OCR
Oxford Cambridge and RSA

F

GCSE (9–1) Mathematics

J560/02 Paper 2 (Foundation Tier)

Thursday 7 June 2018 – Morning

Time allowed: 1 hour 30 minutes

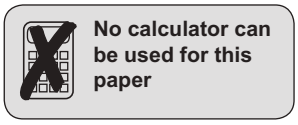
You may use:
- geometrical instruments
- tracing paper

Do not use:
- a calculator

First name										
Last name										
Centre number						Candidate number				

INSTRUCTIONS
- Use black ink. You may use an HB pencil for graphs and diagrams.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Read each question carefully before you start to write your answer.
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided. Additional paper may be used if required but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the barcodes.

INFORMATION
- The total mark for this paper is **100**.
- The marks for each question are shown in brackets **[ ]**.
- This document consists of **20** pages.



Answer **all** the questions.

1 **(a)** Write down a multiple of 6 between 10 and 20.

6 12 18 24 ...

(a) ..... 12 ..... **[1]**

(b) Write down two factors of 30 that are prime numbers.

30

1	30
2	15
3	10
5	6

(b) ..... 2 ..... and ..... 3 ..... **[2]**

2 **(a)** Write these fractions as decimals.

(i) $\frac{9}{10}$ $9 \div 10 = 0.9$

(a)(i) ..... 0.9 ..... **[1]**

(ii) $\frac{3}{4}$ $3 \div 4$

$$4\overline{)3.^{3}0^{2}0} \quad 0.75$$

(ii) ..... 0.75 ..... **[1]**

(b) A plank of wood 2.4 m long is cut into 6 pieces of equal length.

How long is each piece?

$2.4\text{m} \div 6$

$$6\overline{)2.^{2}4} \quad 0.4$$

(b) ..... 0.4 ..... m **[2]**

3 **(a)** Work out.

(i) 10^3

10 x 10 x 10

(a)(i) 1000 **[2]**

(ii) $9(8 - 3 \times 2)$

9(8 - 6)

9(2)

(ii) 18 **[2]**

(b) Put brackets into this sum so that the answer is correct.

$1 + 2 \times 3 + 5 = 17$ **[1]**

1 + 2 x 8

1 + 16 = 17

4 **(a)** Simplify.

(i) $5x - 6y - x + 3y$

$4x - 3y$

(a)(i) ..... $4x-3y$ ..... **[2]**

(ii) $w^8 \div w^2$

w^{8-2}

(ii) ..... w^6 ..... **[1]**

(iii) $5c^2d \times 3c$

$5 \times 3 = 15$

$c^2 \times c^1 = c^{2+1} = c^3$

$15 \times c^3 \times d$

(iii) ..... $15c^3d$ ..... **[1]**

(b) Work out the value of

(i) $4x - 7$ when $x = 5$,

$4(5) - 7$

$20 - 7$

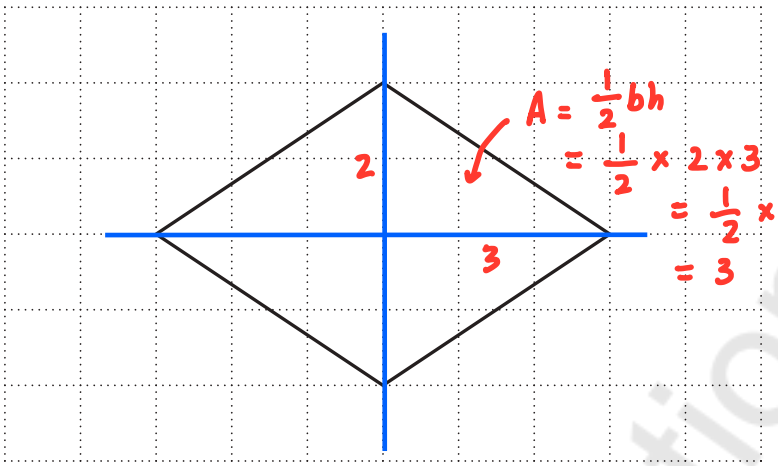
(b)(i) ..... 13 ..... **[1]**

(ii) $\frac{p+7}{3}$ when $p = 2$.

