



Please write clearly in block capitals.

Centre number

--	--	--	--	--

Candidate number

--	--	--	--

Surname

---

Forename(s)

---

Candidate signature

---

I declare this is my own work.

# GCSE MATHEMATICS

# F

Foundation Tier      Paper 2 Calculator

Thursday 4 June 2020

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.
- 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.

### 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	
<b>TOTAL</b>	



J U N 2 0 2 0 8 3 0 0 2 F 0 1

Answer all questions in the spaces provided.

1 Circle the ratio that is the same as 3 : 4

$$2 \times (3 : 4) \\ 6 : 8$$

[1 mark]

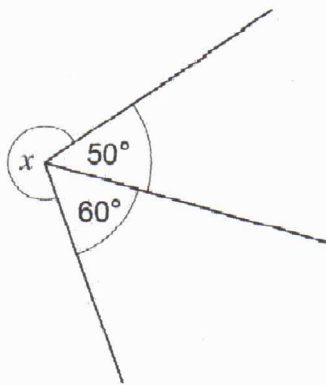
6 : 7

6 : 8

6 : 9

6 : 16

2

Not drawn  
accurately

$$360 - (50 + 60) \\ 360 - 110 \\ = \underline{\underline{250^\circ}}$$

Circle the size of angle  $x$ .

[1 mark]

70°

110°

250°

270°

3 Circle the expression that has the smallest value when  $x = 4$ 

$$5 - 4 = 1 \quad \left(\frac{1}{2}\right)^4 = \frac{1}{16} \quad 4 + 1 = 5 \quad 4 - 4 = 0$$

[1 mark]

5 -  $x$  $\frac{1}{2}x$  $x + 1$  $x - 4$ 

4 The term-to-term rule for a sequence is

add 1 then double

The first two terms are 2 and 6

Circle the next term.

9

13

14

18

$$2, 6$$

$$(6+1) \times 2 = 14$$

[1 mark]

5 (a) Solve  $7x = 56$

$$\frac{7x}{7} = \frac{56}{7} = 8$$

$$x = 8$$

[1 mark]

$x =$  8

5 (b) Solve  $25 - y = 18$

$$25 - 18 = y, \quad y = 7$$

[1 mark]

$y =$  7



- 6 Eleven people play a game.  
Here are their scores.

12   9   15   9   18   18   3   14   9   16   20

- 6 (a) Write down the mode.

[1 mark]

Answer 9

- 6 (b) Work out the median.

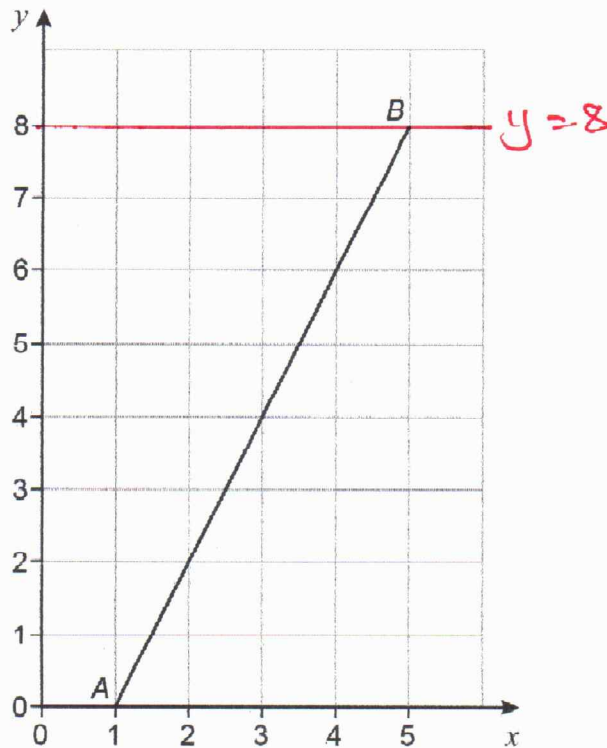
[2 marks]

3, 9, 9, 9, 12, 14, 15, 16, 18, 18, 20

Answer 14



- 7 Line  $AB$  is shown where  $A$  is the point  $(1, 0)$  and  $B$  is the point  $(5, 8)$



- 7 (a)  $P$  is a point on  $AB$ .  
The distance  $AP$  is half the distance  $AB$ .  
Work out the coordinates of  $P$ .

$$A(1, 0) \quad B(5, 8)$$

$$\text{mid point } \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$\left( \frac{1+5}{2}, \frac{0+8}{2} \right)$$

[1 mark]

Answer ( 3 , 4 )

- 7 (b) A line is drawn from  $B$  that is  
parallel to the  $x$ -axis  
meets the  $y$ -axis at point  $Q$ .  
Work out the coordinates of  $Q$ .

