

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**  
**GCSE**

**B392/01**

**METHODS IN MATHEMATICS**

**Methods in Mathematics 2**

**(Foundation Tier)**

**THURSDAY 16 JUNE 2016: Afternoon**

**DURATION: 1 hour 30 minutes**  
**plus your additional time allowance**

**MODIFIED ENLARGED**

<b>Candidate forename</b>		<b>Candidate surname</b>	
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<b>Centre number</b>						<b>Candidate number</b>				
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**Candidates answer on the Question Paper.**

**OCR SUPPLIED MATERIALS:**

**None**

**OTHER MATERIALS REQUIRED:**

**Scientific or graphical calculator**

**Geometrical instruments**

**Tracing paper (optional)**

<p><b>YOU ARE PERMITTED TO USE A CALCULATOR FOR THIS PAPER</b></p>
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**READ INSTRUCTIONS OVERLEAF**



## **INSTRUCTIONS TO CANDIDATES**

**Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**

**Use black ink. HB pencil may be used for graphs and diagrams only.**

**Answer ALL the questions.**

**Read each question carefully. Make sure you know what you have to do before starting your answer.**

**Your answers should be supported with appropriate 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. If additional space is required, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.**

## **INFORMATION FOR CANDIDATES**

**The number of marks is given in brackets [ ] at the end of each question or part question.**

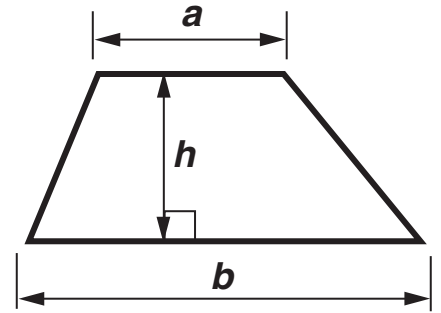
**Quality of written communication will be assessed in questions marked with an asterisk (\*).**

**The total number of marks for this paper is 90.**

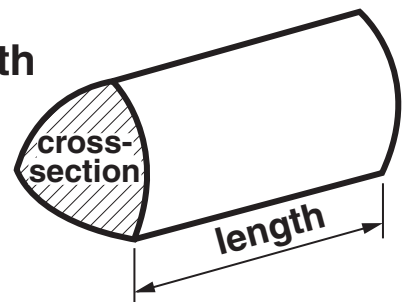
**Any blank pages are indicated.**

## FORMULAE SHEET: FOUNDATION TIER

**Area of trapezium =  $\frac{1}{2} (a + b)h$**

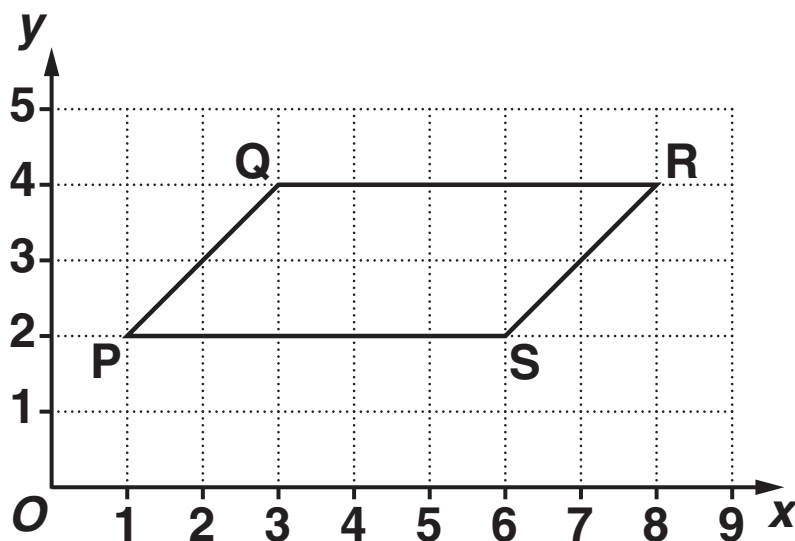


**Volume of prism = (area of cross-section) × length**



Answer ALL the questions.

