

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

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Forename(s)

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Candidate signature

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# GCSE MATHEMATICS

# F

Foundation Tier      Paper 2    Calculator

Thursday 6 June 2019

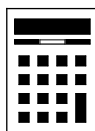
Morning

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	
<b>TOTAL</b>	

## Advice

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



Answer **all** questions in the spaces provided

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

[1 mark]

20

22

24

26

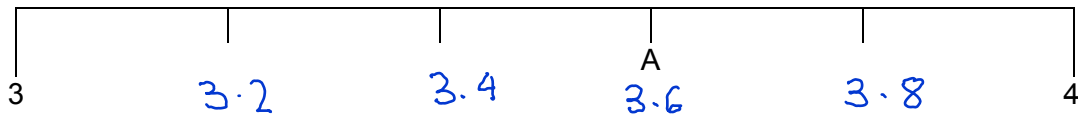
cube numbers: 1, 8, 27

- 2 Circle the fraction which is equal to  $0.25 = \frac{1}{4}$

[1 mark]

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

- 3 Here is a number line.



Which number is at A?

Circle your answer.

[1 mark]

3.3

3.55

3.6

3.8



4 How many millimetres are equal to 3.27 metres?

Circle your answer.

$$3.27 \times 100 \times 10 =$$

[1 mark]

32.7

327

3270

32700

$$m \xrightarrow{\times 100} cm \xrightarrow{\times 10} mm$$

5 Which is longer,  $\frac{3}{4}$  of a day or 1000 minutes?

You **must** show your working.

[3 marks]

Into hours:

$$\begin{aligned} \frac{3}{4} \text{ of } 24 \text{ hours (1 day)} &= 0.75 \times 24 \\ &= 18 \text{ hours} \end{aligned}$$

min  $\xrightarrow{\div 60}$  hour

$$1000 \text{ min} = 1000 \div 60 = 16.66... \text{ hours}$$

$$18 \text{ h} > 16.6 \text{ h}$$

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



- 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]

$$= \frac{921.167317}{1.875} + 40.96$$

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]

$$9.75 \approx 10$$

$$10^3 = 1000$$

$$1.875 \approx 2$$

$$6.4 \approx 6$$

$$6^2 = 36$$

$$\frac{1000}{2} + 36 = 536$$

2

536 is close to 535.285

Tick a box.



Sensible



Not sensible



7 Complete the bank statement.

**[3 marks]**

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>

$$72.09 + 189.34$$

$$86.75 - 72.09$$

$$86.75 + 1430.29$$

Turn over for the next question

Turn over ►

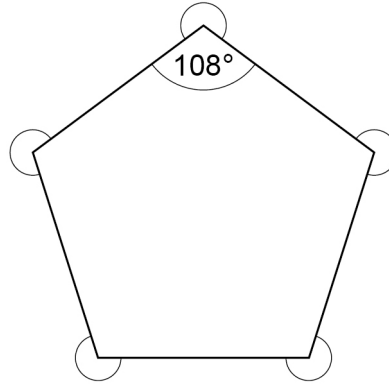


- 8 (a) The interior angle of a regular pentagon is  $108^\circ$

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

[3 marks]

Not drawn  
accurately



*- angles around a point*

$$1 \text{ reflex angle} = 360 - 108 = 252^\circ$$

$$5 \text{ reflex angles} = 252 \times 5 = 1260^\circ$$

Answer 1260 degrees



Omar asks Harry,

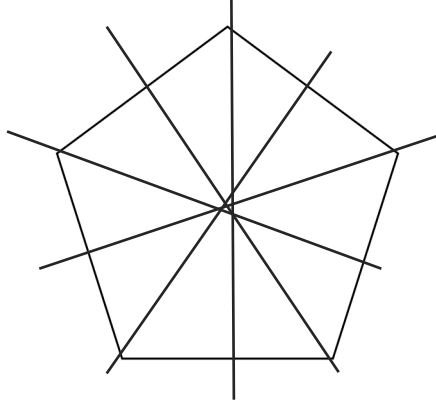
“How many lines of symmetry does a pentagon have?”

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



9

56 customers pay for satellite television.