[1 mark]

Answer ( 0 , 8 )



8 (a) Write down an even whole number that is also a square number.

[1 mark]

Answer 16

8 (b) Write down all the cube numbers between 100 and 400

[2 marks]

$4^3 = 64$  ]  $5^3 = 125$ ,  $6^3 = 216$ ,  $7^3 = 343$ ,  $8^3 = 512$

Answer 5, 6, 7

8 (c) Write down two numbers that  
are multiples of 3  
and  
multiply to make 216

[1 mark]

$$\frac{216}{3} = 72 \quad | \quad \frac{216}{6} = 36 \quad | \quad \frac{216}{9} = 24$$

Answer 6 and 36



- 9 Members of a club are Senior, Adult or Junior.
- 9 (a) Here is a report about the members of the club.

18% are Senior 54% are Adult 38% are Junior
---

Give a reason why there **must** be a mistake in the report.

[1 mark]

$18 + 54 + 38 = 110$   
 The Percentages should add up to 100%  
 Not 110%

- 9 (b) An Adult membership fee is £120
- A Junior membership fee is  $\frac{1}{5}$  of the Adult fee.

Work out the total membership fee for 2 Adults and 3 Juniors.

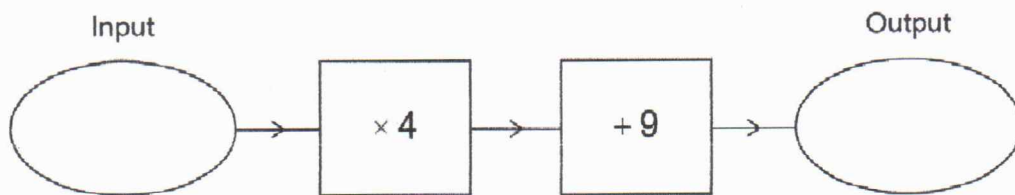
[3 marks]

$\frac{1}{5} \times 120 = 24$  [Junior membership]  
 $24 \times 3 = 72$   
 $120 \times 2 = 240$   
 $312$

Answer £ 312



10 (a) Here is a number machine.



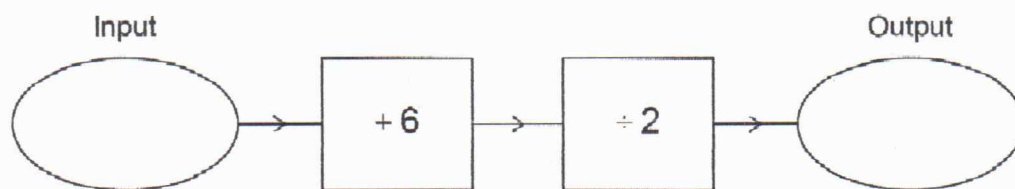
Work out the output when the input is 16

[1 mark]

$$(16 \times 4) + 9 = 73$$

Answer 73

10 (b) Here is a different number machine.



Work out the output when the input is -48

[1 mark]

$$(-48 + 6) \div 2 = -42 \div 2 = -21$$

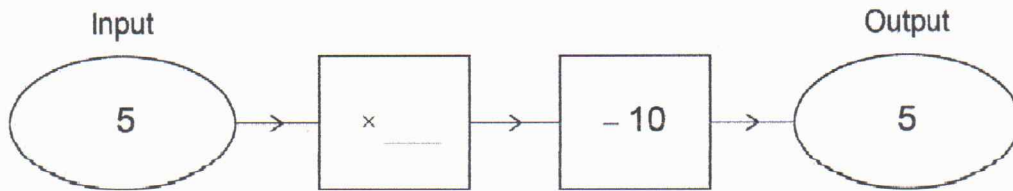
Answer -21





10 (c) Complete this number machine.

