



Please write clearly in block capitals.

Centre number Candidate number

Surname MODEL SOLUTIONS

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

F

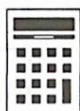
Foundation Tier Paper 2 Calculator

Thursday 6 June 2019 Morning Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- a calculator
- mathematical instruments.



Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- 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.

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	

Advice

In all calculations, show clearly how you work out your answer.



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Answer all questions in the spaces provided

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1 Circle the number that is one less than a cube number.

[1 mark]

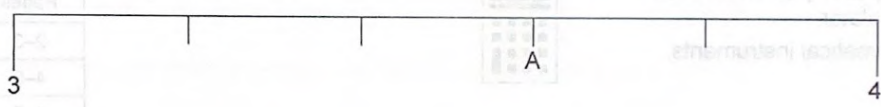
20 22 24 26

2 Circle the fraction which is equal to 0.25

[1 mark]

$\frac{1}{40}$ $\frac{2}{5}$ $\frac{3}{12}$ $\frac{4}{100}$

3 Here is a number line.



Which number is at A?
Circle your answer.

[1 mark]

3.3 3.55 3.6 3.8



Do not write outside the box

4 How many millimetres are equal to 3.27 metres?
Circle your answer.

[1 mark]

32.7 327 3270 32700

5 Which is longer, $\frac{3}{4}$ of a day or 1000 minutes?
You must show your working.

[3 marks]

$$\frac{3}{4} \times 24 = 18 \text{ hrs}$$

$$1000 \div 60 = 16.67 \text{ hrs}$$

Answer $\frac{3}{4}$ of a day

Not sensible

Sensible

7

Turn over ►



0 3

Do not write outside the box

6 (a) Use your calculator to work out $\frac{9.75^3}{1.875} + 6.4^2$

Give your answer as a decimal.

Write down your full calculator display.

[2 marks]

Answer 535.285

6 (b) Is your answer to part (a) sensible?

Check by rounding each of 9.75, 1.875 and 6.4 to the nearest whole number.

You must show your working.

[3 marks]

$$\frac{10^3}{2} + 6^2 = \frac{1000}{2} + 36 = 536$$

So the answer to (a) is sensible

Tick a box.

Sensible

Not sensible



7

Complete the bank statement.

[3 marks]

Do not write outside the box

Date	Description	Credit (£)	Debit (£)	Balance (£)
01/04/2019	Starting balance			<u>261.43</u>
05/04/2019	Council tax		189.34	72.09
10/04/2019	Refund	<u>14.66</u>		86.75
12/04/2019	Salary	1430.29		<u>1517.04</u>

Turn over for the next question

8

Turn over ►



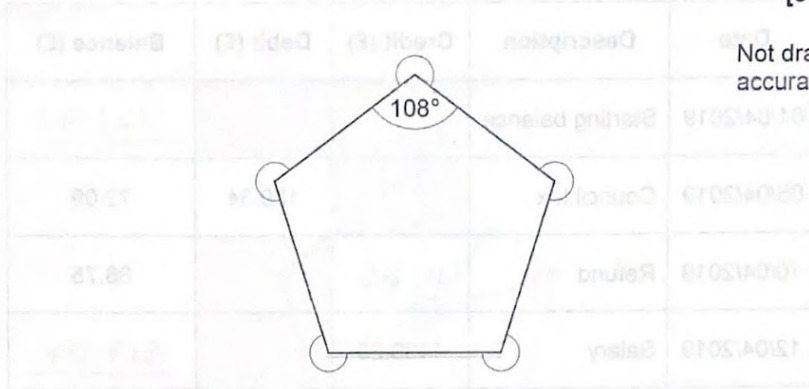
0 5

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8 (a) The interior angle of a regular pentagon is 108°

Work out the sum of the five reflex angles at the vertices of a regular pentagon.

[3 marks]



$$360 - 108 = 252$$

$$252 \times 5 = 1260$$

Answer 1260 degrees



Do not write
outside the
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Omar asks Harry,

"How many lines of symmetry does a pentagon have?"

Harry assumes it is a regular pentagon.

His answer is 5.

8 (b) Draw the lines of symmetry on this regular pentagon.

