

C(72) D(60) E(48) F(37) G(26)



F

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
MATHEMATICS SYLLABUS A**

J512/01

Paper 1
(Foundation Tier)

SOLUTIONS

Friday 9 January 2009

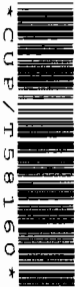
Morning

Duration: 2 hours

Candidates answer on the question paper

OCR Supplied Materials:
None

Other Materials Required:
• Geometrical instruments
• Tracing paper (optional)



Candidate Forename		Candidate Surname	
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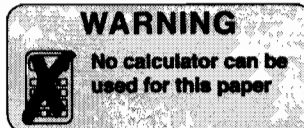
Centre Number										Candidate Number					
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INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Show your working. Marks may be given for a correct method even if the answer is incorrect.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

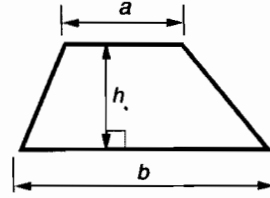
- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **100**.
- This document consists of **20** pages. Any blank pages are indicated.



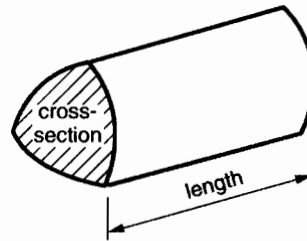
FOR EXAMINER'S USE

Formulae Sheet: Foundation Tier

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



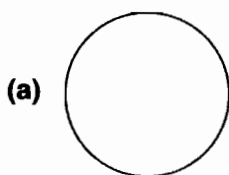
Volume of prism = (area of cross-section) \times length



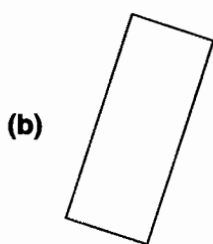
PLEASE DO NOT WRITE ON THIS PAGE

- 1 Write down the name for each shape.
Choose from the names in the box.

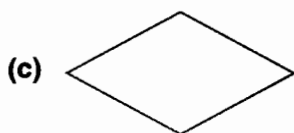
Square	Rhombus	Isosceles Triangle
Circle	Equilateral Triangle	Trapezium
Scalene Triangle	Pentagon	Rectangle



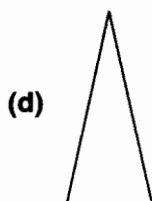
(a) Circle [1]



(b) Rectangle [1]



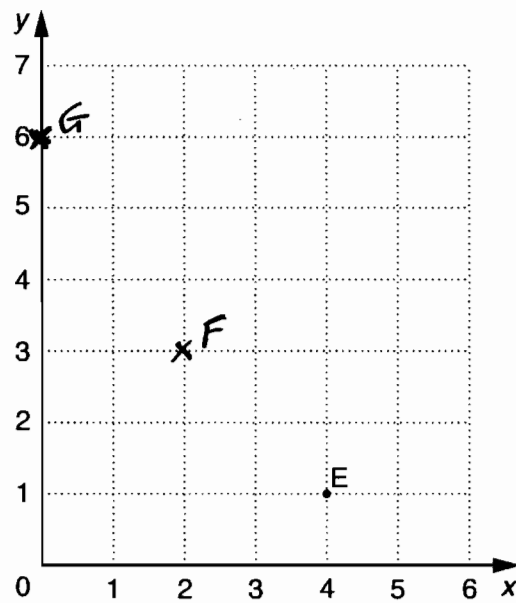
(c) Rhombus [1]



(d) Isosceles Triangle [1]



(e) Trapezium [1]



(a) Write down the coordinates of point E.

(a) (4 , 1) [1]

(b) Mark and label the points F (2, 3) and G (0, 6). [2]

(c) Julian thinks that F is the midpoint of the line joining E to G.

Explain why he is wrong.

