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Candidate surname	Other names
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Centre Number	Candidate Number
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## Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Time 1 hour 30 minutes

Paper  
reference

**1MA1/2F**

### Mathematics

#### PAPER 2 (Calculator)

#### Foundation Tier

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may be used.**
- If your calculator does not have a  $\pi$  button, take the value of  $\pi$  to be 3.142 unless the question instructs otherwise.



### Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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1 Write 31% as a fraction.

% is same as fraction with 100 on denominator  $\frac{31}{100}$  (1)

(Total for Question 1 is 1 mark)

2 Change 3 metres into centimetres.

1m = 100cm  
 $\times 3 \downarrow$  3m = 300cm  $\downarrow \times 3$  300 (1) centimetres

(Total for Question 2 is 1 mark)

3 Write the following numbers in order of size.  
Start with the smallest number.

1.02    0.12    1.20    0.21

0.12, 0.21, 1.02, 1.20 (1)

(Total for Question 3 is 1 mark)

4 (a) Simplify  $m + m + m + m$

$(m + m + m + m) = 4m$   
collect 'like' terms

$4m$  (1)

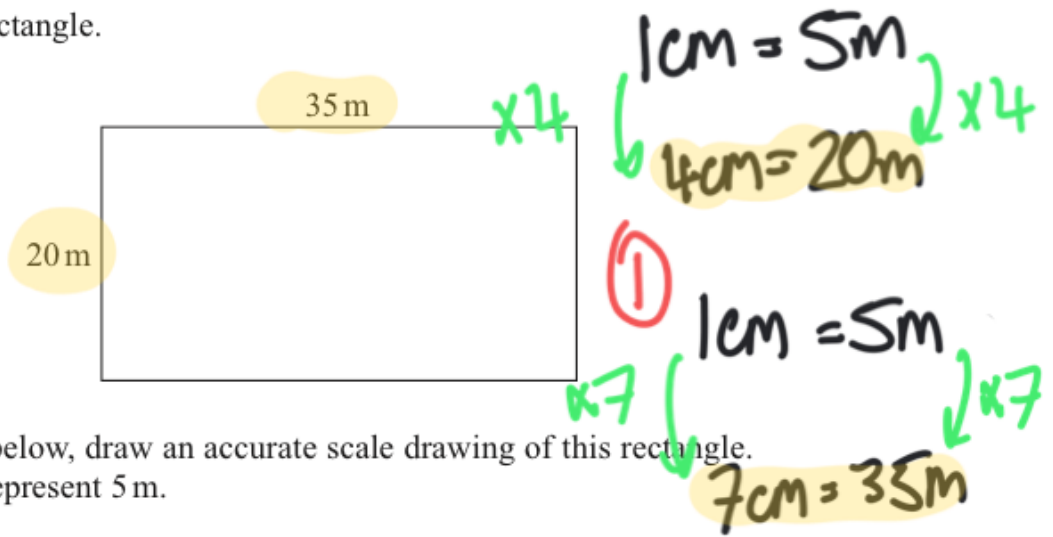
(b) Simplify  $12p \div 4$

$\frac{12p}{4} = \frac{3p}{1} = 3p$

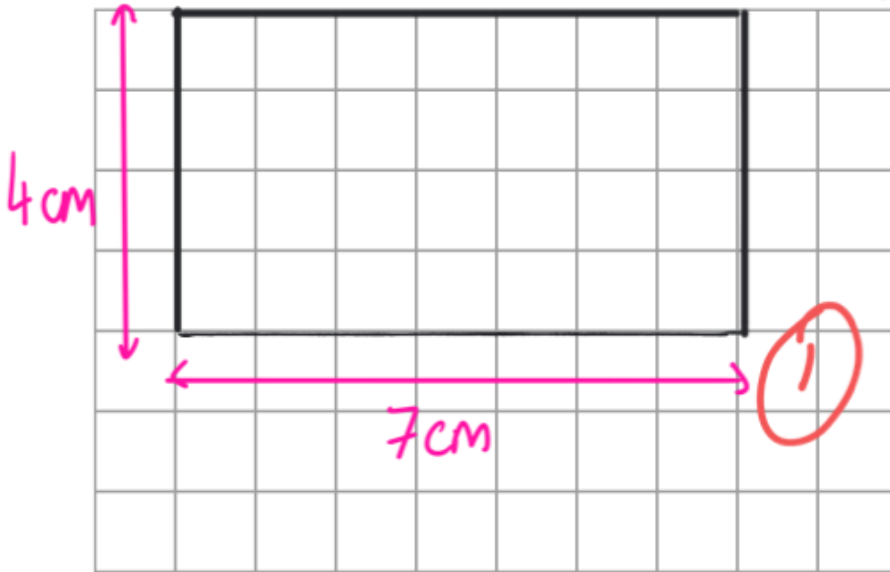
$3p$  (1)

(Total for Question 4 is 2 marks)

5 The diagram shows a rectangle.



On the centimetre grid below, draw an accurate scale drawing of this rectangle.  
Use a scale of 1 cm to represent 5 m.



(Total for Question 5 is 2 marks)

6 Here is a list of whole numbers from 21 to 30

21    22    23    24    25    26    27    28    29    30

$5 \times 5 = 5^2 = 25$

(a) From the list, write down a square number.

$\downarrow a \times a = a^2$

25 (1)

(1)

(b) From the list, write down a multiple of 8

$\downarrow$  Any number in 8 times table  $\nearrow$  8, 16, 24, 32...

24 (1)

(1)

(Total for Question 6 is 2 marks)

7 A baker has three bags of flour, A, B and C.

Bag A and bag B contain the same amount of flour.

Bag C contains 940 g of flour.

In the three bags, there is a total of 2500 g of flour.