1 Quadrilateral PQRS is drawn on a one-centimetre grid.



(a) What is the mathematical name for quadrilateral PQRS?

(a) \_\_\_\_\_ [1]

(b) Work out the area of quadrilateral PQRS.

(b) \_\_\_\_\_  $\text{cm}^2$  [2]

(c) Write down the coordinates of points P and R.

(c) P ( \_\_\_\_\_ , \_\_\_\_\_ ) [1]

R ( \_\_\_\_\_ , \_\_\_\_\_ ) [1]

**(d) Work out the coordinates of the midpoint of the diagonal PR.**

**(d) ( \_\_\_\_\_ , \_\_\_\_\_ ) [2]**

**2 Solve.**

**(a)  $x - 14 = 21$**

**(a) \_\_\_\_\_ [1]**

**(b)  $x + 57 = 120$**

**(b) \_\_\_\_\_ [1]**

**(c)  $5x = 80$**

**(c) \_\_\_\_\_ [1]**

**3 (a) Find the next three terms of each sequence.**

**(i) 26, 21, 16, 11, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_**  
**[2]**

**(ii) 2, 6, 18, 54, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_**  
**[2]**

**(b)\*These are the first five terms of another sequence.**

**3      14      25      36      47**

**Lucy says, ‘The 6<sup>th</sup> term of the sequence is 58 and so I just have to double 58 to find the 12<sup>th</sup> term.’**

**Show that Lucy is NOT correct.**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ **[2]**

**4 Work out.**

**(a)  $\frac{2}{3}$  of £342**

**(a) £ \_\_\_\_\_ [2]**

**(b) 25% of £64**

**(b) £ \_\_\_\_\_ [2]**

**(c) 40% of £280**

**(c) £ \_\_\_\_\_ [2]**

**5 Work out the value of these expressions when  $r = 3$ ,  $s = 5$  and  $t = -7$ .**

**(a)  $6r$**

**(a) \_\_\_\_\_ [1]**

**(b)  $r - t$**

**(b) \_\_\_\_\_ [1]**

**(c)  $s^3$**

**(c) \_\_\_\_\_ [1]**

**(d)  $r(s + t)$**

**(d) \_\_\_\_\_ [2]**

**6 A supermarket sells chicken pieces in different pack sizes.**

**Pack A has 3 pieces and pack B has 5 pieces.**

**Rob and Sai are planning a party and they need exactly 28 pieces of chicken.**

**(a) Rob suggests they buy one pack A and five pack Bs.**

**Sai suggests a different way to buy exactly 28 pieces of chicken.**

**Find the way Sai suggests.**

**(a) \_\_\_\_\_ pack A and \_\_\_\_\_ pack B [2]**

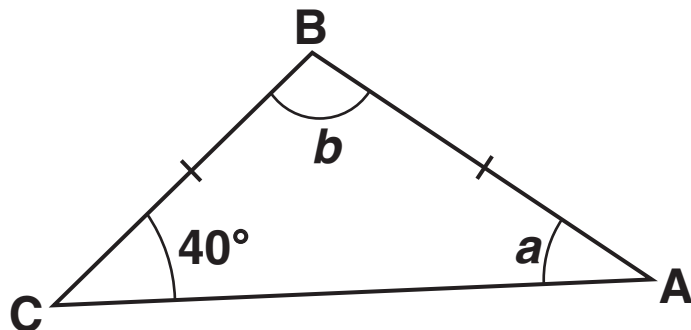
**(b) Pack A costs £1.45 and pack B costs £2.40.**

**Work out whose suggestion is cheaper and by how much.**

**(b) \_\_\_\_\_ suggestion is cheaper by \_\_\_\_\_ [4]**

- 7 (a) ABC is an isosceles triangle, with  $BC = BA$ .  
Angle  $BCA = 40^\circ$ .