IT is not on the straight line from
E to G

[1]

3 Fill in the six gaps in the table.

Decimal		Fraction		Percentage
0.5	=	$\frac{1}{2}$	=	50%
0.3	=	$\frac{3}{10}$	=	30%
0.25	=	$\frac{1}{4}$	=	25%
0.09	=	$\frac{9}{100}$	=	9%

[6]

4 Complete the sentences.
Use words from this list.

impossible	certain	fifty-fifty
likely	unlikely	

- (a) It is fifty-fifty that when you spin an ordinary coin it lands on heads. [1]
- (b) It is likely that when you roll an ordinary 6-sided dice, you will get a number between 1 and 5. [1]
- (c) It is unlikely that, one day, your maths teacher will become Prime Minister. [1]
- (d) It is certain that if you drop a ball it will move downwards not upwards. [1]

5

8	9	10	14
15	20	120	

From these numbers write down

(a) the smallest even number,

(a) 8 [1]

(b) a factor of 30,

(b) 10 or 15 [1]

(c) a square number,

(c) 9 [1]

(d) a multiple of 7,

(d) 14 [1]

(e) a common multiple of 30 and 60.

(e) 120 [1]

- 6 (a) (i) Write down the next number in this sequence.

1 7 13 19 25 [1]

- (ii) Describe the rule for continuing the sequence.

Add on 6 each time [1]

- (b) (i) Write down the next number in this sequence.

3 6 12 24 48 [1]

- (ii) Describe the rule for continuing the sequence.

Double the previous number each time [1]

- 7 (a) Complete these sentences.

(i) 1 kilogram is approximately equal to 2.2 pounds. [1]

(ii) 1 gallon is approximately equal to 4.5 litres. [1]

- (b) Lewis is driving from Paris to Dunkerque.
He knows the distance is 300 kilometres.
He knows that 50km is approximately 30 miles.

- (i) Approximately how many miles is it from Paris to Dunkerque?

$300 = 50 \times 6$ so $30 \times 6 = 180$

.....
.....

(b)(i) 180 miles [2]

- (ii) Lewis drives at an average speed of 60 km/hour.

How long does it take him to drive the 300 kilometres from Paris to Dunkerque?

$T = \frac{D}{S} = \frac{300}{60} = 5 \text{ hrs}$

.....
(ii) 5 hours [2]

- 8 A postal company decides whether an item is a Letter, a Large Letter or a Packet by its size.

Letter	less than 240 mm long and less than 165 mm wide
Large Letter	less than 353 mm long and less than 250 mm wide
Packet	longer than 353 mm or wider than 250 mm

- (a) Lizzie has an item that is 290 mm long and 200 mm wide.

Is it a Letter, a Large Letter or a Packet?

(a) Large Letter [1]

- (b) Sam has an item that is 290 mm square.

Explain why it is a Packet.

Because it is wider than 250 mm

[1]

The cost of postage also depends on the weight of the item and whether it is *Premier* or *Standard service*, as shown in this table.

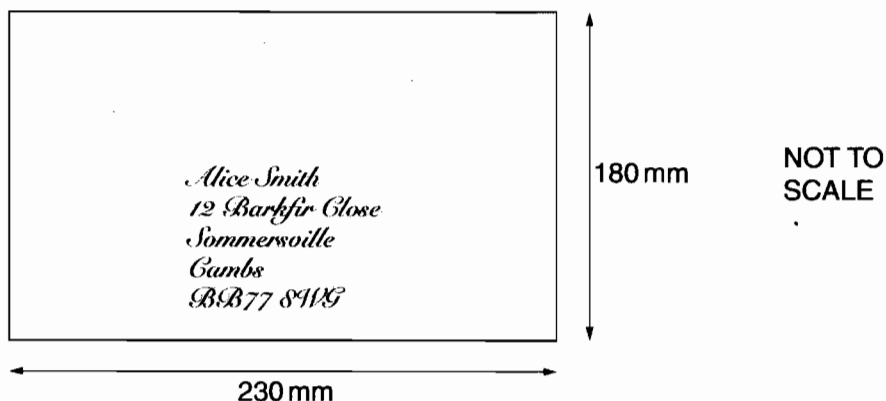
	Weight	<i>Premier</i>	<i>Standard</i>
Letter	0 - 100g	32 p	23 p
	101 - 250g	51 p	42 p
Large Letter	0 - 100g	44 p	37 p
	101 - 250g	65 p	55 p
	251 - 500g	90 p	75 p
	501 - 750g	131 p	109 p
Packet	0 - 100g	100 p	84 p
	101 - 250g	127 p	109 p
	251 - 500g	170 p	139 p
	501 - 750g	220 p	177 p
	751 - 1000g	270 p	212 p

- (c) Tanweer wants to send a Packet that weighs 300 g by *Standard service*.