[1 mark]



8 (c) Omar then says,

"What if the pentagon is not regular?"

For a pentagon that is not regular, what is true about the number of lines of symmetry?

Tick one box.

[1 mark]

There must be 0

There could be 0 or 1

There could be 0, 1 or 2

There could be any number up to 5

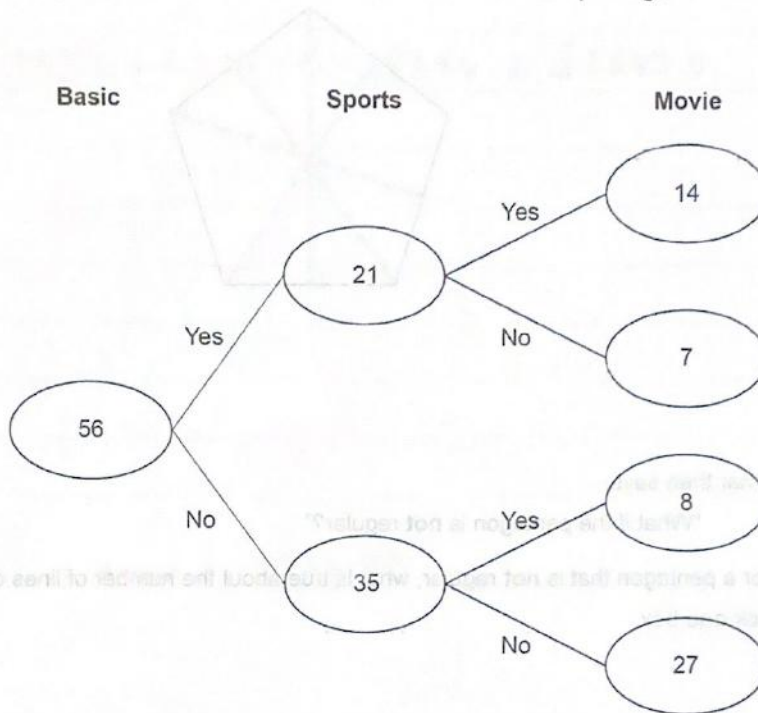
5

Turn over ►



Do not write outside the box

- 9 56 customers pay for satellite television.
 They all have the Basic package for £24.50 per month.
 Some also have
 the Sports package for £27.50 extra per month
 the Movie package for £18 extra per month.
 The frequency tree shows the number of customers with each package.



There must be 0

There could be 0 or 1

There could be 0, 1 or 2

There could be any number up to 2



Do not write outside the box

In total, how much per month do the 56 customers pay?

[4 marks]

$$56 \times \pounds 24.50 = \pounds 1372 \text{ (Basic)}$$

$$21 \times \pounds 27.50 = \pounds 577.50 \text{ (Sports)}$$

$$(14+8) \times \pounds 18 = \pounds 396 \text{ (Movie)}$$

$$\pounds 1372 + \pounds 577.50 + \pounds 396 = \pounds 2345.5$$

Answer \pounds 2345.50

Turn over for the next question

4

Turn over ►



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outside the
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10 Zoe is thinking of a number.

$$\frac{3}{10} \text{ of } 90 = \frac{1}{2} \text{ of her number}$$

What number is she thinking of?

[3 marks]

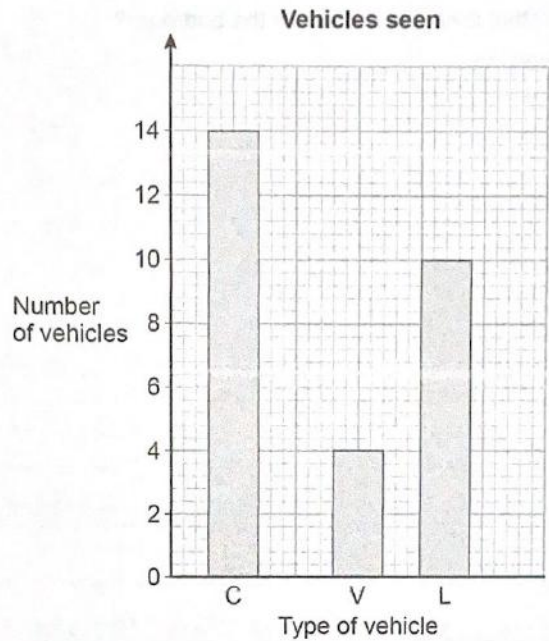
$$\frac{3}{10} \times 90 = 27$$

$$27 \times 2 = 54$$

Answer 54

Do not write outside the box

- 11 On a journey, Laura sees 30 vehicles.
Each vehicle is a car, a van or a lorry.
She draws this bar chart.



