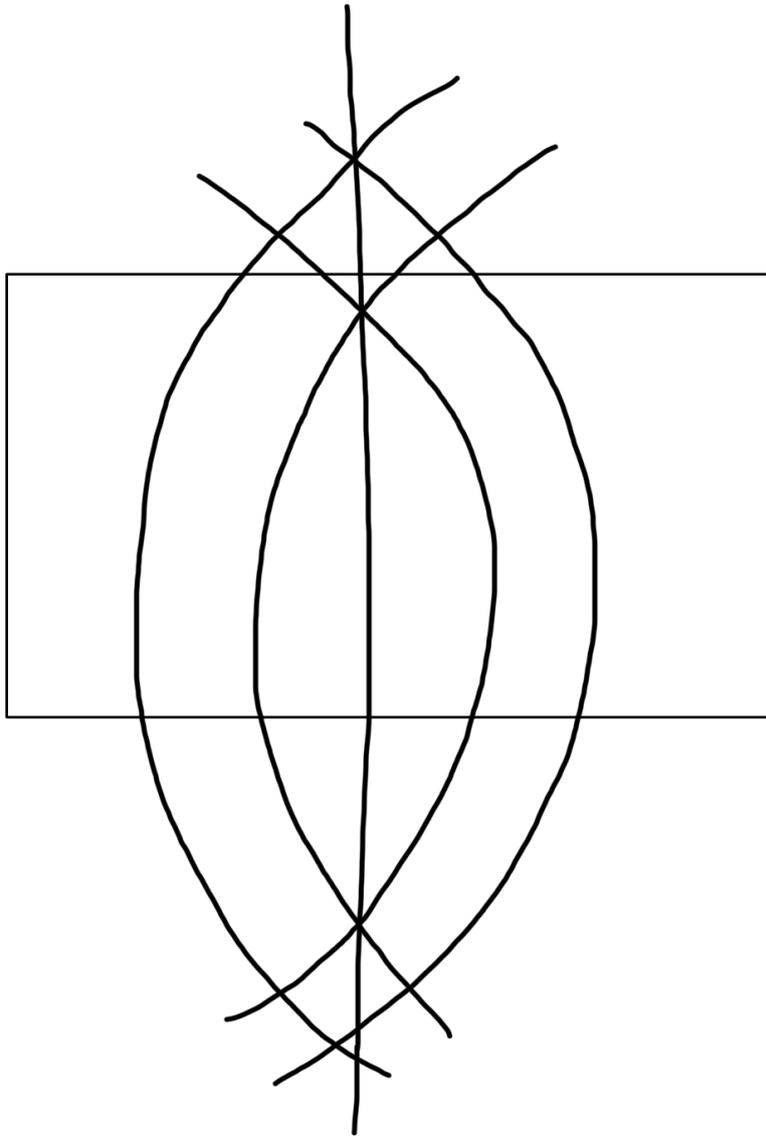
Using a pair of compasses and a straight edge, construct **one** line of symmetry.

Show clearly your construction arcs.

[2 marks]

→ put compass at one of the vertices
and open to more than half way along edge.
Draw an arc.
→ do the same for the other vertex on the
same side of the rectangle.
→ draw a line between the points at which
the arcs intersect.

2 0

22 $x : y = 7 : 4$

$x + y = 88$

Work out the value of $x - y$

[3 marks]