How much postage should he pay?

(c) 139 p [1]

- (d) Jo wants to send this item by *Premier* service.
It weighs 200g.



How much will Jo have to pay?
Show clearly how you decide.

Large letter because too wide to be a letter

Large letter weight 101-250g Premier = 65p

(d) 65p p [3]

9 Solve.

(a) $4x = 28$

$$x = \frac{28}{4} \quad x = 7$$

(a) $x = 7$ [1]

(b) $y - 6 = 7$

$$y = 7 + 6 \quad y = 13$$

(b) $y = 13$ [1]

(c) $\frac{w}{5} = 4$

$$w = 4 \times 5 \quad w = 20$$

(c) $w = 20$ [1]

(d) $10z + 6 = 21$

$$10z = 21 - 6$$

$$10z = 15$$

$$z = \frac{15}{10}$$

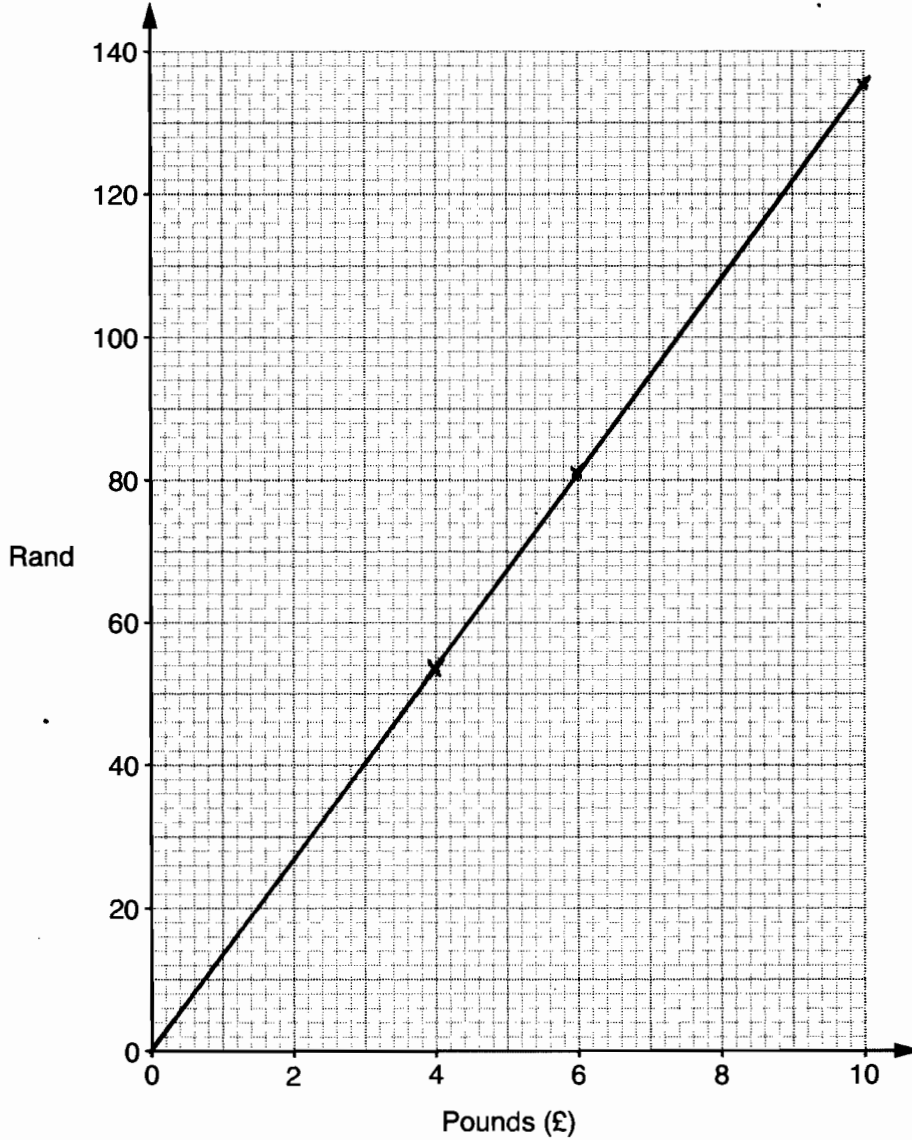
$$z = 1.5$$

(d) $z = 1.5$ [2]

10 The currency used in South Africa is the Rand.
This table gives some conversions between Pounds (£) and Rand.

Pounds	4	6	10
Rand	54	81	135

(a) Plot these values on the grid.
Join the points with a straight line to make a conversion graph between Pounds and Rand.