$\frac{2+7}{3} = \frac{9}{3}$

(ii) ..... 3 ..... **[1]**

5 A shape is drawn on a one-centimetre grid.



(a) Ring the mathematical name of the shape.

Pentagon (5 sides) Square Octagon (8 sides) (Rhombus) **[1]**

(b) How many lines of symmetry does the shape have?

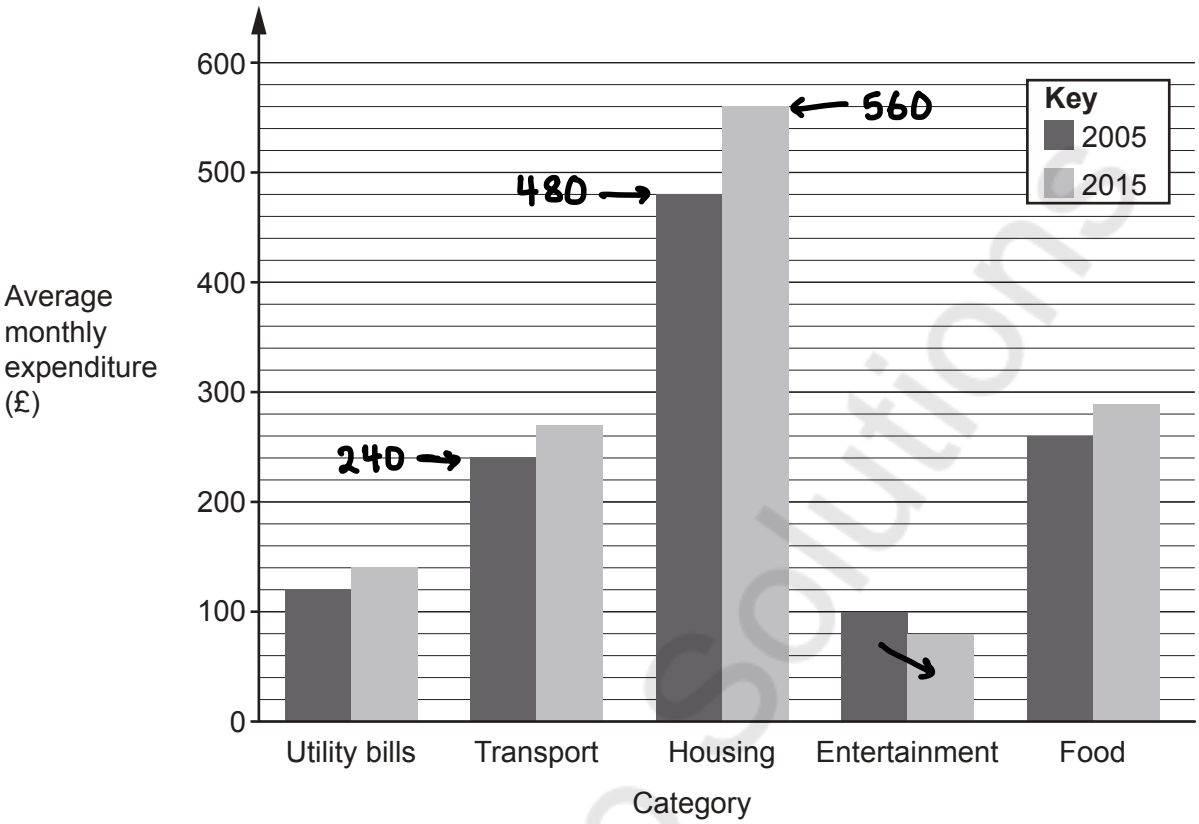
(b) 2 **[1]**

(c) Work out the area of the shape.

4 x 3 = 12

(c) 12 cm^2 **[2]**

6 This bar chart shows the average monthly expenditure, by category, of households in a particular town in 2005 and 2015.



(a) In which category was there a decrease in the average monthly expenditure between 2005 and 2015?