[1 mark]

Let the unknown be  $x$ 

$$5 \times x - 10 = 5$$

$$5x - 10 = 5$$

$$\frac{5x}{5} = \frac{15}{5}$$

$$x = \underline{\underline{3}}$$

11 Here are two calculations.

A

$$17^2 - 300$$

B

$$47 \times 21 - 10^3$$

Which calculation has the smaller answer?

You must show the answer to each calculation.

[2 marks]

$17^2 - 300$	$47 \times 21 - 1000$
$289 - 300 = -11$	$987 - 1000$
	$= -13$

Answer            $47 \times 21 - 10^3$           

5

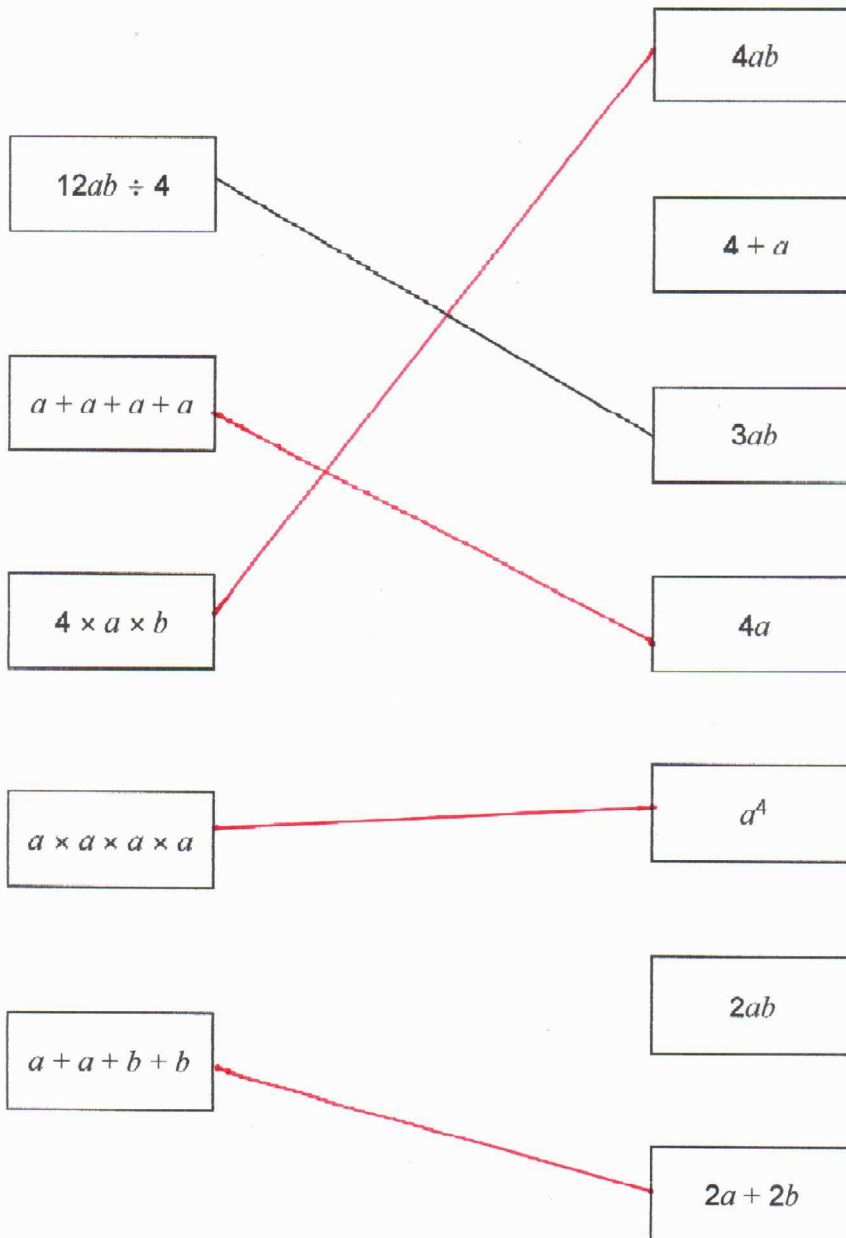
Turn over ►



12

Match each expression on the left with one on the right.  
One has been done for you.