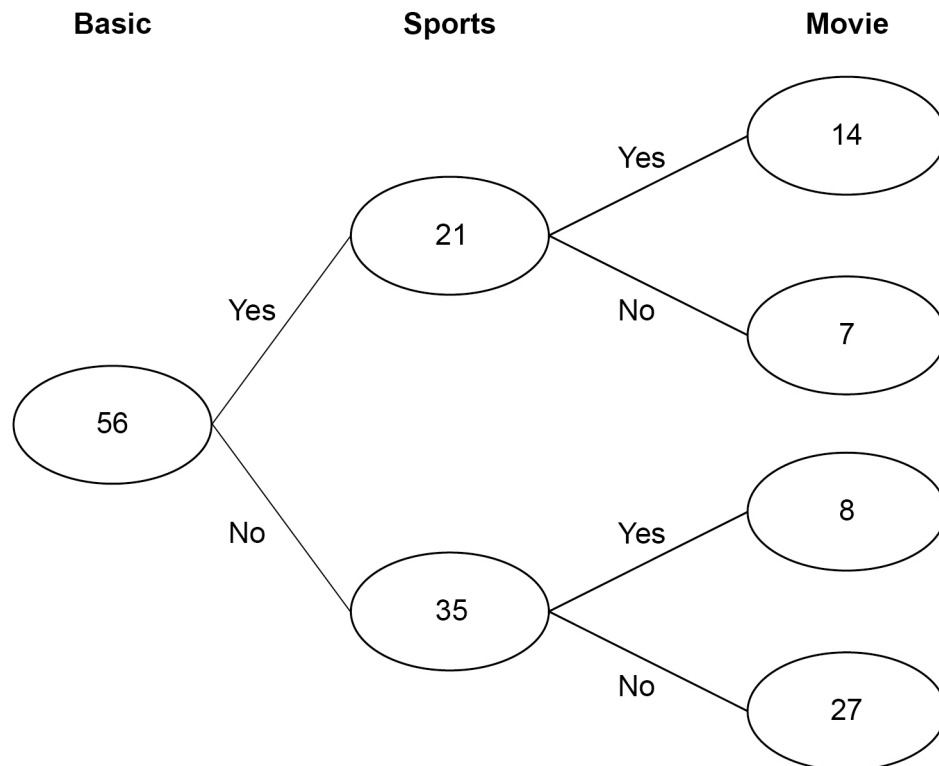
They **all** have the Basic package for £24.50 per month.

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.







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]**

$$\frac{3}{10} \text{ of } 90 = (90 \div 10) \times 3 = 9 \times 3 = 27$$

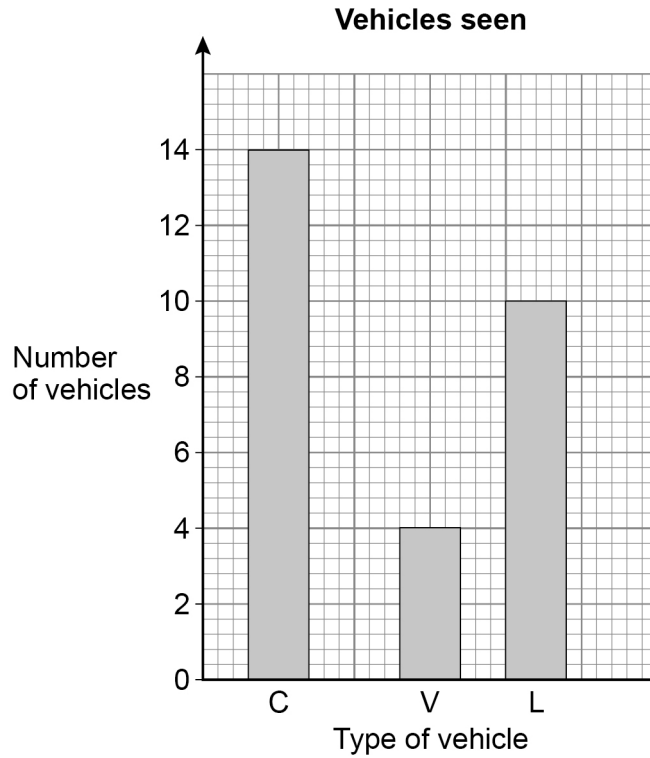
$$\frac{1}{2} x = 27$$

 $\times 2$ 

$$x = 54$$

Answer 54

- 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 bars aren't equally spaced

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Criticism 2  $14 + 4 + 10 = 28$   
Bars heights should add to 30

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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 cm<sup>2</sup>

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

You **must** show your working.