(a) ..... Entertainment ..... **[1]**

(b) How much more was the average monthly expenditure on housing in 2015 than in 2005?

$$\begin{array}{r} {}^{4}\cancel{5}^{1}60 \\ -\ 480 \\ \hline 080 \end{array}$$

(b) £ ..... 80 ..... **[2]**

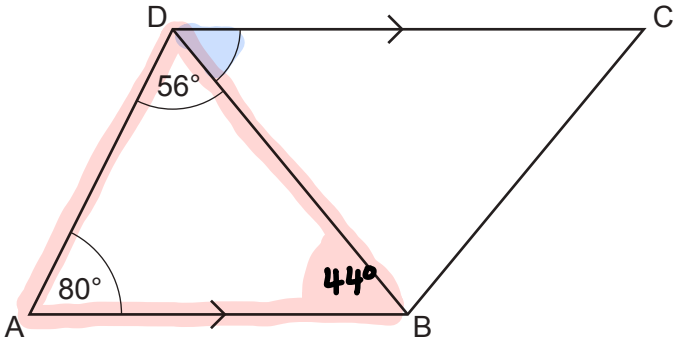
(c) The total average monthly expenditure in 2005 was £1200.

What percentage of this was spent on transport?

$$\frac{240}{1200} \quad \begin{matrix} \div 12 \\ \div 12 \end{matrix} \quad \frac{2}{10} \quad \begin{matrix} \times 10 \\ = \\ \times 10 \end{matrix} \quad \frac{20}{100}$$

(c) ..... 20 ..... % **[3]**

7 In the diagram, AB is parallel to DC.



Not to scale

Work out angle BDC.
Give a reason for each angle you work out.

Angle ABD = 180 − (80 + 56)
= 180 − 136
= 44° Angles in a triangle sum to 180°

Angle BDC = 44° Alternate angles are equal.

..... 44 ° **[4]**

8 Liam is 0.83 metres tall.
William is 1.31 metres tall.
Jacob is taller than Liam by half the difference between Liam's height and William's height.

How tall is Jacob?

Difference

$$\begin{array}{r} {}^{0}\cancel{1}.{}^{12}\cancel{3}{}^{1}1 \\ -\ 0.83 \\ \hline 0.48\ \text{m} \end{array}$$

Half difference $0.48 \div 2 = 0.24\text{m}$

$$2\overline{)0.48} = 0.24$$

Jacob

$$\begin{array}{r} {}^{1}0.83 \\ +\ 0.24 \\ \hline 1.07 \end{array}$$

1.07 ..... m **[3]**

9 **(a)** Elise wants to divide a sum of money between Hannah and Adil in the ratio 2 : 3.

Elise says:

Total 5 parts

Hannah will get $\frac{2}{3}$ of the money.

Explain why Elise is not correct.

It should be $\frac{2}{5}$

..... **[1]**

(b) George has a different sum of money.
He divides the money between Siobhan and Iwan.

Iwan receives $\frac{11}{17}$ of the money.

Write the ratio of the money that Siobhan receives to the money that Iwan receives.

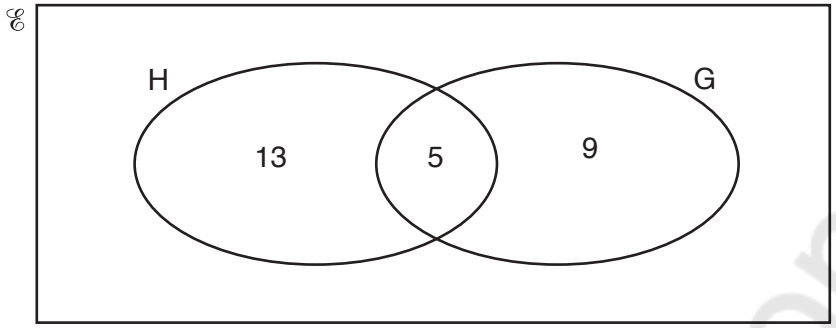
17 parts total

Iwan = 11

Siobhan = 17 − 11
= 6

(b) 6 : 11 **[1]**

10 **(a)** This Venn diagram shows the number of students in a Year 10 tutor group who study History (H) and Geography (G).



There are 29 students in the tutor group.

(i) How many students in the tutor group do not study History or Geography?

13 + 5 + 9 = 27

29 - 27 = 2

(a)(i) ..... 2 ..... **[2]**

(ii) How many students in the tutor group study History?