NOT TO SCALE



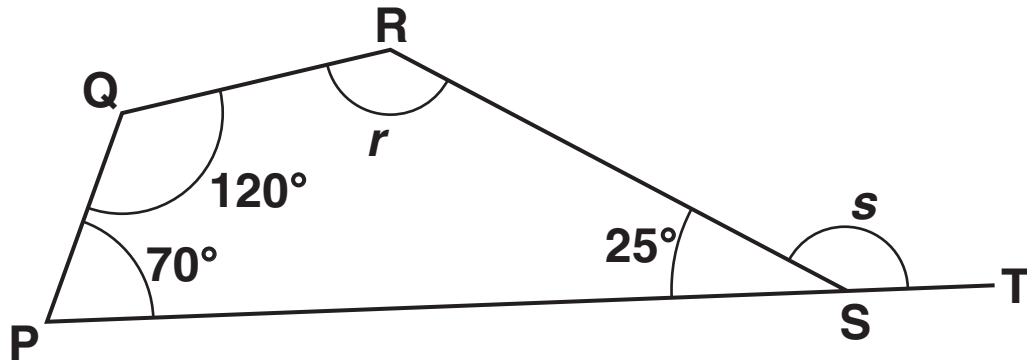
Work out angle  $a$  and angle  $b$ .

(a)  $a =$  \_\_\_\_\_  $^\circ$  [1]

$b =$  \_\_\_\_\_  $^\circ$  [1]

- (b) PQRS is a quadrilateral. PST is a straight line. Angle QPS =  $70^\circ$ , angle PQR =  $120^\circ$  and angle RSP =  $25^\circ$ .

NOT TO SCALE



Work out angle  $r$  and angle  $s$ .

(b)  $r =$  \_\_\_\_\_  $^\circ$  [2]

$s =$  \_\_\_\_\_  $^\circ$  [2]

- 8 Barry thinks that these two calculations give the same answer.

$$578^2 - 312^2 \quad \text{and} \quad (578 - 312)(578 - 312)$$

Rebecca thinks that these two calculations give the same answer.

$$8.6^2 - 3.4^2 \quad \text{and} \quad (8.6 - 3.4)(8.6 + 3.4)$$

Complete these calculations and decide who is correct.

$$578^2 - 312^2 = \underline{\hspace{4cm}}$$

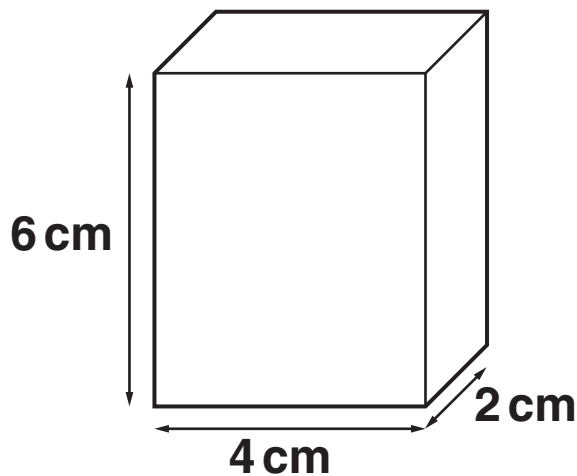
$$(578 - 312)(578 - 312) = \underline{\hspace{4cm}}$$

$$8.6^2 - 3.4^2 = \underline{\hspace{4cm}}$$

$$(8.6 - 3.4)(8.6 + 3.4) = \underline{\hspace{4cm}}$$

   is correct [4]

- 9 Helen has some small cubes.  
Each cube is 1 cm by 1 cm by 1 cm.  
Helen uses all of these small cubes to make this cuboid.



The dimensions of Helen's cuboid are 6 cm by 4 cm by 2 cm.