Actual Area of bedroom :

1 : 40	1 : 40
$10 \times 18$	$18 \times 18$
10 : 400	18 : 720

[4 marks]

$$400 \times 720 = 288,000 \text{ cm}^2$$

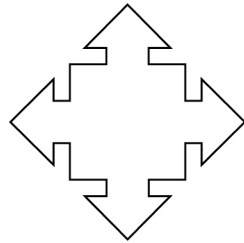
$$288,000 < 300,000$$

Answer The kitchen is bigger

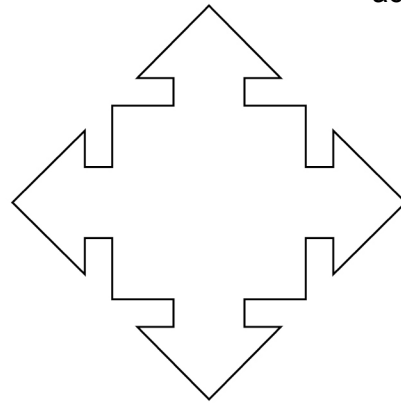


13 Here are two similar shapes, A and B.

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]

$$\text{Scale factor: } 5 \div 2 = 2.5$$

$$\begin{aligned} \text{P of B} &= 2.5 \times 210 \\ &= 525 \end{aligned}$$

Answer 525 mm



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.

$$135 - 15 = 120$$

$$\frac{1}{4} \text{ of } 120 = 30$$

14 (a) In the Venn diagram,

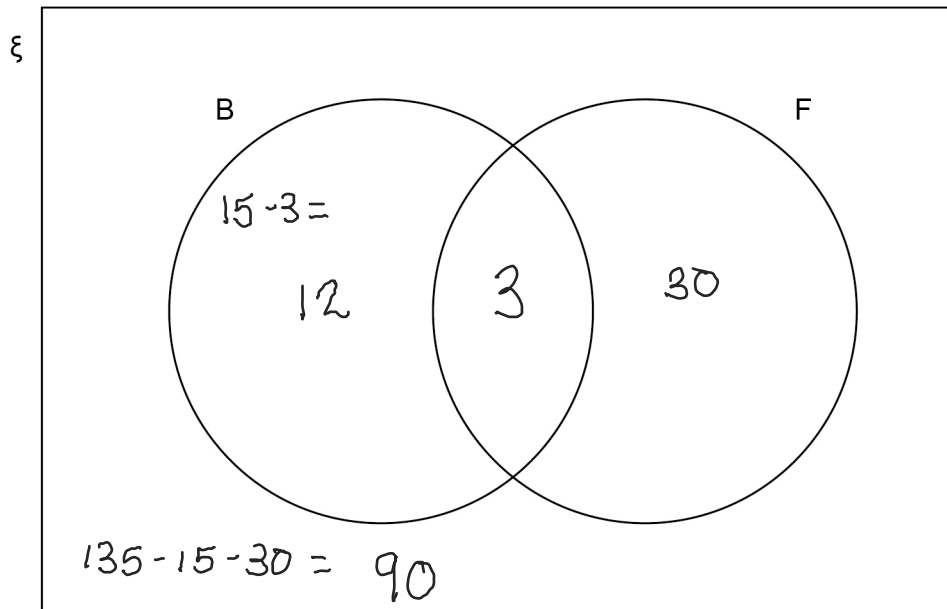
$\xi$  = passengers on the plane

B = passengers in Business Class

F = passengers flying for the first time.

Complete the Venn diagram.