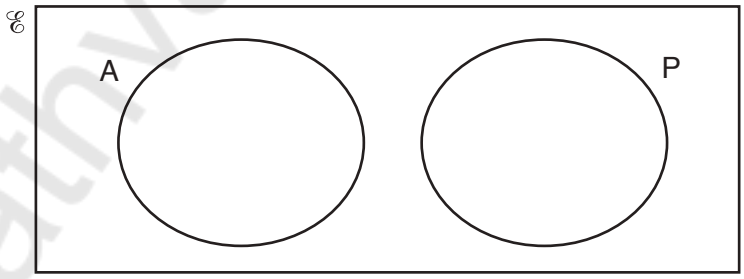
13 + 5

(ii) ..... 18 ..... **[1]**

(iii) One of the 29 students is selected at random.
What is the probability that they study Geography but do not study History?

(iii) ..... $\frac{9}{29}$ ..... **[1]**

(b) This diagram represents students in a tutor group who study Art (A) and Physics (P).



How many students study both Art and Physics?

(b) ..... 0 ..... **[1]**

11 **(a)** Liu has a bag only containing red grapes and green grapes.

$\frac{4}{9}$ of the grapes are red.

If there are 8 red grapes in the bag, how many grapes are green?

$\frac{4}{9} \equiv 8$

$\div 4 \qquad \div 4$

$\frac{1}{9} \equiv 2$

$\times 9 \qquad \times 9$

$\frac{9}{9} \equiv 18$

Green = 18 − 8
= 10

(a) ..... 10 ..... **[3]**

(b) Sophia has a different bag only containing red grapes and green grapes.

The number of grapes in her bag is different, but $\frac{4}{9}$ of the grapes are also red.

She picks out a red grape from her bag and eats it. $\frac{5}{9}$ = green

$\frac{3}{7}$ of the remaining grapes in her bag are red. $\frac{4}{7}$ = green

How many of the remaining grapes in her bag are red and how many are green?

R : G
4 : 5
× 4
16 : 20

R : G
3 : 4
× 5
15 : 20

(b) ..... 15 ..... red grapes

..... 20 ..... green grapes **[2]**

12 **(a)** Multiply out.

$4c(d - 5)$

$4cd - 20c$

(a) $4cd - 20c$ **[2]**

(b) Multiply out and simplify.

$(3x + 2)(x - 4)$

$3x^2 - 12x + 2x - 8$

$3x^2 - 10x - 8$

(b) $3x^2 - 10x - 8$ **[2]**

(c) Solve.

$3x - 2 \leqslant 22$

$+2 \quad +2$

$3x \leq 24$

$\div 3 \qquad \div 3$

$x \leq 8$

(c) $x \leq 8$ **[2]**

13 **(a)** Calculate.

$$\frac{3}{5} + \frac{5}{8}$$

Give your answer as a mixed number in its simplest form.

$\frac{3}{5} \times \frac{8}{8} = \frac{24}{40}$

$\frac{5}{8} \times \frac{5}{5} = \frac{25}{40}$

$\frac{24}{40} + \frac{25}{40} = \frac{49}{40}$

$= 1\frac{9}{40}$

$1\frac{9}{40}$

(a) ..... **[3]**

(b) Work out.

$$5 \times 10^4 - 1.6 \times 10^3$$

0.16×10^4 (÷10, +1)

Give your answer in standard form.

$5 \times 10^4 - 0.16 \times 10^4$

4.84

5.00

$- 0.16$

4.84

4.84×10^4

(b) ..... **[3]**

14 Here is the nutritional information for a 110 g serving of cereal.

Carbohydrates	99.4 g
Proteins	9.5 g
Fats	1.1 g

Emily says that more than 90% of this serving is carbohydrates.

Is she correct?
Explain your reasoning.

100% = 110g

÷10 ÷10

10% = 11g

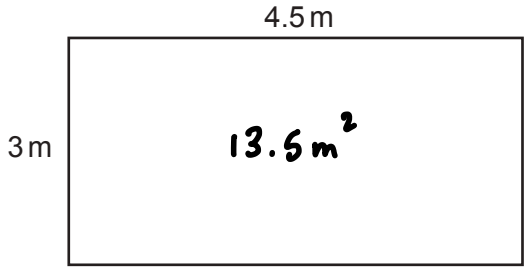
×9 ×9

90% = 99g

Yes. 99.4g is greater than 99g.

..... **[3]**

15 Here is the floor plan of a rectangular room.



Not to scale

Tim buys carpet tiles for this room.