Work out the amount of flour in bag A.

$$A = B$$

$$C = 940$$

$$A + B + C = 2500$$

$\downarrow$  Since  $C = 940$

$$A + B + 940 = 2500$$

$\downarrow$  Since  $A = B$

$$A + A + 940 = 2500$$

$$2A + 940 = 2500$$

$$2A = 1560 \quad (1)$$

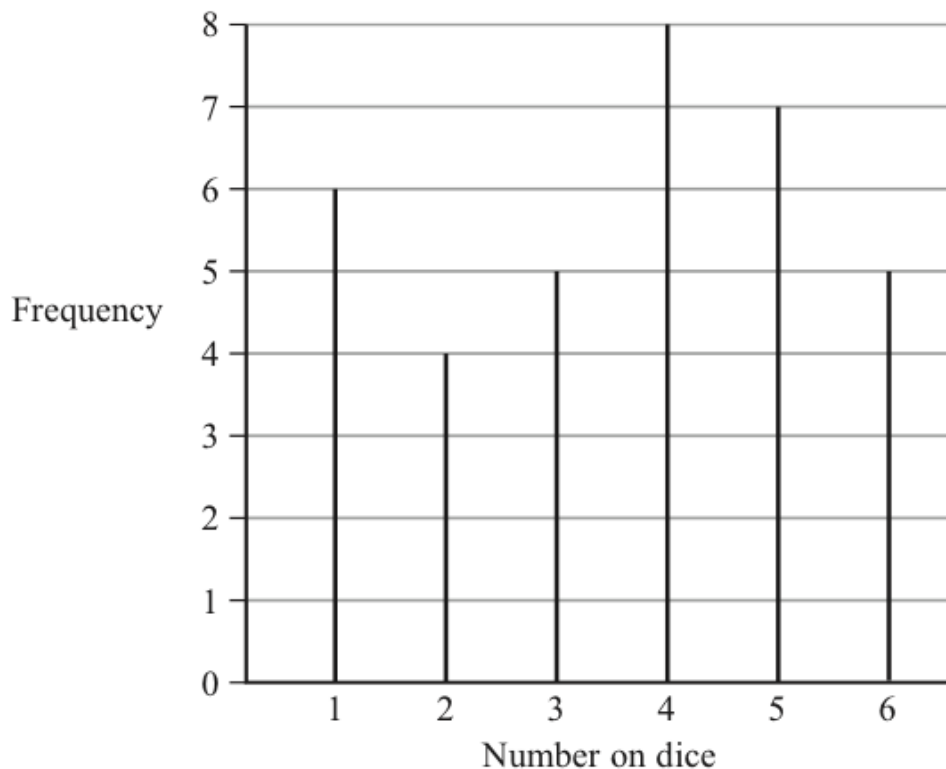
$$\div 2 \quad \downarrow \div 2 \quad A = 780$$

(1) 780 g

(Total for Question 7 is 3 marks)

- 8 5 students throw a dice.  
They each throw the dice the same number of times.

The diagram gives information about the number of times the dice lands on each number.



Work out how many times each student throws the dice.

Find out how many times the dice is rolled in total

$$\text{Total Roles} = 6 + 4 + 5 + 8 + 7 + 5 = 35 \text{ (1)}$$

Between 5 students dice rolled 35 times

$$\text{Each student rolls dice } \frac{35}{5} = 7 \text{ times}$$

Because each  
roll same number  
of times

7 times (1)

(Total for Question 8 is 3 marks)

9 Alec needs to work out the value of  $2 + 3 \times 4$

He writes

$$2 + 3 = 5 \text{ and } 5 \times 4 = 20, \text{ so } 2 + 3 \times 4 = 20$$

Alec is wrong.

Explain why.

Order of operations is wrong <sup>BIDMAS</sup>  $\rightarrow$  <sup>BODMAS</sup> ①

$2 + (3 \times 4) = 2 + 12 = 14$  which is what the answer should be

(Total for Question 9 is 1 mark)

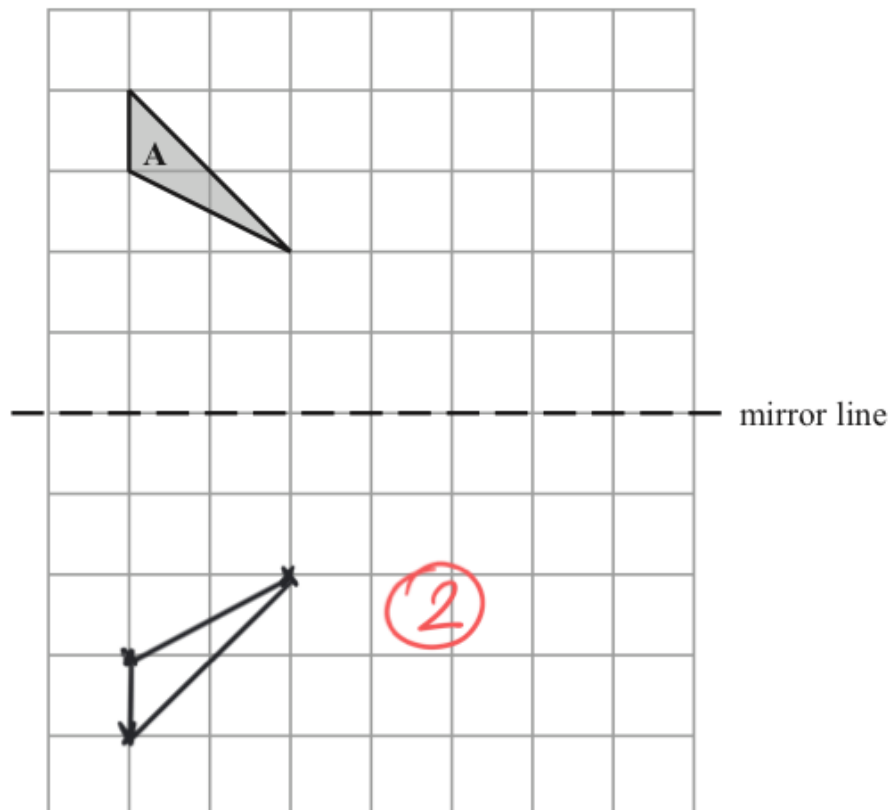
10 Write 17 as a fraction of 30

$$\frac{17}{30} \text{ ①}$$

$$\frac{17}{30}$$

(Total for Question 10 is 1 mark)

11 Reflect shape A in the mirror line.



(Total for Question 11 is 2 marks)

12 (a) Work out  $\sqrt{\frac{13.82}{4.06}}$

Write down all the figures on your calculator display.

②

1.844977205

(2)

(b) Give your answer to part (a) correct to 2 decimal places.