$x : y = 7 : 4$

$7 + 4 = 11$

$88 \div 11 = 8$

$x \rightarrow 7 \times 8 = 56$

$y \rightarrow 4 \times 8 = 32$

$x - y = 56 - 32 = 24$

Answer _____ 24 _____

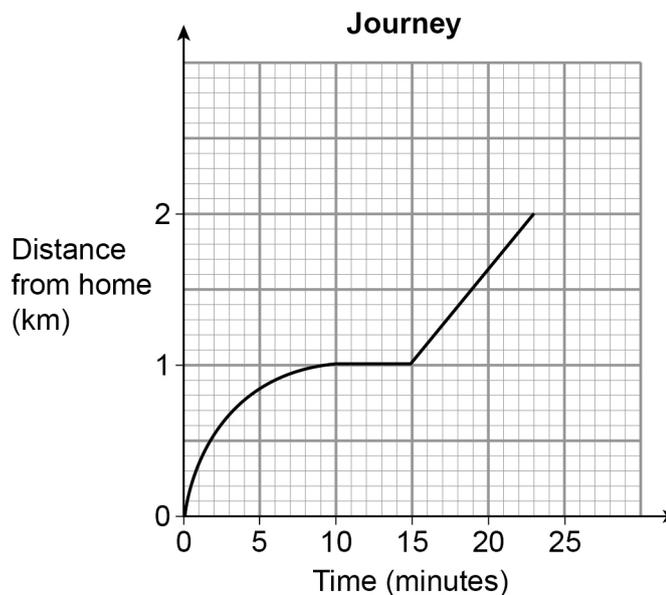**Turn over for the next question**

5

Turn over ►

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 _the line for the first 10 minutes should be a straight line because he is moving at a constant speed._

Criticism 2 _the final part of the line from 15 minutes should go back down because he walks back home._

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]

each number must have units
digits 4.
from units of original digits:
4 × 3 = 12
70 + 12 = 82
so 82 is the maximum possible
sum for the first 3 numbers.

Answer _____ 82 _____

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

[1 mark]

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

range = largest value - smallest
value

Turn over for the next question

5

Turn over ▶

23

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
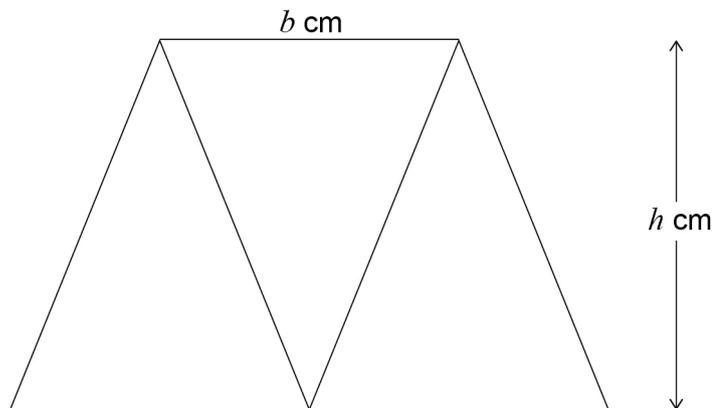
26 (a) Work out an expression, in terms of b and h, for the area of the trapezium.
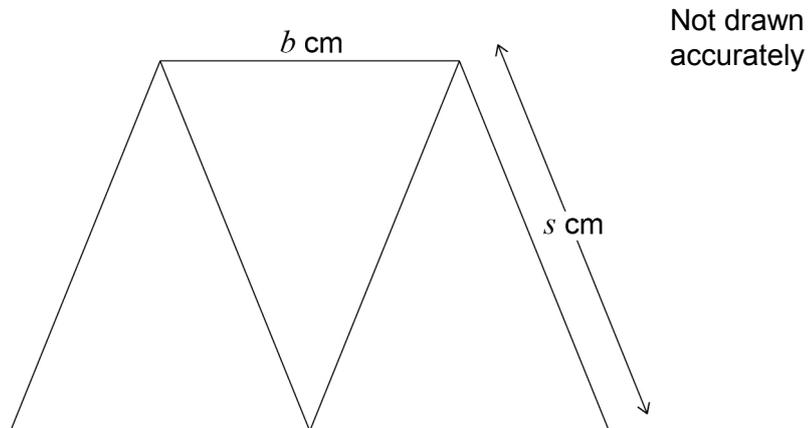
Give your answer in its simplest form.