Each tile is a square measuring 50 cm by 50 cm.
The tiles are only sold in packs of ten.
Each pack costs £20.
Tim pays for fitting at a rate of £7.50 per square metre, with any fraction of a square metre rounded up.

Work out the **total** cost of the tiles and fitting.

Area of room = l x w
= 3 x 4.5

$$\begin{array}{r} {}^{1}4.5 \\ \times\ 3 \\ \hline 13.5\ m^2 \end{array}$$

Area of tile = l x w

cm $\xrightarrow{\div 100}$ m

50 ÷ 100 = 0.5

Area = 0.5 x 0.5 = 0.25m²
(×10 ↓ ×10 ↓)
5 x 5 = 25
(÷100 ↓)
0.25 m²

Number of tiles : 13.5 ÷ 0.25 = 54
(×100 ×100)
1350 ÷ 25 = 54

$$25\overline{)1350} = 54$$

Number of packs = 54 ÷ 10
= 5.4
≈ 6 packs

Cost of packs = 6 x £20
= £120

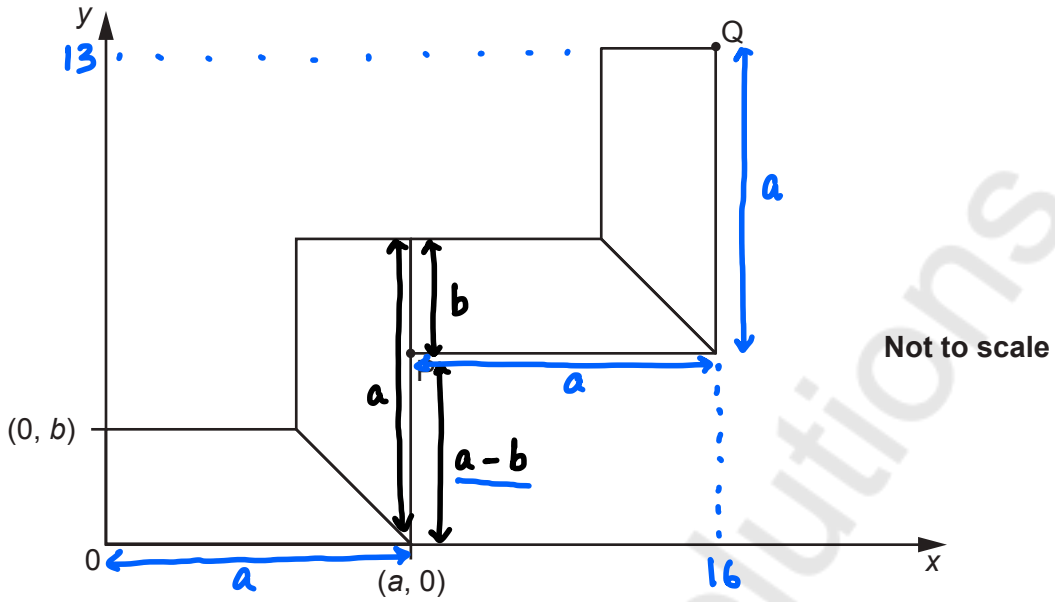
Fitting Rate
13.5m² ≈ 14m²
£7.50 x 14

$$\begin{array}{r} {}^{2}7.50 \\ \times\ 14 \\ \hline 30.00 \\ 75.00 \\ \hline 105.00 \end{array}$$

Total cost = $\begin{array}{r} {}^{1}20 \\ +\ 105 \\ \hline £225 \end{array}$

£ 225 [6]

16 Four identical trapeziums are placed on a coordinate grid as shown.



(a) Write down algebraic expressions for the coordinates of point P.

(a) (..... a ..... , ... a − b .....) **[2]**

(b) The coordinates of point Q are (16, 13).

Work out the value of a and the value of b.