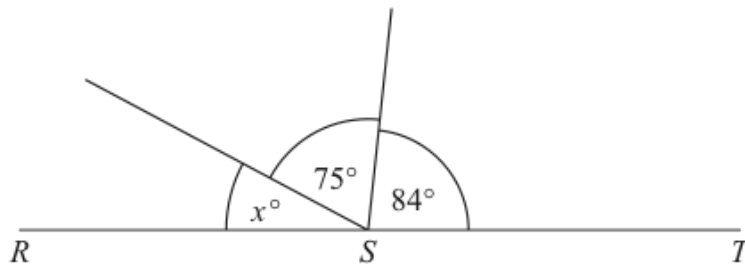
①

1.84

(1)

(Total for Question 12 is 3 marks)

13



$RST$  is a straight line.

(i) Work out the value of  $x$ .

Angles on a straight line add to  $180^\circ$

$$x + 75 + 84 = 180$$

$$\begin{array}{r} -75 \\ -75 \end{array}$$

$$\textcircled{1} \quad x + 84 = 105$$

$$\begin{array}{r} -84 \\ -84 \end{array}$$

$$x = 21$$

21 ①  
(2)

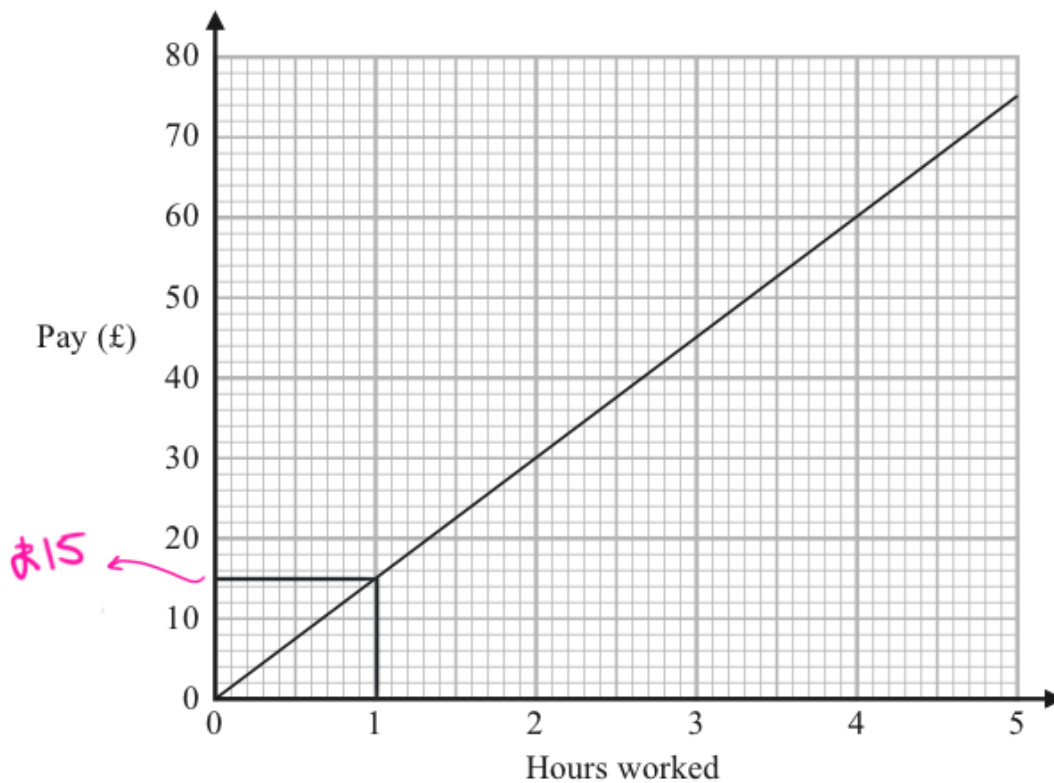
(ii) Give a reason for your answer.

Angles on a straight line add to  $180^\circ$  ①

(1)

(Total for Question 13 is 3 marks)

- 14 Nazima uses this graph to find out how much money she is paid for the number of hours she has worked.



- (a) How much money is Nazima paid for each hour she works?

work out how much she gets for one hour of work

£ 15 (1)

Last week Nazima worked for 36 hours.

- (b) How much money was Nazima paid?

1 hour of work = £15 (1)  
 $\left. \begin{array}{l} \downarrow \times 36 \\ \downarrow \times 36 \end{array} \right\}$   
 36 hours of work = £540

£ 540 (1)  
 (2)

(Total for Question 14 is 3 marks)



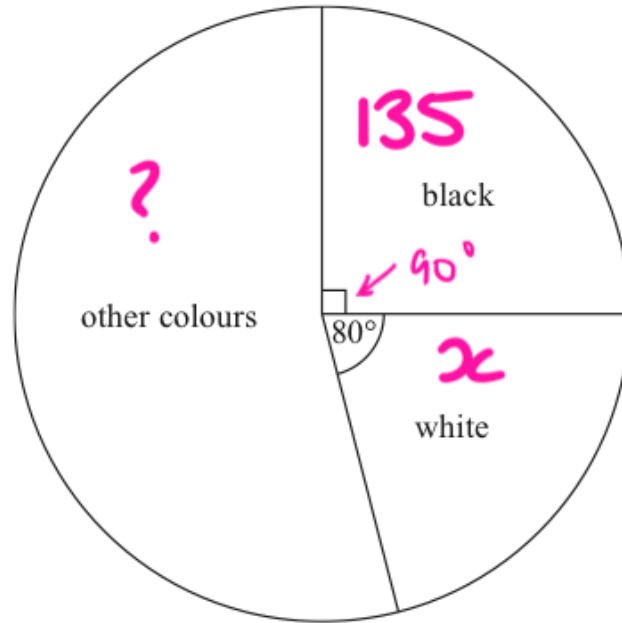
- 15 Write the following fractions in order of size.  
Start with the smallest fraction.

	$\frac{5}{8}$	$\frac{2}{3}$	$\frac{4}{9}$	$\frac{3}{5}$
	↓	↓	↓	↓
convert to decimals →	0.625	0.6	0.4	0.6 (1)
	↓ ×100	↓ ×100	↓ ×100	↓ ×100
Percentage to 1dp →	62.5%	66.7%	44.4%	60%
	(3)	(4)	(1)	(2)

$\frac{4}{9}, \frac{3}{5}, \frac{5}{8}, \frac{2}{3}$  (1)

(Total for Question 15 is 2 marks)

16 The pie chart gives information about the colour of each car in a car park.



There are 135 black cars in the car park.