[3]

(b) Use the graph to convert £7 into Rand.

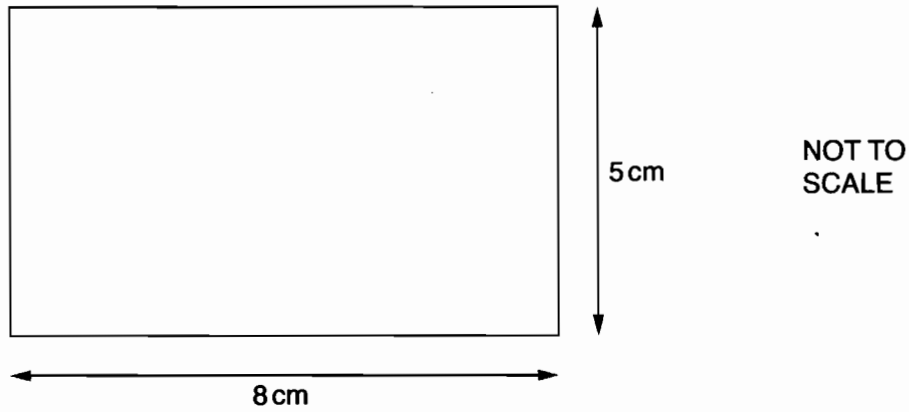
(b) 94 Rand [1]

(c) In South Africa a DVD costs 200 Rand.

What is 200 Rand in Pounds?

100 = £7.40
200 = £14.80
(c) £ 14.80 [2]

11 (a) A rectangle is 8 cm long and 5 cm wide.



(i) Work out the area of this rectangle.

$$8 \times 5 = 40$$

.....

(a)(i) 40 cm² [2]

(ii) Work out the perimeter of this rectangle.

$$8 + 8 + 5 + 5 = 26$$

.....

(ii) 26 cm [1]

(b) A second rectangle has an area of 28 cm².

Write down a possible pair of values for its length and width.

.....

(b) Length 7 cm Width 4 cm [1]

(c) A third rectangle is half as long and half as wide as the rectangle in part (b).

What is the area of the third rectangle?

$$3\frac{1}{2} \times 2 = 7$$

.....

(c) 7 cm² [2]

12 Francois asked nine of his friends how many hours of TV they watched one weekend.

Here are their answers.

2 7 12 2 4 14 2 9 2

(a) What is the range of these times?

$$14 - 2 = 12$$

Highest - Lowest

(a) 12 hours [1]

(b) Calculate the mean of these times.

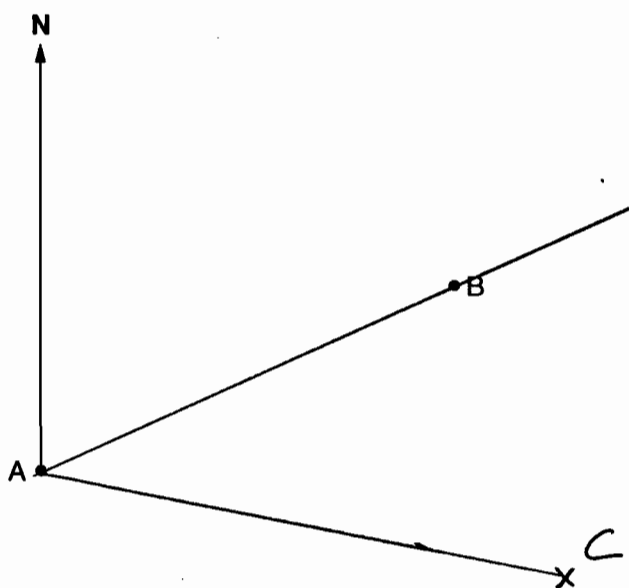
$$2 + 7 + 12 + 2 + 4 + 14 + 2 + 9 + 2 = 54$$

$$\frac{54}{9} = 6$$

(b) 6 hours [3]

13 This map shows two towns, Anyton (A) and Bayville (B).

Scale: 1 cm represents 5 miles.



$$6 \text{ cm} \rightarrow 6 \times 5 = 30 \text{ miles}$$

(a) Find the distance from Anyton to Bayville in miles.