$2a = 16$

$\div 2 \qquad \div 2$

$a = 8$

$a - b + a = 13$

$2a - b = 13$

$2(8) - b = 13$

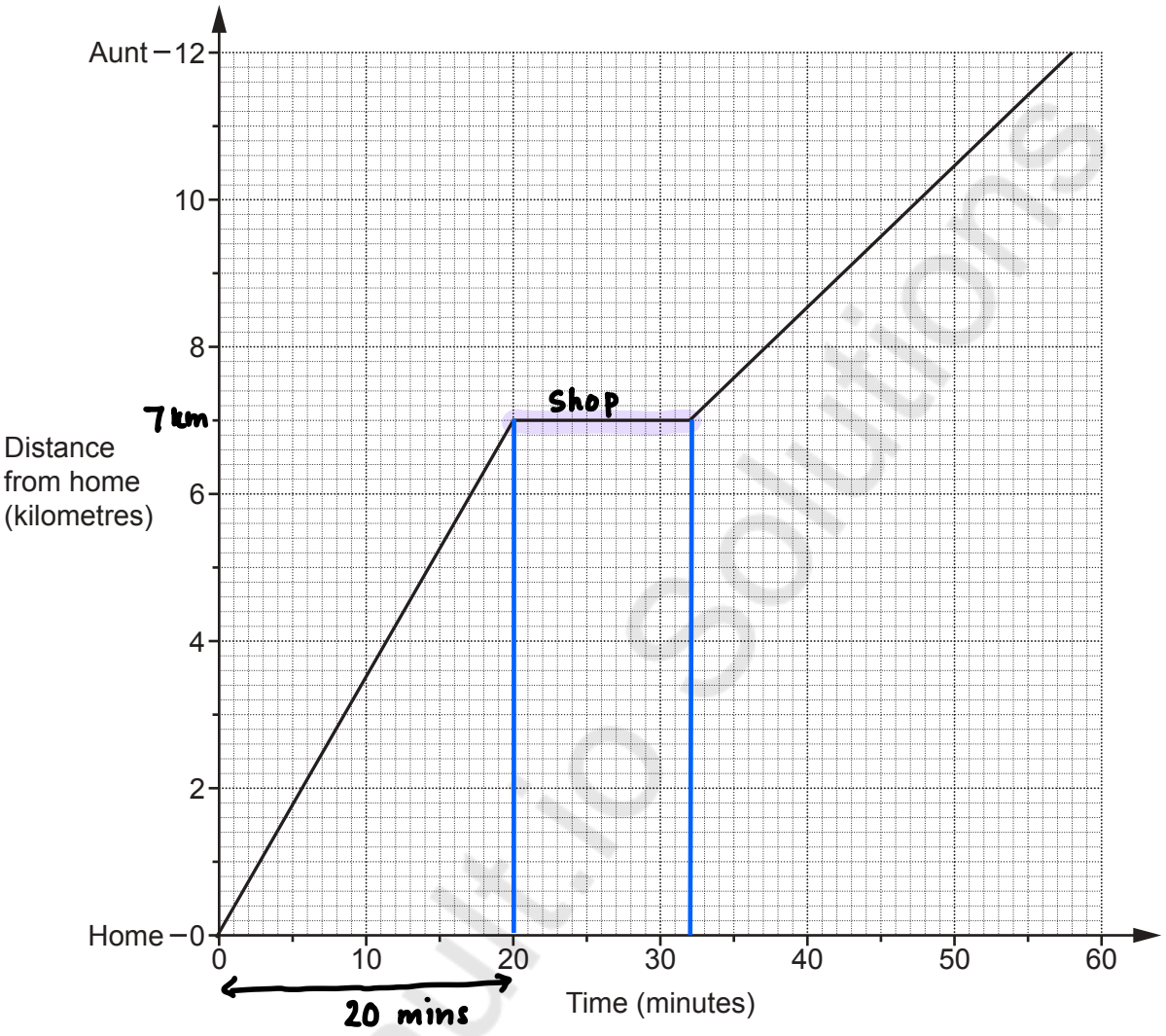
$16 - b = 13$

$b = 3$

(b) a = ... 8 .....

b = ... 3 ..... **[4]**

17 Viraj cycled from his home to visit his aunt.
He drew this graph to show his journey.
He stopped at a shop 7 km from his home.



(a) State one assumption that Viraj made when he drew his graph.

He travelled at a constant speed.

.....

.....

[1]

(b) For how long did Viraj stop at the shop?

32 - 20

(b) 12 minutes **[1]**

(c) Work out Viraj's average speed between his home and the shop.
Give your answer in metres per minute.