[4 marks]




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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]

$$\begin{array}{r} \text{Business} = 15 \\ \hline \text{Total} = 135 \end{array} \qquad P = \frac{15}{135}$$

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 )

$y$  intercept

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

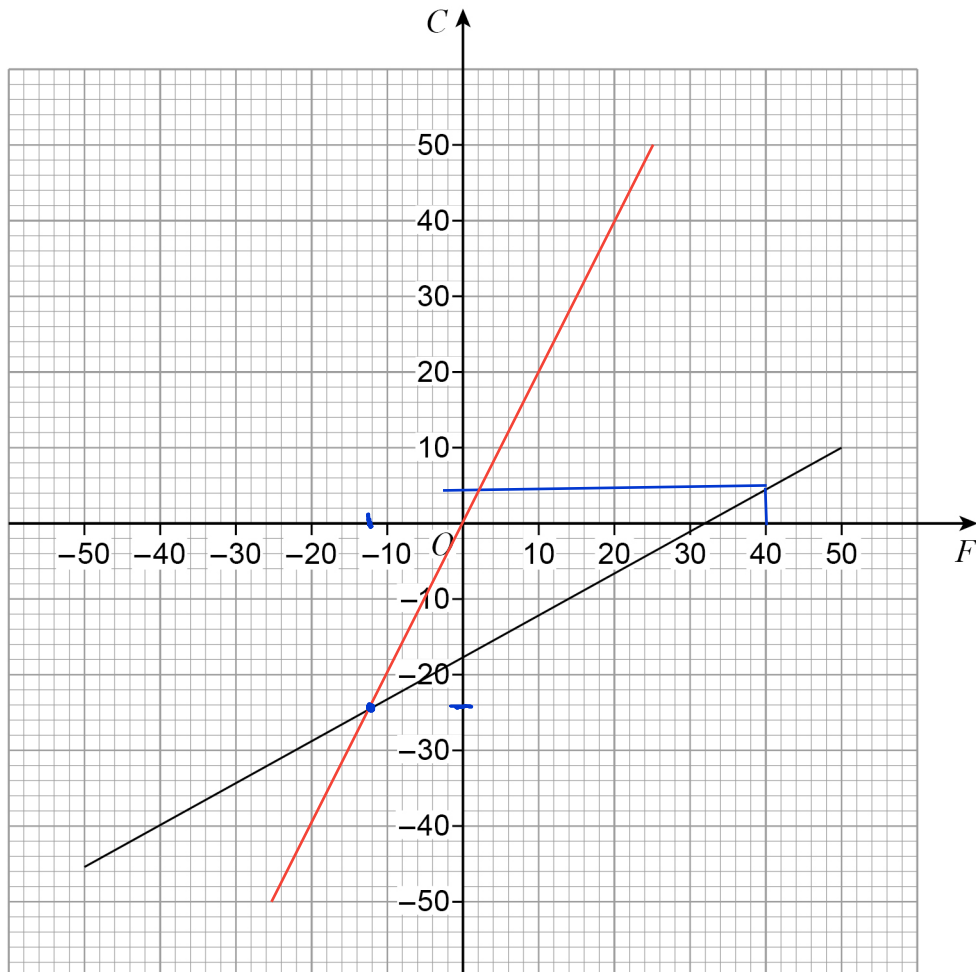
[1 mark]

Answer ( -3 , 0 )

$$\begin{aligned} 0 &= x + 3 \\ -3 &= x \end{aligned}$$



- 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 \_\_\_\_\_ 5 \_\_\_\_\_ degrees Celsius





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	25	
$C$	-50	50	

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

intersection  
(-12, -24)

[2 marks]

Answer                     - 24                     degrees Celsius

**Turn over for the next question**

**Turn over ►**



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]

$$\begin{aligned} \text{Total: } & n + n - 2 + n + 5 \\ & = 3n + 3 \end{aligned}$$

$$\begin{aligned} 3n + 3 & = 60 \\ -3 & \end{aligned}$$

$$\begin{aligned} 3n & = 57 \\ \div 3 & \end{aligned}$$

$$n = 19$$

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

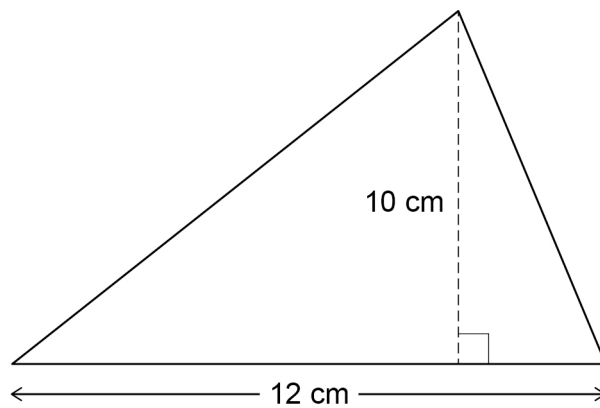
$$17 \times 0.2 = \text{value}$$

$$\text{Answer } \pounds \quad 3.40$$



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]