Make two criticisms of her bar chart.

[2 marks]

Criticism 1 The gaps between bars are not consistent.

Criticism 2 The bar heights do not add up to 30 (14 + 4 + 10 = 28)

Turn over ▶



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box

12

A drawing has a scale of 1 : 40

On the drawing, a bedroom is a rectangle measuring 10 cm by 18 cm

A kitchen has an actual area of 300 000 cm²

Which has the bigger actual area, the kitchen or the bedroom?

You must show your working.

[4 marks]

(scale)
Bedroom = 10 cm × 18 cm =

↳ (actual) = 400 cm × 720 cm = 288000 cm²

Therefore the kitchen has the bigger area,
300 000 cm² > 288000 cm²

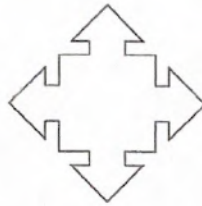
Answer Kitchen



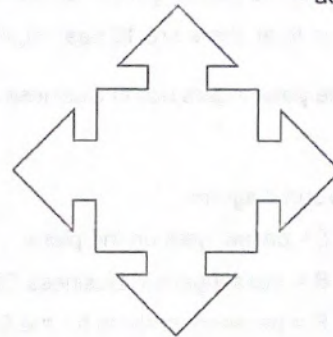
13 Here are two similar shapes, A and B.

Do not write outside the box

Not drawn accurately



A



B

length of edges in A : length of edges in B = 2 : 5

The perimeter of A is 210 mm

Work out the perimeter of B.

[2 marks]

$$(210 \div 2) \times 5 = 525 \text{ mm}$$

Answer 525 mm

6

Turn over ►



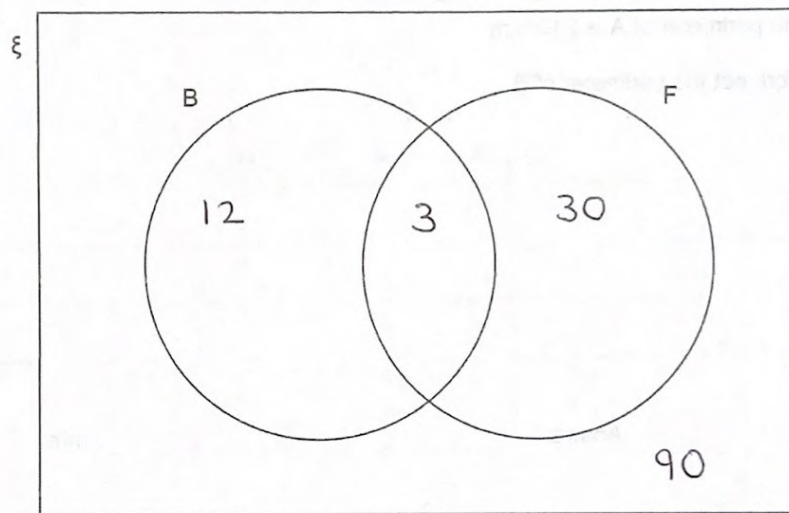
Do not write
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- 14 There are 135 passengers on a plane.
 3 of the passengers in Business Class are flying for the first time.
 In total, there are 15 passengers in Business Class.
 $\frac{1}{4}$ of the passengers not in Business Class are flying for the first time.

- 14 (a) In the Venn diagram,
 ξ = passengers on the plane
 B = passengers in Business Class
 F = passengers flying for the first time.

Complete the Venn diagram.

[4 marks]



$$(135 - 15) \div 4 = 30$$



Do not write
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- 14 (b) One of the passengers is chosen at random.