D
S T

$S = \frac{D}{T}$

$D = 7\text{km} \times 1000 = 7000\text{m}$

$T = 20\text{ mins}$

$S = \frac{7000\text{m}}{20\text{mins}}$

$= 350$

(c) ..... 350 ..... metres per minute **[3]**

(d) How can you tell, without doing any calculations, that Viraj's average speed between his home and the shop is greater than his average speed between the shop and his aunt?

..... Graph is steeper on the first part of the journey. .....

..... **[1]**

18 The table shows the relative frequencies of the results for a football team after a number of games.

Result of game	won	lost	drew
Relative frequency	0.2	0.45	0.35

$= 1$

(a) Complete the table. **[2]**

$0.2 + 0.45 = 0.65$

$1.00 - 0.65 = 0.35$

(b) The team lost 10 more games than they won.

How many games did the team play altogether?

$0.45 - 0.20 = 0.25$

$10 \div 0.25$

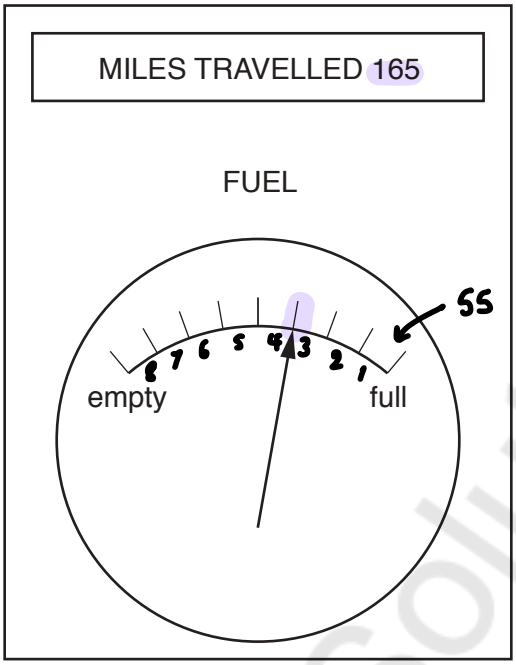
$10 \div \frac{1}{4}$

$10 \times \frac{4}{1}$

10×4

(b) ..... 40 ..... **[3]**

19 Ifsaw noticed this information on her car's dashboard at the end of her journey.
She started her journey with a full tank of fuel and her miles travelled set to zero.



(a) Work out how far Ifsaw's car can travel on a full tank of fuel.

$$3 \overline{)16'5} = 55$$

$$55 \times 8 = 440$$

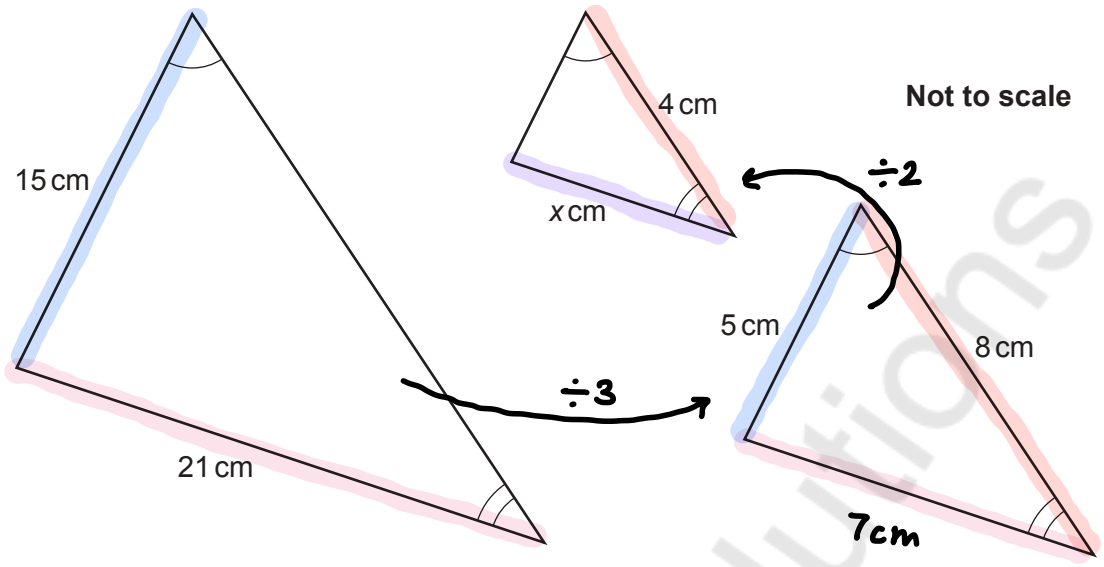
(a) ..... 440 ..... miles **[3]**

(b) What assumption have you made when answering part **(a)**?