Helen then uses all these small cubes to make a cuboid with a **SQUARE BASE**.

Find the dimensions of two different cuboids with a square base that Helen could make.

\_\_\_\_\_ cm by \_\_\_\_\_ cm by \_\_\_\_\_ cm

\_\_\_\_\_ cm by \_\_\_\_\_ cm by \_\_\_\_\_ cm [3]

**10 (a) Complete the table for  $y = 5x - 3$ .**

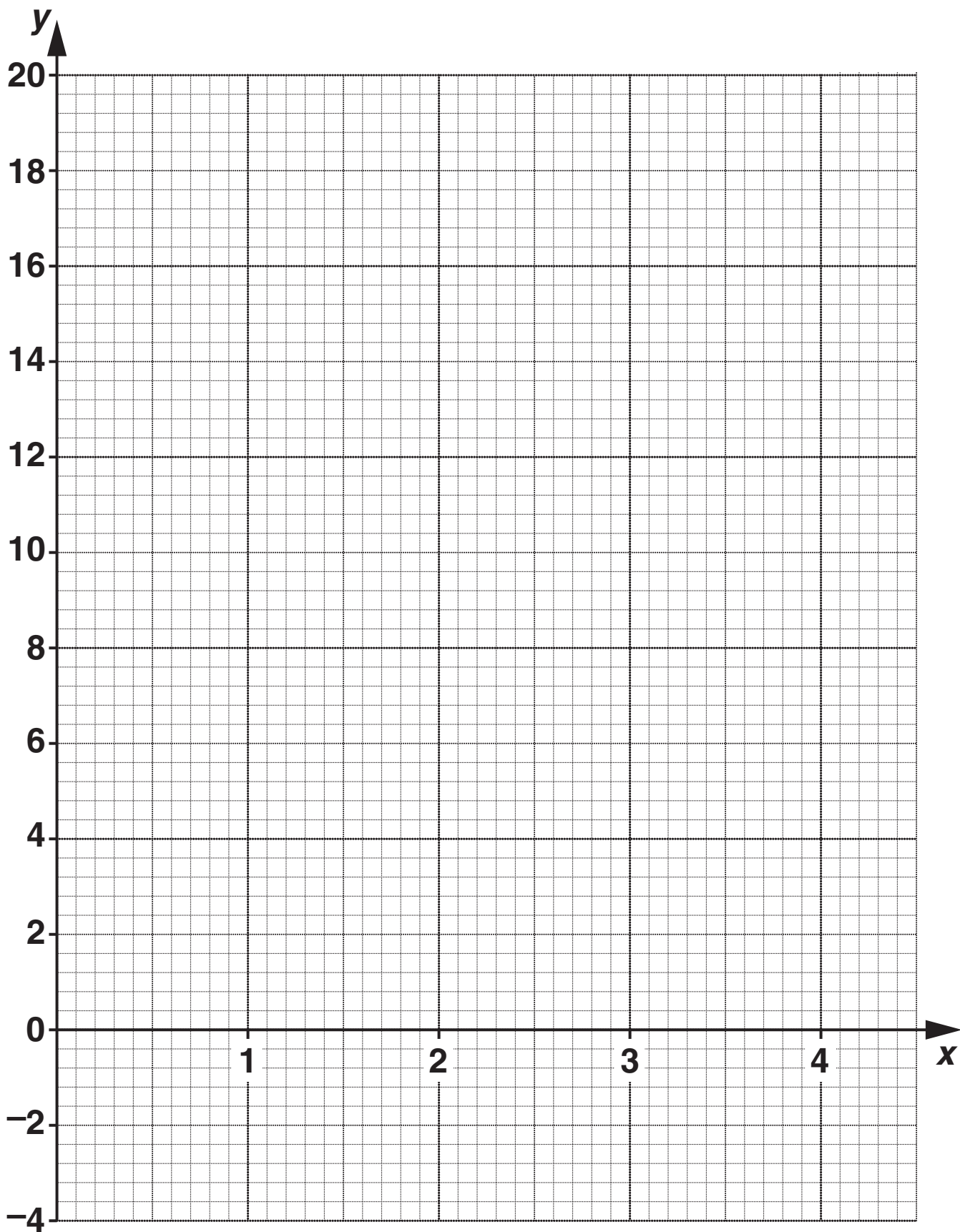
<b><math>x</math></b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b><math>y</math></b>					