Write down the probability that the passenger is in Business Class.

[1 mark]

$$\frac{15}{135} = \frac{1}{9}$$

Answer $\frac{1}{9}$

- 15 A line has the equation $y = x + 3$

- 15 (a) Write down the coordinates of the point where the line intersects the y -axis.

[1 mark]

Answer (0 , 3)

- 15 (b) Write down the coordinates of the point where the line intersects the x -axis.

[1 mark]

Answer (-3 , 0)

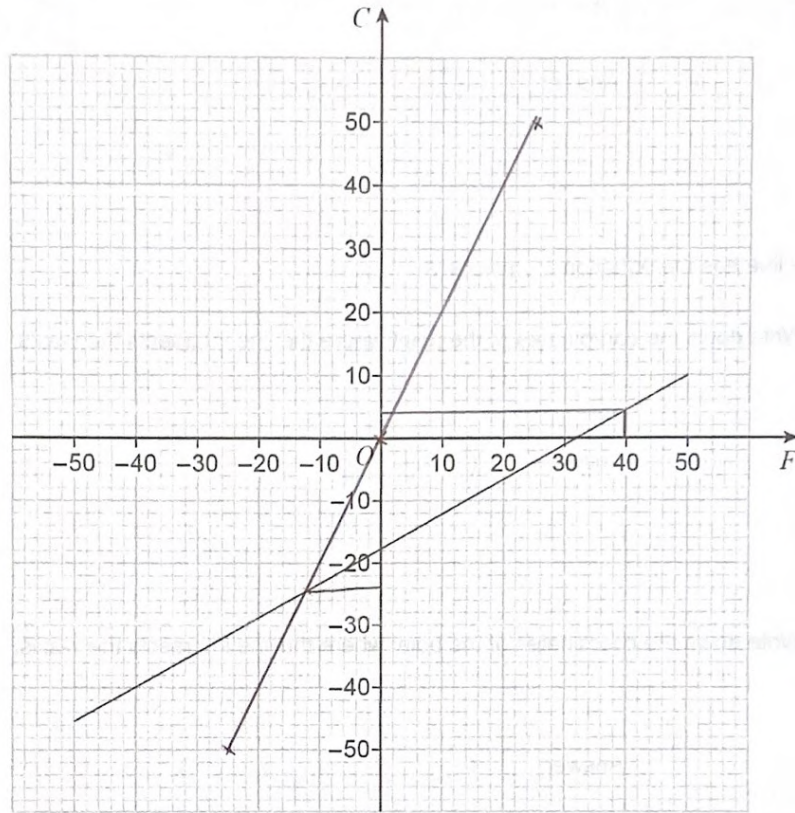
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Turn over ►



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- 16 The graph below is used to convert between temperature in degrees Fahrenheit (F) and temperature in degrees Celsius (C).



- 16 (a) Use the graph to convert 40 degrees Fahrenheit into degrees Celsius.

[1 mark]

Answer 4.5 degrees Celsius



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At one temperature, T ,
the number of degrees Celsius is **double** the number of degrees Fahrenheit.
The graph of $C = 2F$ can be drawn to help find this temperature.

- 16 (b) On the grid opposite, draw the graph of $C = 2F$ for values of F from -25 to 25
You may use the table to help you.

[2 marks]

F	-25	0	25
C	-50	-18 0	50

- 16 (c) Use your graph to estimate the value of T .
Give your answer in degrees Celsius.

[2 marks]

Answer - 24 degrees Celsius

Turn over for the next question

5

Turn over ►



Do not write
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17 In a bag there are 10p coins, 20p coins and 50p coins.

There are two fewer 20p coins than 10p coins.

There are five more 50p coins than 10p coins.

17 (a) Complete the table.

[1 mark]

Coin	Number of coins
10p	n
20p	$n - 2$
50p	$n + 5$

17 (b) Altogether, there are 60 coins.

Work out the total value of the 20p coins.