(a) Work out the number of white cars in the car park.

$$\begin{array}{l}
 90^\circ = 135 \text{ cars} \\
 \div 90 \downarrow \quad \quad \quad \downarrow \div 90 \\
 1^\circ = 1.5 \text{ cars} \quad \textcircled{2} \\
 \times 80 \downarrow \quad \quad \quad \downarrow \times 80 \\
 80^\circ = 120 \text{ cars}
 \end{array}$$

$$\begin{array}{r}
 120 \text{ white cars} \quad \textcircled{1} \\
 \hline
 (3)
 \end{array}$$

There are 50 grey cars in the car park.

A car in the car park is picked at random.

(b) Find the probability that this car is grey.

From part a) 135 black cars, 120 white cars

From part b) 50 grey cars

$$\begin{array}{l}
 \text{Total cars} \rightarrow \text{from a) } 90^\circ = 135 \quad \text{so } 540 \text{ total cars} \quad \textcircled{1} \\
 \quad \quad \quad \times 4 \quad \downarrow \quad \quad \quad \downarrow \times 4 \\
 \quad \quad \quad 360^\circ = 540
 \end{array}$$

$$\text{Probability car is grey} = \frac{50}{540}$$

$$\begin{array}{r}
 50 \quad \textcircled{1} \\
 \hline
 540 \quad (2)
 \end{array}$$

(Total for Question 16 is 5 marks)

17 60 people are asked if they prefer to text or to email their friends.

38 of the people are women and the rest are men.

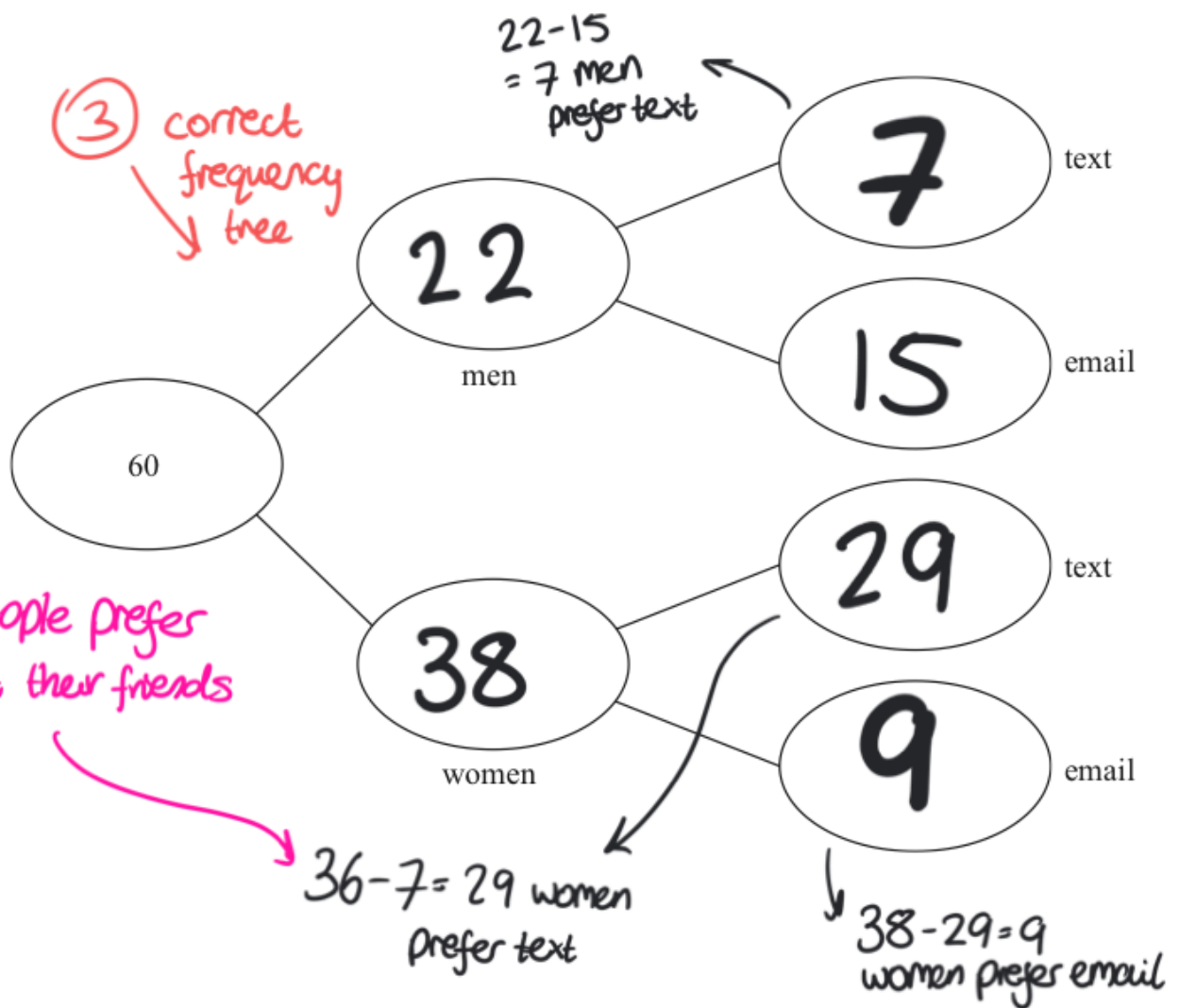
15 of the men prefer to email their friends.

60% of the people prefer to text their friends.

Complete the frequency tree for this information.

$60 - 38 = 22$  men ①

$60 \times 0.6 = 36$  people prefer to text their friends ①



(Total for Question 17 is 5 marks)

- 18 The incomplete table gives some information about the lengths of the planks of wood in Ben's workshop.