[4 marks]



Do not write  
outside the  
box

13

Jenny works for 30 hours and is paid £318

Calvin works for 28 hours and is paid £287

Jenny is paid more per hour than Calvin.

How much more?

[3 marks]

$$\text{Jenny Pay Per hour} = \frac{£318}{30} = £10.6$$

$$\text{Calvin Pay Per hour} = \frac{£287}{28} = 10.25$$

$$10.6 - 10.25 = -0.35 \times 100 = 35p.$$

Answer 35 pence

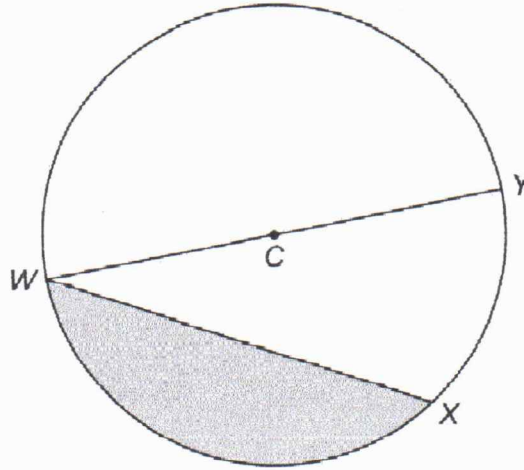
Turn over for the next question

7

Turn over ►



14

This circle has centre  $C$ . $W$ ,  $X$  and  $Y$  are points on the circle. $WY$  is a straight line.

Tick one box for each statement.

[3 marks]

	True	False
$WY$ is a diameter.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
$WX$ is a radius.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
The shaded section is a sector.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Arc $XY$ is part of the circumference.	<input checked="" type="checkbox"/>	<input type="checkbox"/>



15

Mortar is made by mixing cement and sand as shown.

For every 1 kg of cement used, add 4 kg of sand

Cement costs £0.19 per kg

Sand costs £0.07 per kg

Tomasz uses 150 kg of cement to make some mortar.

Work out the total cost of the mortar.

[3 marks]

$$\begin{array}{l} 150\text{kg cement} \\ 150 \times 4 = 600\text{kg sand.} \\ \hline 150 \times 0.19 = 28.5 \\ 600 \times 0.07 = 42 \\ \hline 70.5 \end{array}$$

Answer £ 70.5

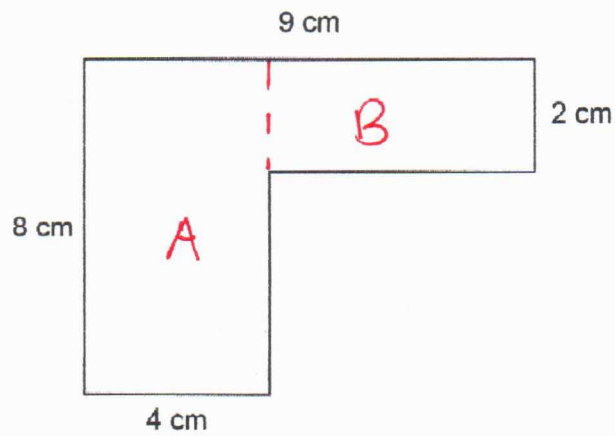
Turn over for the next question





16 (a) Here is a shape made from rectangles.

Not drawn  
accurately



Work out the area.

[3 marks]

$$A = 8 \times 4 = 32 \text{ cm}^2$$

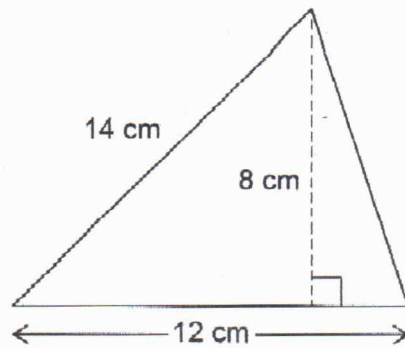
$$B = (9 - 4) \times 2 = 10 \text{ cm}^2$$

$$32 + 10 = 42 \text{ cm}^2$$

Answer 42 cm<sup>2</sup>



- 16 (b) Zak wants to work out the area of this triangle.