[4 marks]

$$n + (n - 2) + (n + 5) = 60$$

$$\Rightarrow 3n + 3 = 60$$

$$\Rightarrow 3n = 57$$

$$\Rightarrow n = 19$$

$$20p \text{ coins} = n - 2 = 19 - 2 = 17$$

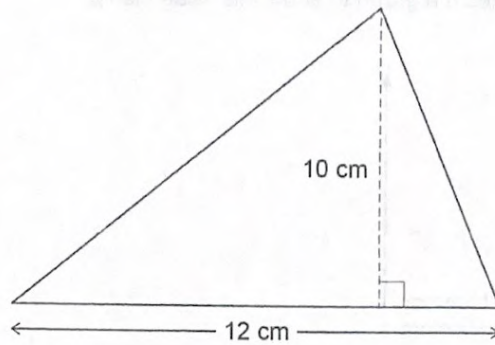
$$17 \times 0.2 = 3.4$$

Answer £ 3.40



Do not write outside the box

18 A force of 180 newtons (N) is applied to the surface of this triangle.



Not drawn accurately

Work out the pressure.

Use $\text{pressure} = \frac{\text{force}}{\text{area}}$

[3 marks]

Triangle area = $0.5 \times 10 \times 12 = 60 \text{ cm}^2$

Pressure = $\frac{180}{60} = 3 \text{ N/cm}^2$

Answer 3 N/cm²

8

Turn over ►



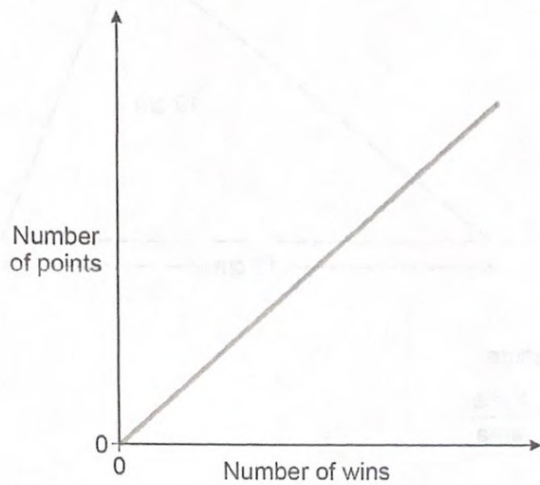
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19

In a sport, the number of points is directly proportional to the number of wins.

On the axes, sketch a graph to show this relationship.

[1 mark]



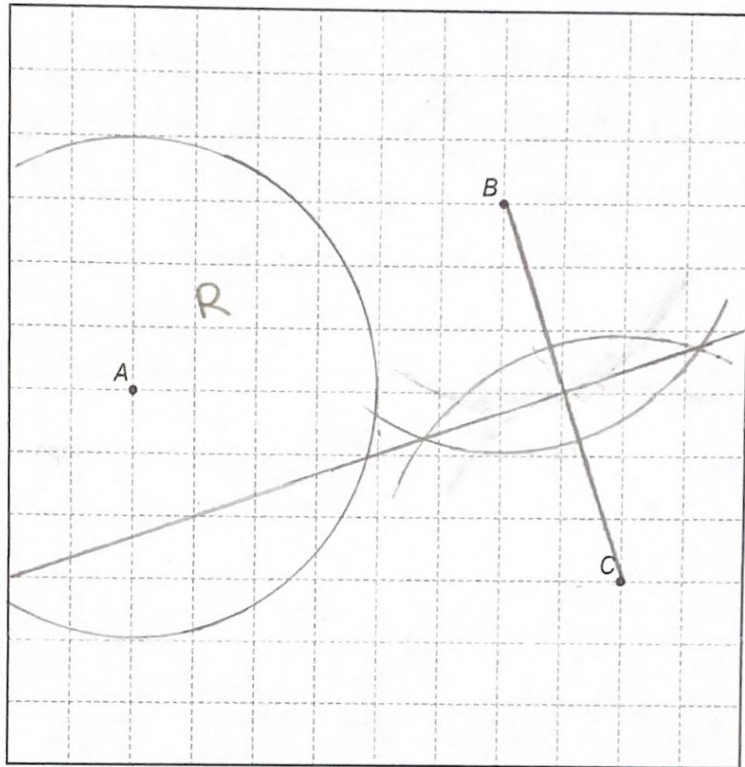
2 0

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20

Using ruler and compasses, show the region inside the grid that is
less than 4 cm from A
and
nearer to B than to C.
Label the region R.
Show all your construction lines.