[2 marks]

area of trapezium = 3 × area of triangle

area of triangle = $\dfrac{base \times height}{2}$

so area of trapezium = $\dfrac{3 \times bh}{2} = \dfrac{3bh}{2}$

Answer $\dfrac{3bh}{2}$ cm^2

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]

$$\text{perimeter} = b + s + 2b + s = 3b + 2s$$
$$\text{as} \quad b : s = 2 : 3$$
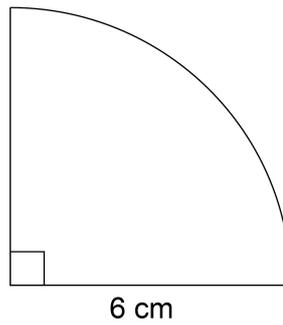$$3b = 3s$$
$$\text{perimeter} = 3b + 3b = 6b \text{ cm}$$

Answer $6b$ cm

Turn over for the next question

4

Turn over ▶

27   Here is a quarter circle of radius 6 cm

area of a full
circle = πr²

Not drawn
accurately

6 cm

Work out the area of the quarter circle.

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

area of quarter circle = $\frac{1}{4} \times \pi \times 6^2$

= 9π cm²

Answer 9π cm²

28 (a) Write in standard form   12 500

[1 mark]

Answer 1.25×10^4

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

[1 mark]

$10^{-2} = 0.01$
$3.4 \times 0.01 = 0.034$

Answer 0.034

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

[2 marks]

$\left(\sqrt{3}\right)^2 \times \left(\sqrt{2}\right)^2$

$3 \times 2 = 6$

Answer 6

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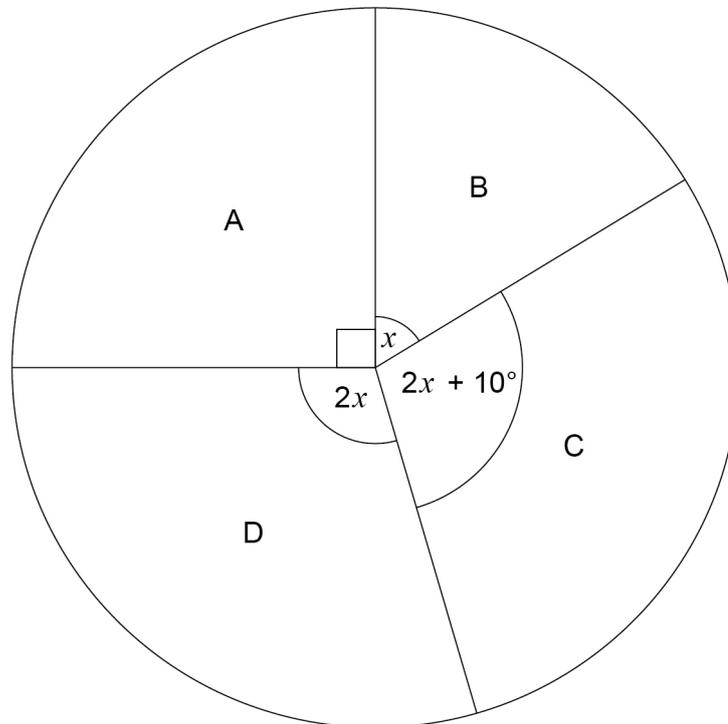
Work out the probability that a person who voted, chosen at random, voted for C.

[4 marks]

$$360 = 90 \times x + 2x + 10 + 2x$$

$$360 = (90 + 10) + (x + 2x + 2x)$$

$$360 = 100 + 5x$$

$$260 = 5x$$

$$x = 52$$

probability of C $= \dfrac{2x + 10}{360}$

$$= \dfrac{2(52) + 10}{360} = \dfrac{114}{360}$$

Answer $\dfrac{114}{360}$

Do not write outside the box

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

difference of 2 squares

$a^2 - b^2 = (a+b)(a-b)$

$= (x+10)(x-10)$

[1 mark]

Answer $(x+10)(x-10)$

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

[2 marks]

$7x + 6 > 1 + 2x$

$7x - 2x > 1 - 6$

$5x > -5$

$x > -1$

Answer $x > -1$

END OF QUESTIONS

7

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