**[2]**

**(b) Draw the graph of  $y = 5x - 3$  for values of  $x$  from 0 to 4 on the grid opposite.**

**(c) Solve  $5x - 3 = 9$ .**

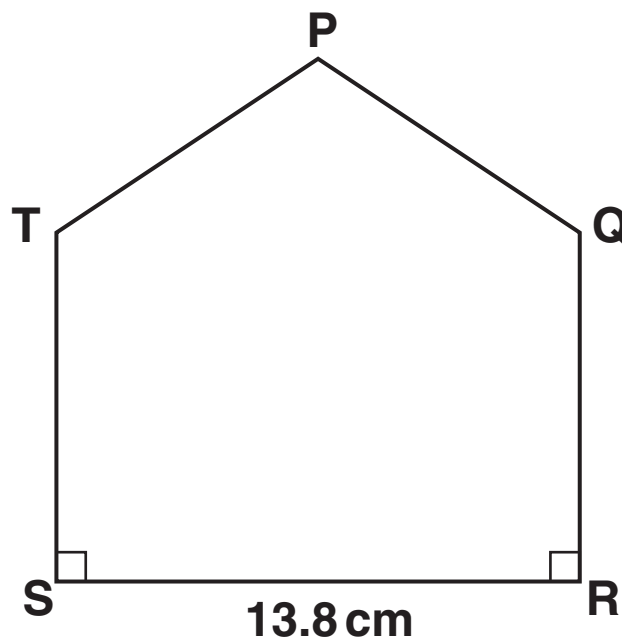
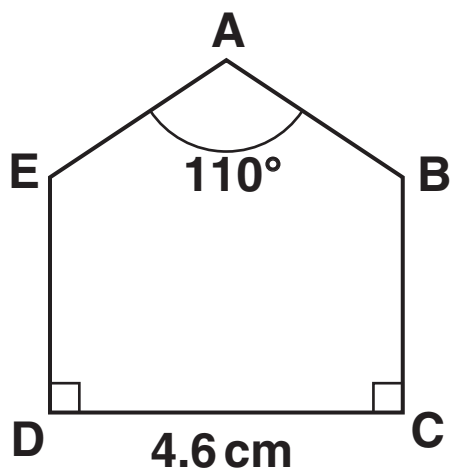
**(c) \_\_\_\_\_ [2]**



[2]

- 11 The pentagons ABCDE and PQRST are mathematically similar.

NOT TO SCALE



$DC = 4.6 \text{ cm}$  and  $SR = 13.8 \text{ cm}$ . Angle  $EAB = 110^\circ$ .

The perimeter of ABCDE is 18.2 cm.

(a) Find the size of angle TPQ.

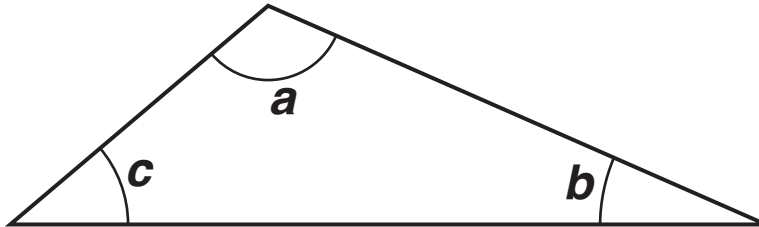
(a) \_\_\_\_\_  $^\circ$  [1]

(b) Find the perimeter of PQRST.