(a) 30 miles [2]

(b) Measure the bearing of Bayville from Anyton.

(b) 065° [1]

(c) A third town, Collyborough (C), is 35 miles from Anyton on a bearing of 100°.

Mark and label C on the map. 5 miles = 1 cm [2]

$$\text{so } 35 \text{ miles} = 7 \text{ cm}$$

14 Work out.

(a) 10^4

.....

(a) 10000 [1]

(b) $\sqrt[3]{125}$

.....

(b) 5 [1]

(c) $4^3 + 6^2$

$$= 64 + 36 = 100$$

.....

.....

(c) 100 [2]

(d) $\frac{5}{6} \times \frac{1}{10}$

Give your answer in its simplest form.

$$\frac{\cancel{5}}{6} \times \frac{1}{\cancel{10}_2} = \frac{1}{12}$$

.....

.....

(d) $\frac{1}{12}$ [2]

15 Linda works in a sandwich factory.

- (a) She makes 30 sandwiches every hour.

$$\frac{220}{30} = \frac{22}{3} = 7\frac{1}{3}$$

How long does it take her to make 220 sandwiches?
Give your answer in hours and minutes.

$$7\frac{1}{3} \text{ hrs} = 7 \text{ hrs } 20 \text{ mins.}$$

(a) 7 hours 20 minutes [3]

- (b) Linda's wage is £360 a week.
She receives a 5% wage rise.

$$10\% = £36$$

$$5\% = £18$$

Work out Linda's new weekly wage.

$$£360 + £18 = £378$$

(b) £ 378 [3]

- (c) Linda makes cheese sandwiches and chicken sandwiches in the ratio 2 : 3.
She makes 200 sandwiches altogether.

How many of these are cheese sandwiches?