Not drawn  
accurately

Here is his working.

$$12 \times 8 = 96 \text{ cm}^2$$

What is wrong with his method?

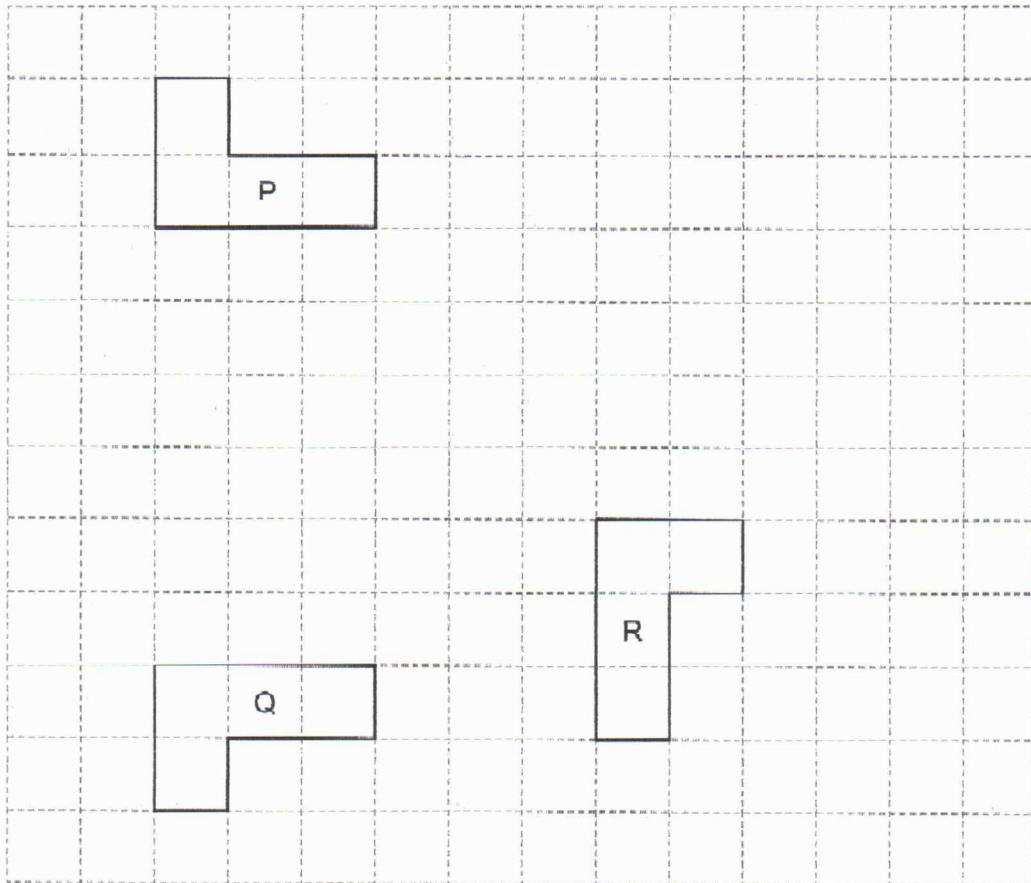
[1 mark]

He should divide the area by 2  
 $\frac{1}{2} \times 12 \times 8 = \underline{\underline{48 \text{ cm}^2}}$

Turn over for the next question



17 Here are shapes P, Q and R.



17 (a) P is mapped to Q by a single transformation.

Circle the type of transformation.

[1 mark]

rotation

reflection

translation

enlargement

17 (b) P is mapped to R by a single transformation.

Circle the type of transformation.

[1 mark]

rotation

reflection

translation

enlargement



18

Kim buys pet food in 1.5 kg packs.

Her pet needs 0.8 kg of food each week.

She wants to have enough food for the next 14 weeks.

She already has two 1.5 kg packs.

Work out the smallest number of packs she needs to buy.

You **must** show your working.