..... Petrol consumption rate is constant. .....

..... **[1]**

20 **(a)** Here are three similar triangles.



Work out the value of x.

$15 \div 5 = 3$

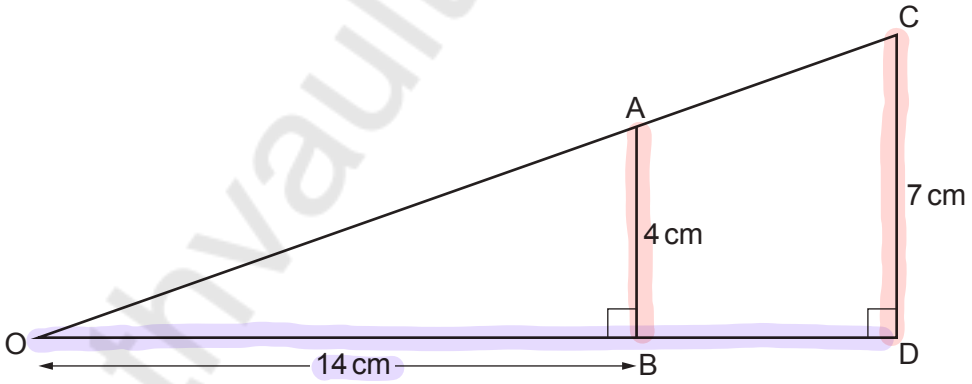
$21 \div 3 = 7$

$8 \div 4 = 2$

$7 \div 2 = 3.5$

(a) $x =$ 3.5 **[3]**

(b) The diagram shows two right-angled triangles, OAB and OCD.



Work out the length of BD.

$SF = \frac{7}{4}$

$OBD = 14 \times \frac{7}{4}$

$= \frac{98}{4} = 24.5\text{cm}$

$4 \overline{)98.20}$ → 24.5

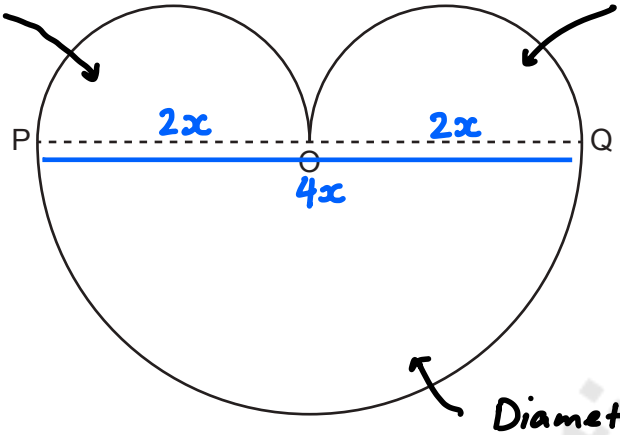
$BD = OBD - OB$

$= 24.5 - 14$

24.5
14.0
10.5

(b) 10.5 cm **[3]**

21 This shape consists of three semicircles.



Area = $\frac{\pi x^2}{2}$

Diameter = 2x
Radius = x
Area = $\frac{\pi r^2}{2}$
= $\frac{\pi x^2}{2}$

Diameter = PQ = 4x
Radius = 2x
Area = $\frac{\pi r^2}{2}$
= $\frac{\pi (2x)^2}{2}$
= $\frac{\pi 4x^2}{2}$
= $\pi 2x^2$
= $2\pi x^2$

OP = OQ.
The length of PQ is $4x$ cm.

Show that the area, in cm^2, of the whole shape is $3\pi x^2$. **[5]**

Area semi-circle = $\frac{\pi r^2}{2}$

Total area = $\frac{\pi x^2}{2} + \frac{\pi x^2}{2} + 2\pi x^2$

$= (3\pi x^2)\ cm^2$

END OF QUESTION PAPER