[3 marks]



4

Turn over ►



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21

Beth drives 200 miles in 4 hours.

She drives the first 18 miles at an average speed of 36 mph

Work out her average speed for the rest of the journey.

[3 marks]

$$S = d/t$$

$$36 = 18/t \Rightarrow t = 0.5 \text{ hrs}$$

So she drives 182 miles in 3.5 hrs

$$\text{Speed} = \frac{182}{3.5} = 52$$

Answer 52 mph

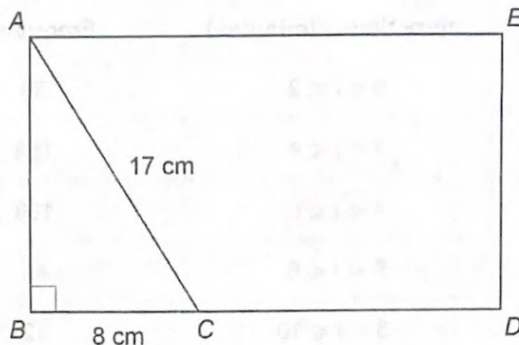
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22

The diagram shows rectangle $ABDE$ and right-angled triangle ABC .

$AC = 17 \text{ cm}$

$BC = 8 \text{ cm}$



Not drawn
accurately

$BC : CD = 1 : 2$

Work out the area of rectangle $ABDE$.

[4 marks]

$$AB^2 + 8^2 = 17^2$$

$$\Rightarrow AB = \sqrt{17^2 - 8^2} = 15$$

$$BC = 8, \text{ so } CD = 16$$

$$\text{Area} = 15 \times 24 = 360$$

Answer 360 cm^2

7

Turn over ►



2 3

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- 23 In a sport, injury time is added time played at the end of a match.
The table shows the injury time, t (minutes) played in 380 matches.

Injury time, t (minutes)	Frequency
$0 < t \leq 2$	59
$2 < t \leq 4$	158
$4 < t \leq 6$	106
$6 < t \leq 8$	45
$8 < t \leq 10$	12

- 23 (a) Circle the **two** words that describe the data. [1 mark]

continuous

discrete

grouped

ungrouped

- 23 (b) Which class interval contains the median?
You **must** show your working.

[2 marks]

$$380 \div 2 = 190$$

Answer 2 $< t \leq$ 4



Do not write outside the box

23 (c) What percentage of the matches had more than 6 minutes of injury time?

[2 marks]

$$45 + 12 = 57$$

$$57 \div 380 \times 100 = 15$$

Answer 15 %

24 x is an integer.

$$-4 < x \leq 2$$

and

$$2 \leq x + 3 < 9$$

Work out all the possible values of x .

[3 marks]

$$-4 < x \leq 2 \rightarrow -3, -2, -1, 0, 1, 2$$

$$2 \leq x + 3 < 9 \rightarrow -1 \leq x < 6 \rightarrow -1, 0, 1, 2, \dots, 5$$

Answer -1, 0, 1, 2

8

Turn over ►



Do not write
outside the
box25 Joe and Kyle share an amount of money in the ratio $7:n$

Joe gets 35% of the money.

Work out the value of n .

[2 marks]

$$\frac{7}{7+n} = 0.35$$

$$\Rightarrow \frac{7}{7+0.35n} = \frac{7}{7+n}$$

$$\Rightarrow n = \frac{7}{0.35} - 7 = 13$$

Answer 13

26 Circle the reciprocal of 4

[1 mark]

-4

2

0.4

0.25



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27

$x : y = 1 : 3$

Circle the correct equation.

[1 mark]

$y = 3x$

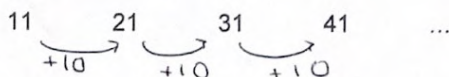
$y = \frac{x}{3}$

$y = x - 2$

$y = x + 2$

28

A linear sequence starts



Work out an expression for the n th term of the sequence.

[2 marks]

$10n + 1$

Answer $10n + 1$

END OF QUESTIONS