**[4 marks]**

$$0.8 \times 14 = 11.2 \text{ Kgs}$$

$$11.2 - (2 \times 1.5) = 8.2 \text{ kg}$$

$$\frac{8.2}{1.5} = 5.46 \text{ Packs}$$

$$\approx 6$$

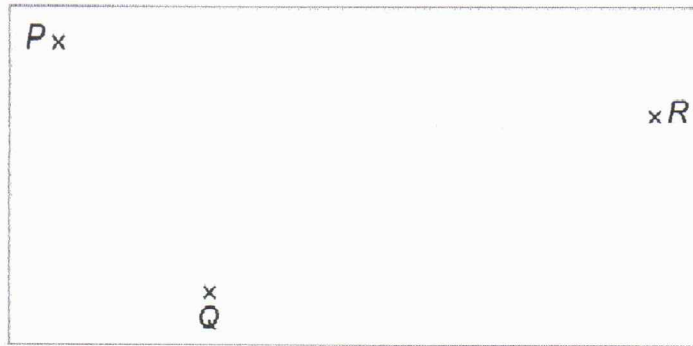
Answer

6**Turn over for the next question**

6

**Turn over ►**

19

A scale drawing shows the positions of  $P$ ,  $Q$  and  $R$ .Not drawn  
accurately

On the scale drawing

$$PQ = 4 \text{ cm} \quad QR = 6.5 \text{ cm}$$

The actual distance  $PQ$  is 50 metres less than the actual distance  $QR$ .

Work out the scale.

[3 marks]

$$6.5 \text{ cm} - 4 \text{ cm} = 2.5 \text{ cm} \quad | \quad 1 \text{ cm} = 20 \text{ m.}$$

$$2.5 \text{ cm} \Rightarrow 50 \text{ m}$$

$$\frac{50}{2.5} = 20$$

Answer 1 cm represents 20 metres



20 (a)  $a$  and  $b$  are whole numbers.

$$a \leq 12 \quad b < 9$$

Work out the largest possible value of  $2a + b$

[2 marks]

$$\begin{aligned} & 2(12) + 8 \\ & 24 + 8 = 32 \end{aligned}$$

Answer 32

20 (b)  $x$  and  $y$  are both negative numbers.

Show that  $\frac{y}{x}$  could equal 4

[1 mark]

$$\begin{aligned} & \text{Let } y = -4 \text{ and } x = -1 \\ & \frac{-4}{-1} = \underline{\underline{4}} \end{aligned}$$

Turn over for the next question



21

Jill puts 440 sweets into small bags, medium bags and large bags.



She uses

30 small bags

twice as many medium bags as large bags.

There are no sweets left over.

For the number of bags, work out the ratio small : medium : large

[4 marks]

*number of*  
Let the large bags be  $x$

$$30 + 2x + x$$

$$8 \times 30 + 2(12)x + 16x = 440$$

$$240 + 24x + 16x = 440$$

$$40x = 440 - 240$$

$$\frac{40x}{40} = \frac{200}{40}$$

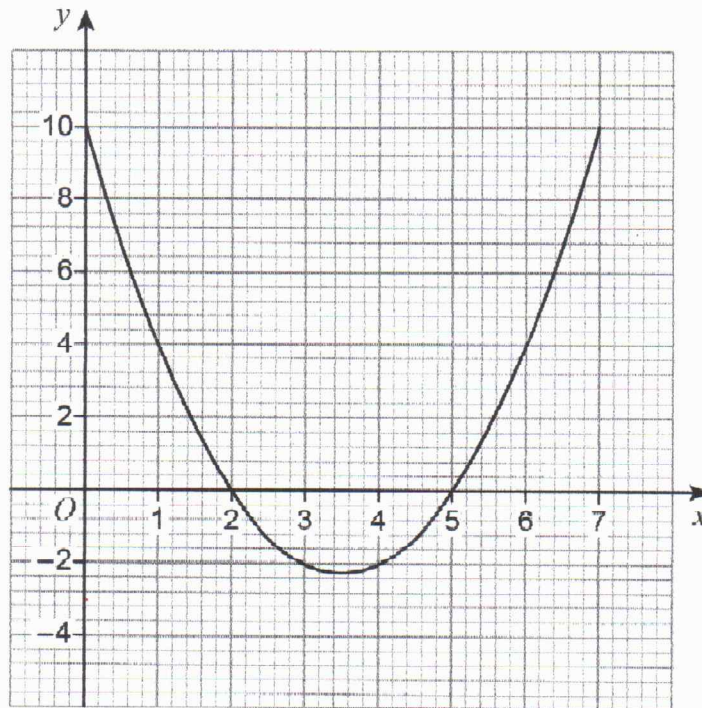
$$x = 5$$

$$\text{medium} = 2 \times 5 = 10$$

Answer 30 : 10 : 5



22

Here is the graph of  $y = x^2 - 7x + 10$  for values of  $x$  from 0 to 722 (a) Write down the roots of  $x^2 - 7x + 10 = 0$ 

From the curve  
crosses x axis at  
points (2,0) and (5,0)  
[2 marks]

Answer 2 and 5

22 (b) Write down the  $x$ -coordinate of the turning point of the curve.