$$\text{Area of triangle: } \frac{1}{2} \times 12 \times 10$$

$$= 60 \text{ cm}^2$$

$$\text{Pressure} = \frac{180}{60}$$

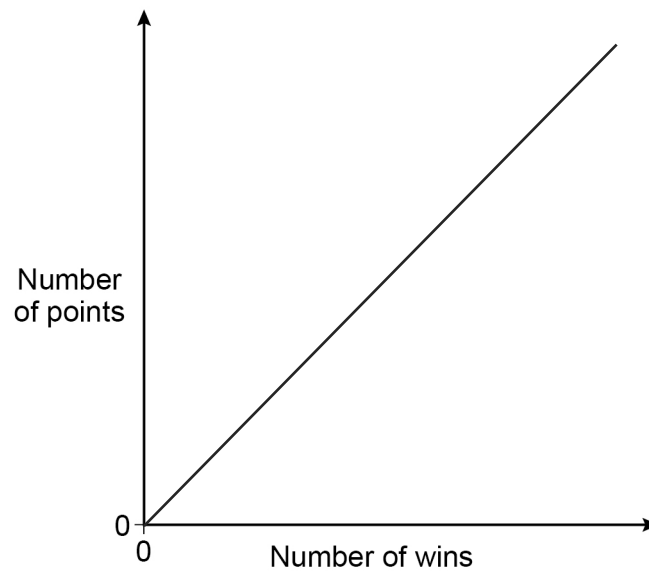
Answer 3 N/cm<sup>2</sup>



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]**

20

Using ruler and compasses, show the region inside the grid that is

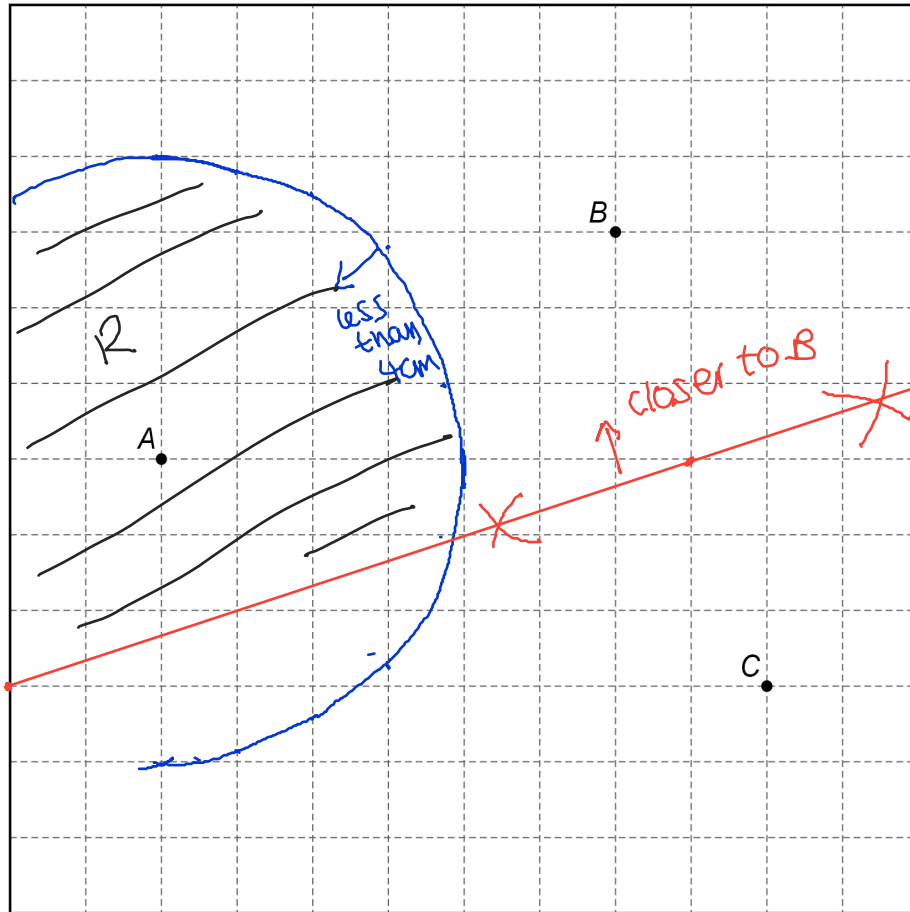
less than 4 cm from A — draw a circle centre A  $r=4$   
and