Length of plank (metres)	Number of planks	length $\times$ number Total length
3	5	$5 \times 3 = 15\text{m}$
2.5	8	$2.5 \times 8 = 20\text{m}$
2	$x$	$2x = 2xm$
1.5	14	$1.5 \times 14 = 21\text{m}$
1	10	$1 \times 10 = 10\text{m}$
		<u><math>66\text{m} + 2xm</math></u> (1)

add totals

The total length of these planks is 92 metres.

Work out the number of planks of length 2 metres in Ben's workshop.

$\downarrow x$

$$\begin{array}{r}
 66 + 2x = 92 \\
 -66 \quad -66 \\
 \hline
 2x = 26 \\
 \hline
 x = 13 \quad (1)
 \end{array}$$

(1)

13 2m planks

(Total for Question 18 is 3 marks)

19 Rachel, Samina and Tom share £600 between them.

Rachel gets  $\frac{2}{5}$  of the £600  $\rightarrow 600 \times \frac{2}{5} = \pounds 240$  (Rachel) STEP 1 ①

Samina gets  $\frac{1}{4}$  of the money that is left over.  $\rightarrow 600 - 240 = \pounds 360$  STEP 2 ①

Tom gets the rest of the money. STEP 3 ①  $360 \times \frac{1}{4} = \pounds 90$  (Samina)

Tom says,  $600 - 240 - 90 = \pounds 270$  (Tom)

"I would have got more money if we had shared the £600 equally between us."

Is Tom correct?

You must show how you get your answer.

STEP 4

If all shared equally Tom would get  $\frac{600}{3} = \pounds 200$

So Tom is **NOT** correct since  $\pounds 200 < \pounds 270$  ①

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(Total for Question 19 is 4 marks)

20 (a) Simplify  $c^5 \div c^2$   $\frac{x^a}{x^b} = x^{a-b}$

$$\frac{c^5}{c^2} = c^{5-2} = c^3$$

$$c^3 \text{ (1)}$$

(1)

(b) Simplify  $(d^4)^3$

$$(x^a)^b = x^{ab}$$

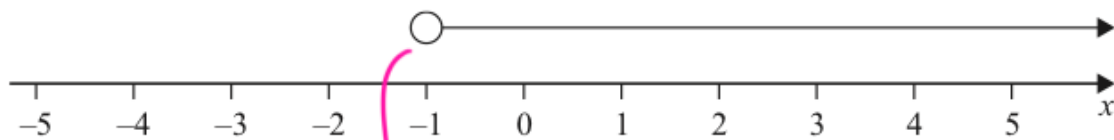
$$(d^4)^3 = d^{4 \times 3} = d^{12}$$

$$d^{12} \text{ (1)}$$

(1)

(Total for Question 20 is 2 marks)

21 (a) Write down the inequality shown on this number line.

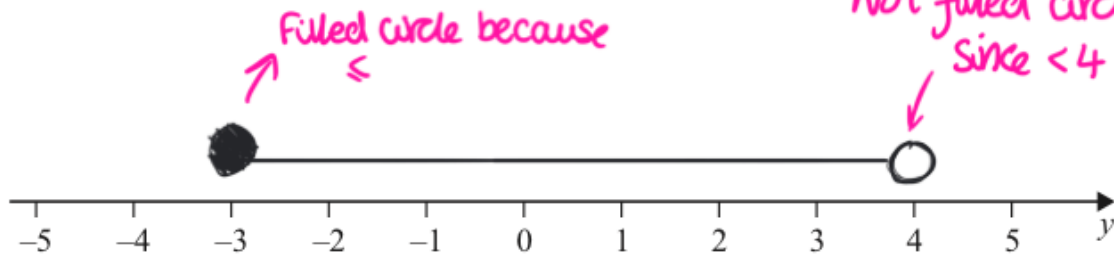


Circle not filled in means  $<$  or  $>$

$$x > -1 \text{ (1)}$$

(1)

(b) On the number line below, show the inequality  $-3 \leq y < 4$



Filled circle because  $\leq$

Not filled circle since  $< 4$

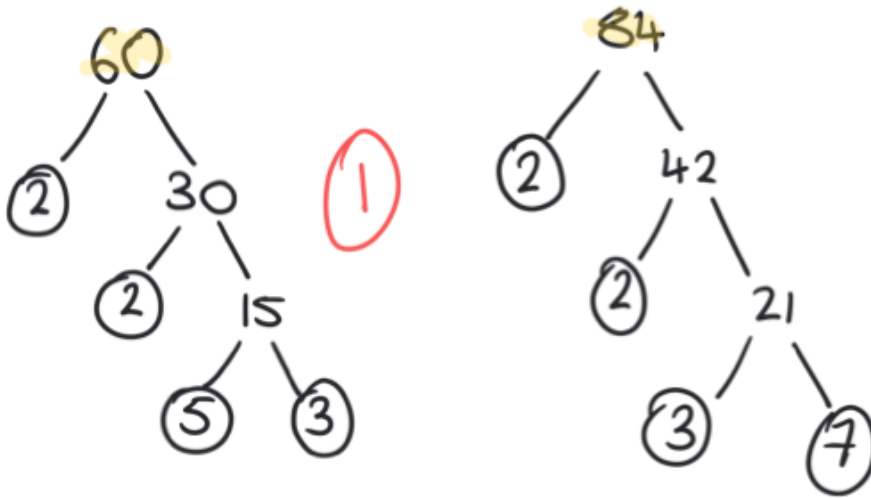
$$\text{(2)}$$

(2)

(Total for Question 21 is 3 marks)

22 (a) Find the Highest Common Factor (HCF) of 60 and 84

Make factor tree for 60 and 84



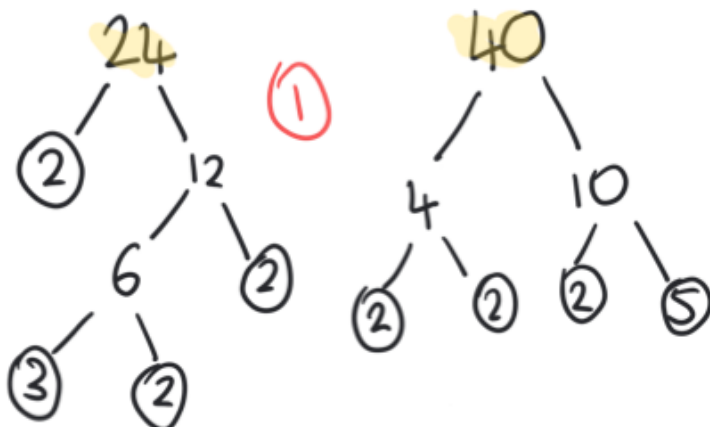
$60 = 3 \times 5 \times 2 \times 2$   
 $84 = 7 \times 3 \times 2 \times 2$   
 $HCF(60, 84) = 2 \times 2 \times 3 = 12$