[1 mark]

3.5

Answer 3.5





23

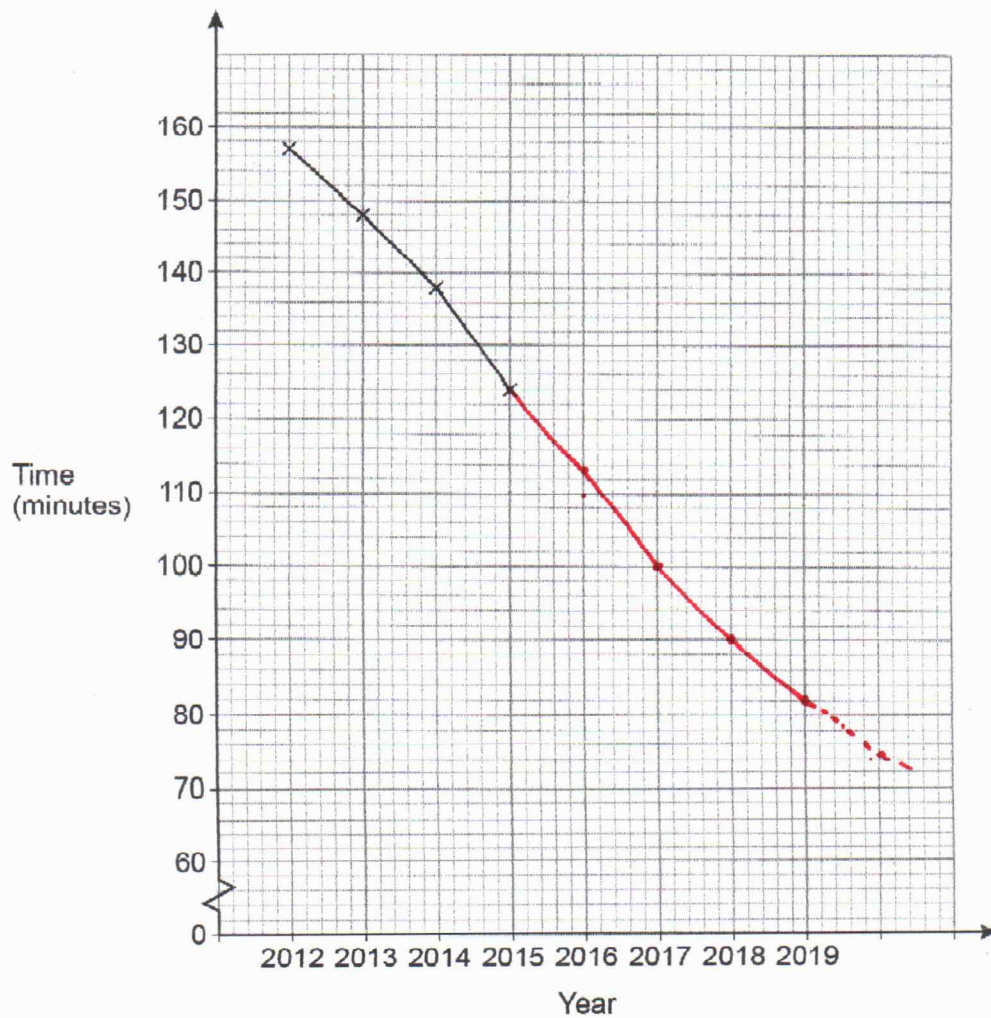
The time students spent watching TV was recorded.

The table shows the average daily time per student each year from 2012 to 2019

Year	2012	2013	2014	2015	2016	2017	2018	2019
Time (minutes)	157	148	138	124	113	100	90	82

A time series graph is drawn to represent the data.