$$5 \text{ parts} = 200$$

$$1 \text{ part} = \frac{200}{5} = 40$$

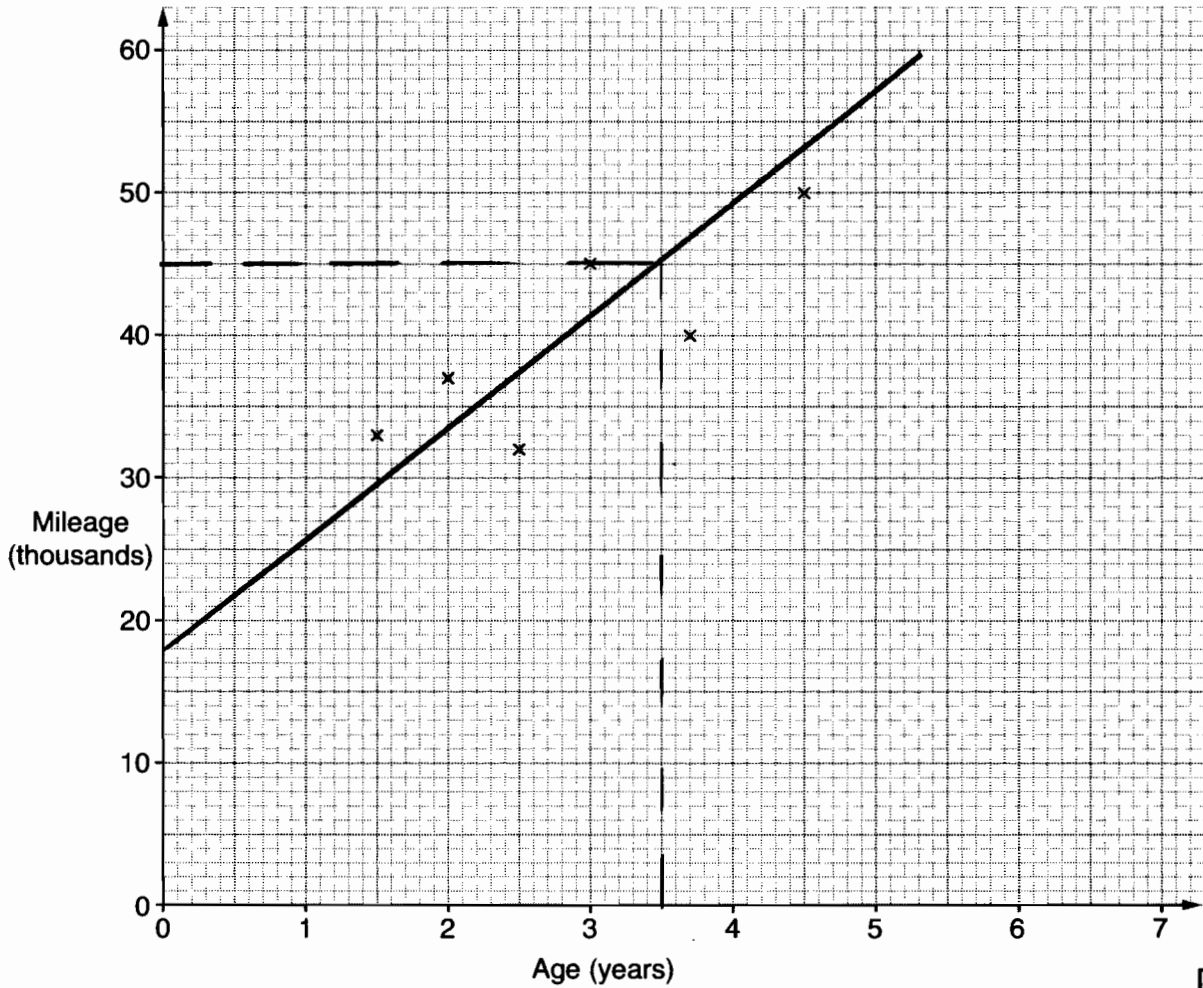
$$\text{cheese} = 2 \text{ parts} = 40 \times 2 = 80$$

(c) 80 [2]

16 As part of a project, Robert records the ages and mileages of some cars. His results are recorded in this table.

Age (years)	1.5	2	2.5	3	3.7	4.5	5.2	5.5	6	6.5	7
Mileage (thousands)	33	37	32	45	40	50	56	54	58	57	60

(a) Complete the scatter diagram. The first 6 points have already been plotted.



[2]

(b) Describe the strength and type of correlation shown in your diagram.

(b) WEAK POSITIVE CORRELATION [2]

(c) (i) Draw a line of best fit for these data.

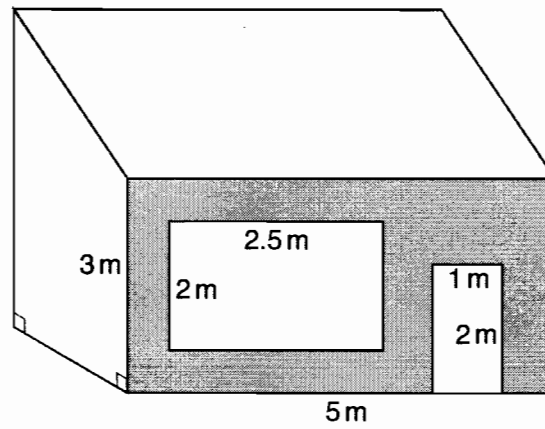
[1]

(ii) Another car is 3.5 years old.

Use your line of best fit to estimate the mileage of this car.

(c)(ii) 45 thousand miles [1]

- 17 The diagram shows a small shop.
The front of the shop, the window and the door are all rectangles.



Work out the shaded area of the front of the shop.
Give the units of your answer.

$$5 \times 3 = 15 \text{ m}^2 \quad 2 \times 2.5 = 5 \text{ m}^2 \quad 2 \times 1 = 2 \text{ m}^2$$

$$15 - 5 - 2 = 8 \text{ m}^2$$

$$8 \text{ m}^2$$

[3]

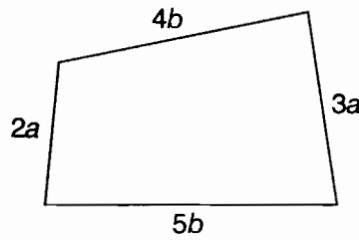
18 (a) Simplify.

$$2xy - 3xy + 4xy$$

.....