← Look for common numbers between both

12 (1)  
.....  
(2)

(b) Find the Lowest Common Multiple (LCM) of 24 and 40

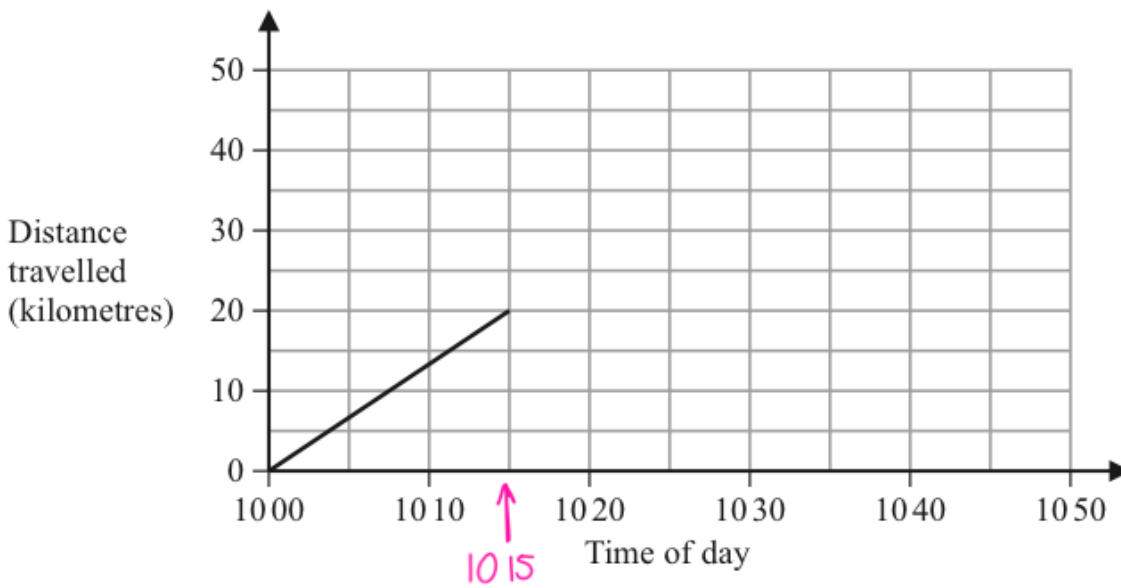
Make factor trees for 24 and 40



$24 = 2 \times 2 \times 2 \times 3$   
 $40 = 2 \times 2 \times 2 \times 5$   
 $HCF(40, 24) = 2 \times 2 \times 2 = 8$   
 $LCM(40, 24) = 8 \times 3 \times 5 = 120$

(1) 120  
.....  
(2)

- 23 Sam drives his car on a journey.  
Here is the travel graph for the first 15 minutes of his journey.



- (a) Work out Sam's speed, in km/h, for the first 15 minutes of his journey.

We have a distance time graph

find gradient of line to work out speed

gradient line =  $\frac{\text{change in } y}{\text{change in } x}$

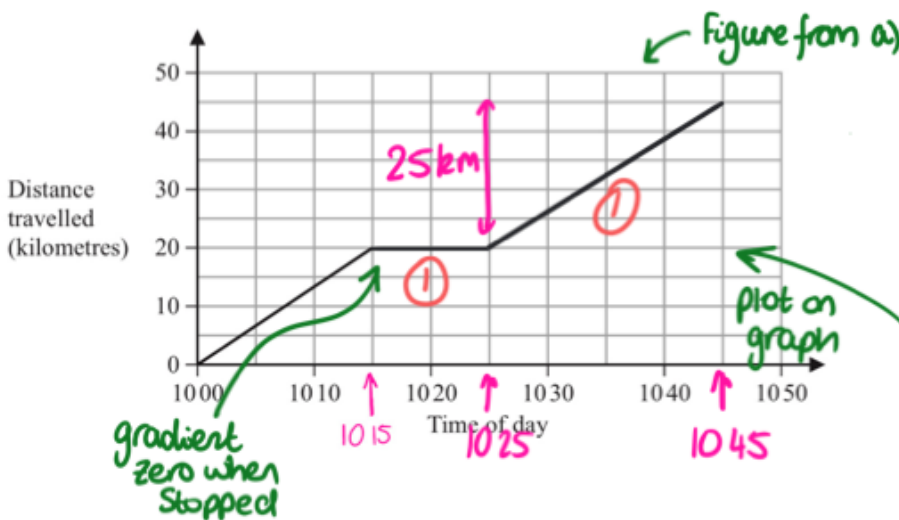
$$\textcircled{1} = \frac{20 - 0 \text{ km}}{15 \text{ minutes}} = \frac{20}{15} \text{ km/minutes}$$

x60

$$\frac{20}{15} \times 60 = 80 \text{ km/h} \textcircled{1} \textcircled{2}$$

At 1015 Sam stops for 10 minutes and then drives for 20 minutes at a speed of 75 km/h.