(b) \_\_\_\_\_ cm [2]

- 12 (a) The angles of this triangle,  $a$ ,  $b$  and  $c$ , are measured in degrees.  
Angle  $a$  is an obtuse angle.

NOT TO SCALE



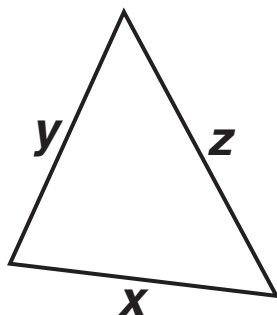
Draw a ring around the inequality that is true for these angles.

$a > b + c$       $a < b + c$       $a + b < c$       $a \leq b + c$

[1]

- (b) This is a different triangle.

NOT TO SCALE



The lengths of the sides,  $x$ ,  $y$  and  $z$ , are measured in centimetres.

Draw a ring around the inequality that is true for these lengths.

$x > y + z$       $x < y + z$       $x \geq y + z$       $y > x + z$

[1]

**13 Draw a line to match each statement on the left with the way of working it out on the right.**

**An example has been done for you.**

**Some of the boxes on the right will not be used.**

	<div><math>0.28 \times 875</math></div>
<div>Find 30% of 875</div>	<div><math>0.34 \times 875</math></div>
	<div><math>0.3 \times 875</math></div>
<div>Increase 875 by 34%</div>	<div><math>0.72 \times 875</math></div>
	<div><math>1.34 \times 875</math></div>
<div>Increase 875 by 6%</div>	<div><math>1.6 \times 875</math></div>
	<div><math>1.06 \times 875</math></div>
<div>Decrease 875 by 28%</div>	

**[3]**

- 14 (a) Fill in the missing fractions, decimals and percentages in the table below.  
Give answers in their simplest forms.  
The top row has been done for you.

FRACTION	DECIMAL	PERCENTAGE
$\frac{1}{4}$	0.25	25%
		30%
$\frac{7}{20}$		
	0.64	

[4]

- (b) Find the missing number.