(a) 3xy [1]

(b) Find an expression for the perimeter of this shape.
 Give your answer as simply as possible in terms of a and b .



.....

(b) Perimeter = $9b + 5a$ [2]

(c) Multiply out and simplify.

$$3(2x + 5) + 2(4x - 1)$$

.....
 $6x + 15 + 8x - 2$

$$= 14x + 13$$

(c) $14x + 13$ [2]

19 Estimate the answer to this calculation.

$$\frac{112 \times 5.8}{0.47}$$

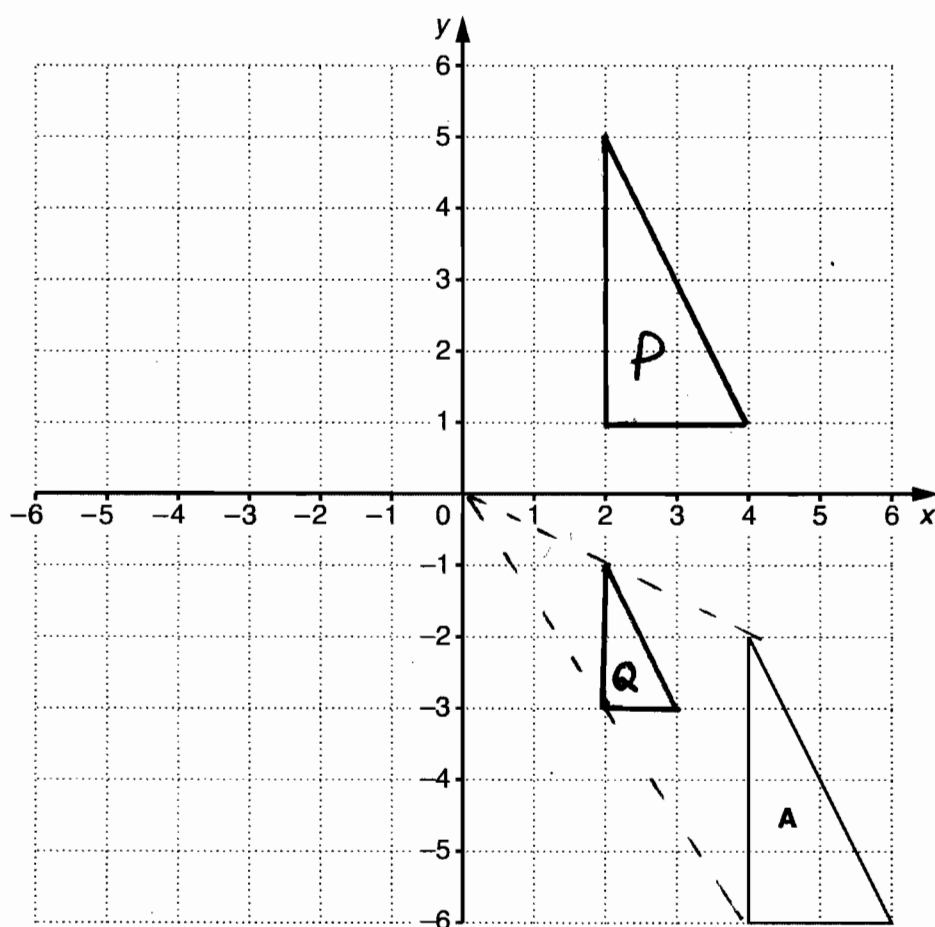
Show clearly the values you use.

$$\frac{100 \times 6}{0.5} = \frac{600}{0.5} = \frac{6000}{5}$$

1200

[2]

TURN OVER FOR QUESTION 20



- (a) Translate triangle A by $\begin{pmatrix} -2 \\ 7 \end{pmatrix}$.

Label the image P.

[2]

- (b) Enlarge triangle A by scale factor $\frac{1}{2}$ using centre (0, 0).

Label the image Q.

[2]