- (b) On the grid, complete the travel graph for Sam's journey.



distance = speed x time  
convert 20 minutes to hours  
 $20 \text{ minutes} = \frac{20}{60} = \frac{1}{3} \text{ hours}$

$$\text{distance} = 75 \times \frac{1}{3} = 25 \text{ km} \textcircled{1} \textcircled{3}$$

(Total for Question 23 is 5 marks)



24 (a) Complete the table of values for  $y = x^2 - 2x + 2$

$$y = (4)^2 - 2(4) + 2 = 10$$

x	-2	-1	0	1	2	3	4
y	10	5	2	1	2	5	10

$$y = (-2)^2 - 2(-2) + 2 = 10$$

$$y = (-1)^2 - 2(-1) + 2 = 5$$

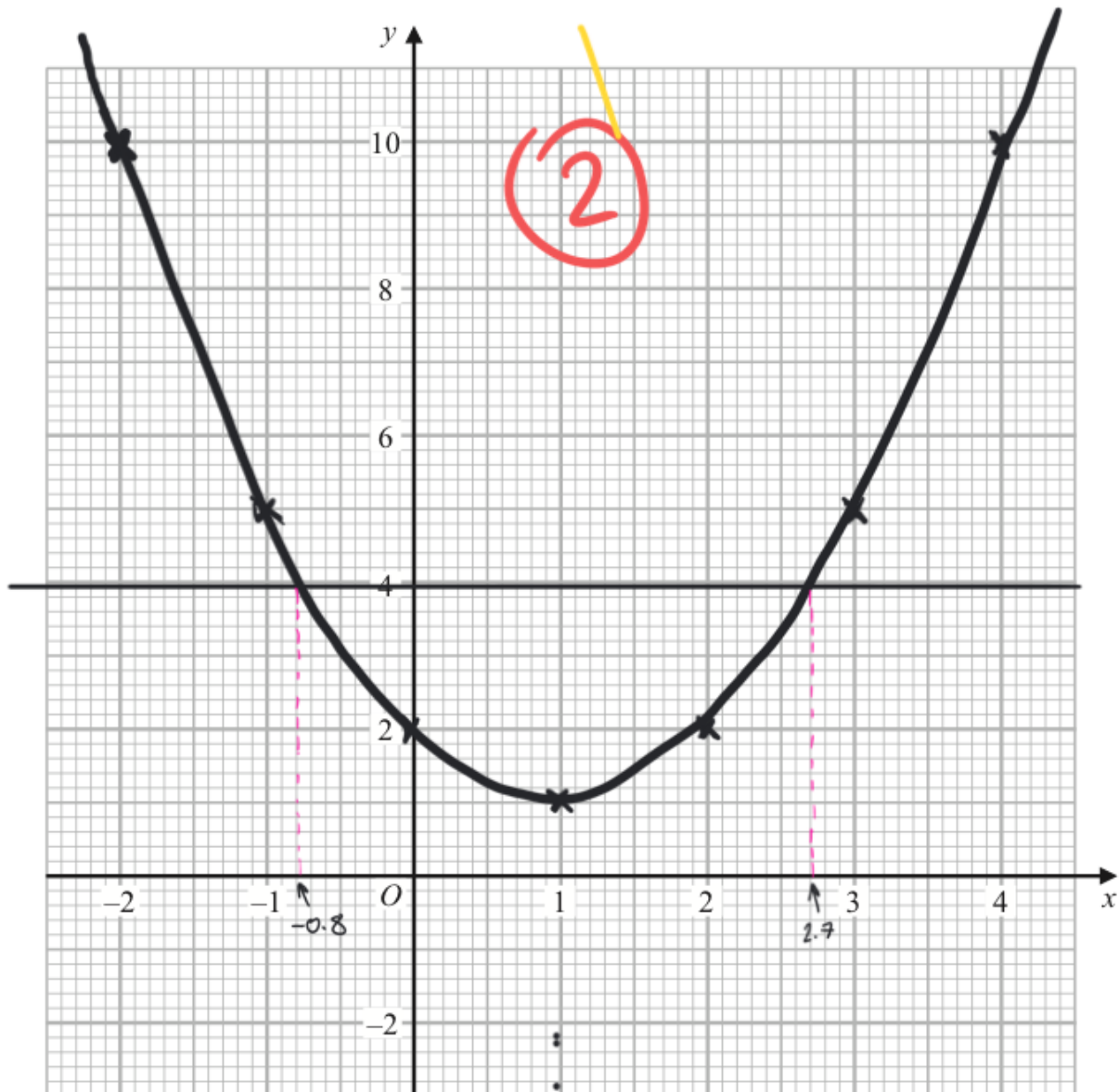
$$y = (1)^2 - 2(1) + 2 = 1$$

$$y = (2)^2 - 2(2) + 2 = 2$$

(2)

(b) On the grid, draw the graph of  $y = x^2 - 2x + 2$  for values of  $x$  from  $-2$  to  $4$

(2)



(c) Use your graph to find estimates of the solutions of the equation  $x^2 - 2x + 2 = 4$

$$y = x^2 - 2x + 2$$

$$y = 4$$

Plot  $y = 4$  and see where it intersects  $y = x^2 - 2x + 2$

$$x = -0.8 \quad x = 2.7$$

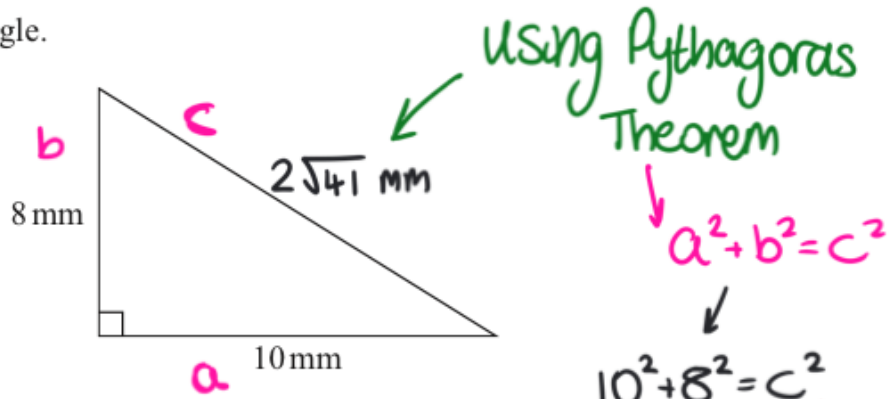
(1)

(1)

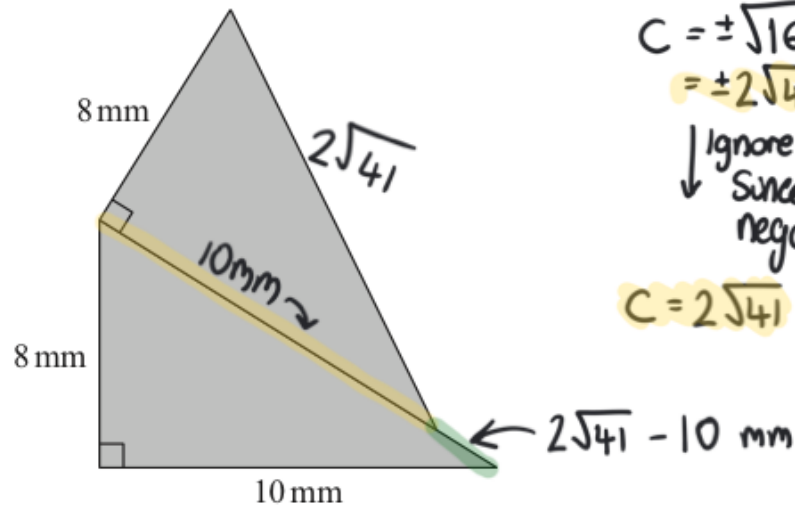
(2)

(Total for Question 24 is 6 marks)

25 Here is a right-angled triangle.



The shaded shape below is made from two of these triangles.