The first four points have been plotted.



23 (a) Complete the graph.

[2 marks]

23 (b) Use the graph to estimate the average daily time per student in 2020

[1 mark]

74

Answer 74 minutes

24 Work out the highest common factor (HCF) of 75 and 105

[2 marks]

$$\begin{array}{r|l} 3 & 75 \\ \hline 5 & 25 \\ \hline & 5 \end{array} \quad \begin{array}{r|l} & 105 \\ \hline & 35 \\ \hline & 7 \end{array}$$

$$3 \times 5 = \underline{15}$$

Answer 15

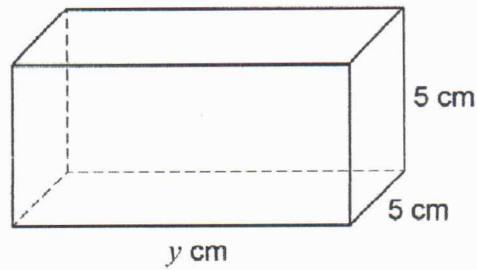
Turn over for the next question





25

Here is a cuboid.



- 25 (a) Assume that the total surface area of the cuboid is  $200 \text{ cm}^2$

Work out the volume of the cuboid.

[3 marks]

$$V = l \times w \times h$$

$$SA = 2(5 \times y) + (5 \times 5) \times 2 = 200 \quad | \quad V = 7.5 \times 5 \times 5$$

$$20y + 50 = 200$$

$$20y = 150$$

$$y = \frac{150}{20}$$

$$y = 7.5$$

$$V = \underline{187.5}$$

Answer 187.5  $\text{cm}^3$



25 (b) In fact, the total surface area of the cuboid is smaller than  $200 \text{ cm}^2$

What does this mean about the volume of the cuboid?

Tick one box.

[1 mark]

It is smaller than the answer to part (a)

It is bigger than the answer to part (a)

It is the same as the answer to part (a)

It could be any of the above

26 Here is some information about the time spent on social media by 50 people.

Time, $t$ minutes	Number of people
$0 < t \leq 15$	2
$15 < t \leq 30$	9
$30 < t \leq 45$	31
$45 < t \leq 60$	8

$$31 + 8 = 39$$

Circle the number of people who spent more than 30 minutes.

[1 mark]

9

11

31

39

5

Turn over ►



27

At a party there are 90 people.

48 are women and 42 are men.

Some women leave.

Some men arrive.

The ratio of women to men is now 10 : 11

Are there now more than 90 people at the party?

Tick **one** box.

Yes

No

Cannot tell

Show working to support your answer.

[2 marks]

$$\begin{array}{l} \text{Women : men.} \\ (10 : 11) \times 4 = 40 : 44 \\ = 84 \text{ People.} \end{array}$$



28

Alex and Bev sat six tests, each with 50 marks.

The table shows their mean percentages after five tests.

Alex	60%
Bev	52%

After all six tests, their mean percentages were equal.

In the sixth test, Alex scored 24 out of 50

Work out Bev's score, out of 50, in the sixth test.

[4 marks]

$$\frac{24}{50} \times 100 = 48\%$$

$$\frac{60 \times 5 + 48}{6} = \frac{348}{6} = 58$$

$$\frac{52 \times 5 + x}{6} = 58$$

$$260 + x = 348$$

$$x = 348 - 260 = 88$$

$$\frac{88}{2} = \frac{44}{50}$$

Answer 44 out of 50

Turn over for the next question



29

A solid piece of silver has  
mass 2.625 kilograms  
volume 250 cm<sup>3</sup>

Work out the density of the piece of silver.  
Give your answer in grams per cubic centimetre.

[2 marks]

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

$$D = \frac{2.625}{250} = 0.0105 \quad \left| \quad \begin{array}{l} 0.0105 \times 1000 \\ = 10.5 \end{array} \right.$$

Answer 10.5 g/cm<sup>3</sup>

30

Work out the gradient of the straight line through (-2, 3) and (1, 9)

[2 marks]

$$\frac{dy}{dx} = \frac{9-3}{1-(-2)} = \frac{6}{3} = 2$$

Answer 2

END OF QUESTIONS