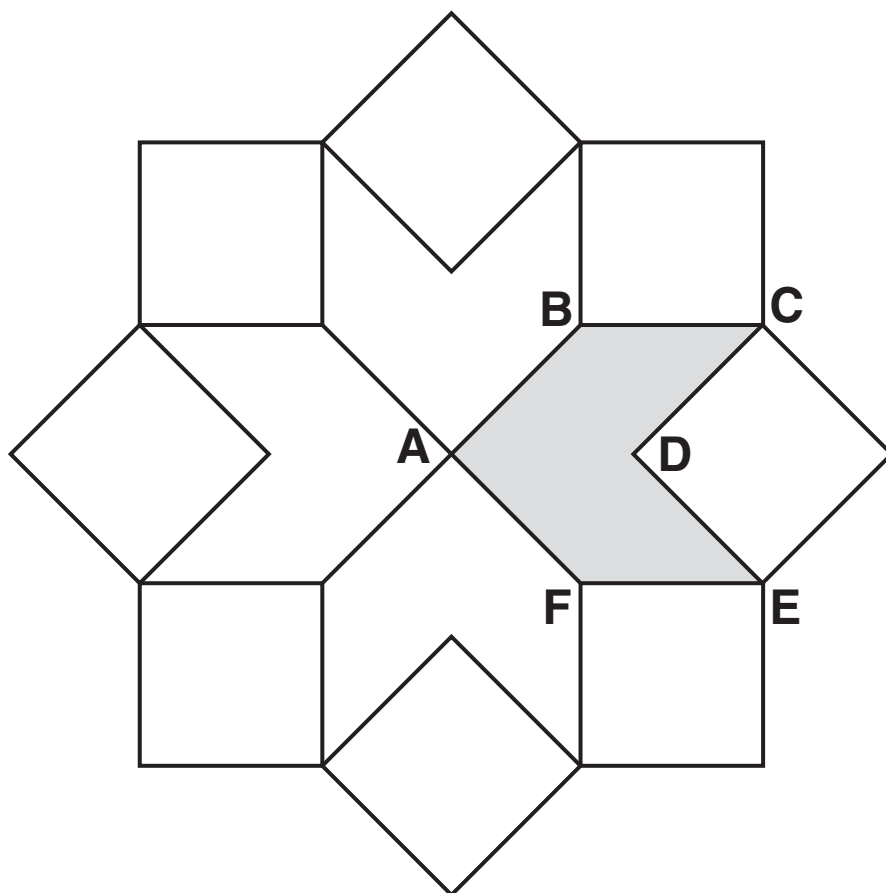
$$14 \times \boxed{\phantom{000}} = 1$$

[1]

- (c) Find a number that is bigger than  $\frac{1}{3}$  but smaller than  $\frac{1}{2}$ .

(c) \_\_\_\_\_ [2]

**15\*** The tiling pattern below is made from eight congruent squares and four congruent hexagons. Each hexagon has one line of symmetry.



**CALCULATE all six angles of hexagon ABCDEF. Give a geometrical reason for each step in your working.**

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**[5]**

**16 (a) Share £60 in the ratio 8 : 7.**

**(a) £ \_\_\_\_\_ , £ \_\_\_\_\_ [2]**

**(b) The ratio of red sweets to black sweets in a bag is 3 : 2.**

**There are only red sweets and black sweets in the bag.**

**(i) What fraction of the sweets in the bag are red?**

**(b)(i) \_\_\_\_\_ [1]**

**(ii) Kirsty opens the bag of sweets and eats 5 black sweets.**

**This leaves only one black sweet in the bag.**

**What is the ratio of red sweets to black sweets now?**

**(ii) \_\_\_\_\_ : \_\_\_\_\_ [3]**

**17 (a) Solve.**

$$7(x + 2) = 9x - 1$$

**(a)** \_\_\_\_\_ **[3]**

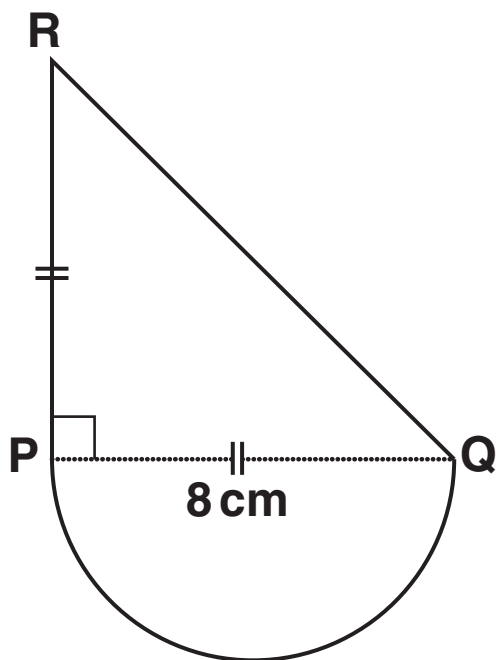
**(b) Make  $t$  the subject of the following formula.**

$$v = u + at$$

**(b)** \_\_\_\_\_ **[2]**

- 18 (a) The shape below is made from a semicircle and a triangle PQR.  
The triangle is isosceles and right-angled.  
PQ is the diameter of the semicircle.  
PQ = 8 cm.

NOT TO SCALE



**Calculate the area of the shape.**

**(a) \_\_\_\_\_  $\text{cm}^2$  [5]**

- (b) The cross-section of a prism has area  $81 \text{ cm}^2$ .  
The volume of the prism is  $350 \text{ cm}^3$ .**

**Calculate the length of the prism.**

**(b) \_\_\_\_\_  $\text{cm}$  [2]**

**END OF QUESTION PAPER**

## ADDITIONAL ANSWER SPACE

**If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).**

[illegible]







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