Using Pythagoras Theorem

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

$$10^2 + 8^2 = c^2$$

$$c^2 = 164 \text{ (1)}$$

$$c = \pm \sqrt{164}$$

$$= \pm 2\sqrt{41}$$

Ignore negative  
Since cannot have negative length

$$c = 2\sqrt{41} \text{ (1)}$$

Work out the perimeter of the shaded shape.

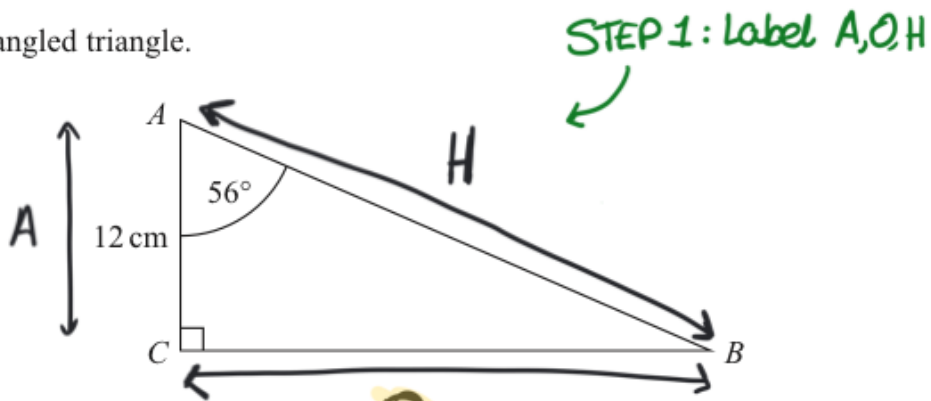
Give your answer correct to 3 significant figures.

$$\text{Perimeter} = 10 + 8 + 8 + 2\sqrt{41} + (2\sqrt{41} - 10) = 41.61249\dots = 41.6 \text{ mm (3sf)}$$

..... 41.6 ..... mm

(Total for Question 25 is 4 marks)

26  $ABC$  is a right-angled triangle.



- (a) Work out the length of  $BC$ .  
Give your answer correct to 1 decimal place.

~~SOHCAHTOA~~  
SOHCAHTOA

$$\tan \theta = \frac{O}{A} \text{ so } \tan(56^\circ) = \frac{BC}{12}$$

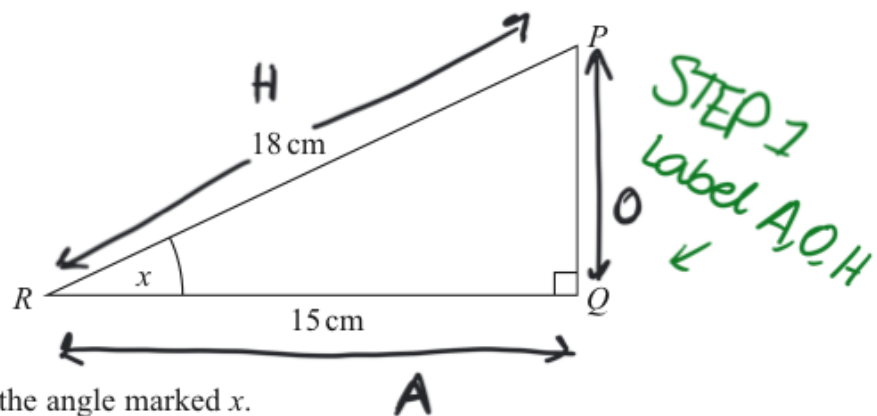
$$12 \tan(56^\circ) = BC \quad (1)$$

$$BC = 17.79073... \\ = 17.8 \text{ (1dp) cm}$$

(1)

17.8 cm  
(2)

$PQR$  is a right-angled triangle.



- (b) Work out the size of the angle marked  $x$ .  
Give your answer correct to 1 decimal place.

SOHCAHTOA

$$\cos \theta = \frac{A}{H} \text{ so } \cos(x) = \frac{15}{18} \quad \text{STEP 2}$$

$$x = \cos^{-1}\left(\frac{15}{18}\right) \\ = 33.5573... \quad (1) \\ = 33.6^\circ \text{ (1dp)}$$

(1)

33.6 °  
(2)

(Total for Question 26 is 4 marks)

27 Solve  $x^2 - 7x - 18 = 0$

Method using factorisation  
Find pair of numbers that add to  $-7$  and multiply to  $-18$

$$(x-9)(x+2) = 0$$
$$x-9=0 \quad x+2=0$$
$$x=9 \quad x=-2$$

-18	1	x
18	-1	x
9	-2	
-9	2	

$9 \times -2 = -18 \checkmark$   
 $9 + -2 = 9 - 2 = 7 \times$

$-9 \times 2 = -18 \checkmark$   
 $-9 + 2 = -7 \checkmark$

$x=9 \quad x=-2$

(Total for Question 27 is 3 marks)

28 In a sale, the normal price of a boat is reduced by 15%  
The sale price of the boat is £272 000

Work out the normal price of the boat.

$$x \times 0.85 = 272000$$

normal (original) price

$1 - 0.15 = 0.85$   
Multiplying by 0.85  
Same as 'reduce by 15%'

$$\frac{0.85x = 272000}{\cancel{0.85} \quad 0.85}$$
$$x = 320000$$

£ 320 000

(Total for Question 28 is 2 marks)