nearer to B than to C. — perpendicular bisector between  
B and C

Label the region R.

Show all your construction lines.

[3 marks]



Turn over ►



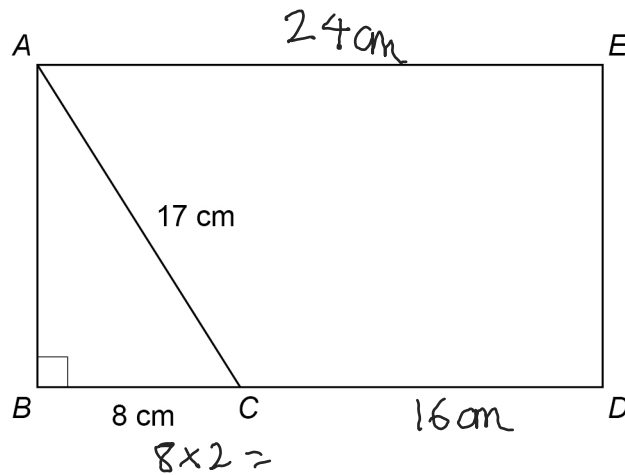


22

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]

$$CD = 8 \times 2 = 16 \text{ cm}$$

$$BD = 16 + 8 = 24 \text{ cm}$$

Pythagoras:  $a^2 + b^2 = c^2$

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

$$AB^2 = 17^2 - 8^2$$

$$= 225$$

$$AB = 15 \text{ cm}$$

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

Answer 360  $\text{cm}^2$

Turn over ►



- 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

59  
217

- 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]

$$\frac{380}{2} = 190$$

190 falls in

Answer  $2 < t \leq 4$





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

[2 marks]

$$\text{More than 6min} = 45 + 12 = 57$$

$$\text{Percentage} = \frac{57}{380} \times 100$$

total

Answer 15 %

24  $x$  is an integer.

$$\frac{-4 < x \leq 2}{\text{and}}$$

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

Work out all the possible values of  $x$ .

[3 marks]

$$\frac{2 \leq x + 3 < 9}{-3 \quad -3}$$

$$-1 \leq x < 6$$

Between  $-1 \leq x < 6$  and  $-4 < x \leq 2$

$$\text{so } -1 \leq x \leq 2$$

Answer -1, 0, 1, 2



25 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]

$$35\% = \frac{7}{20}$$

$$\frac{n}{20} = 1 - \frac{7}{20} = \frac{13}{20}$$

$$n = 13$$

Answer 13

26 Circle the reciprocal of 4  
lover

$$\frac{1}{4}$$

[1 mark]

-4

2

0.4

0.25



27

$x : y = 1 : 3$

Circle the correct equation.

$y = 3x$

[1 mark]

$y = 3x$

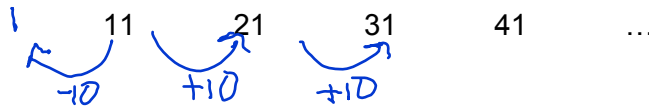
$y = \frac{x}{3}$

$y = x - 2$

$y = x + 2$

28

A linear sequence starts

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

[2 marks]

Di	Difference	10
$n$	$\times n$	$n$
0	+ 0 <sup>th</sup> term	+ 1

Answer  $10n + 1$ 

END OF QUESTIONS



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2 8



1 9 6 G 8 3 0 0 / 2 F

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