C73 D61 E49 F37 G25

OCR
RECOGNISING ACHIEVEMENT

F

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS SYLLABUS A **J512/01**

Paper 1
(Foundation Tier)

Solutions.

OCE/10696

Candidates answer on the question paper

OCR Supplied Materials:
None

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

Monday 18 May 2009
Afternoon

Duration: 2 hours

J J S 1 2 0 1

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

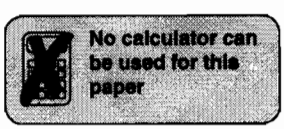
MODIFIED LANGUAGE

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.

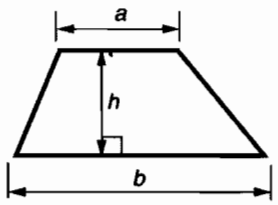
INFORMATION FOR CANDIDATES

- 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.

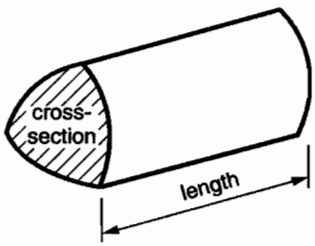


Formulae Sheet: Foundation Tier

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

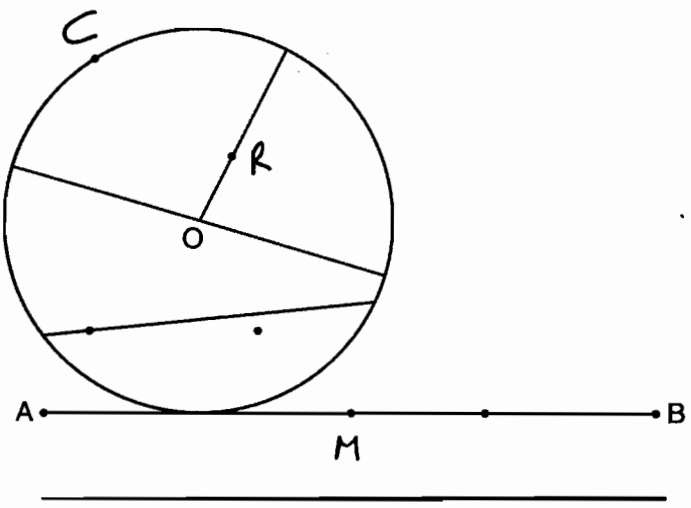


Volume of prism = (area of cross-section) × length



PLEASE DO NOT WRITE ON THIS PAGE

1 The diagram shows a circle, centre O, and a line AB.



(a) Measure the length of the line AB in centimetres.

(a) 8 cm **[1]**

(b) Measure the diameter of the circle in centimetres.

(b) 5 cm **[1]**

There are some dots (•) on the diagram.

(c) Write R by the dot on the radius of the circle. **[1]**

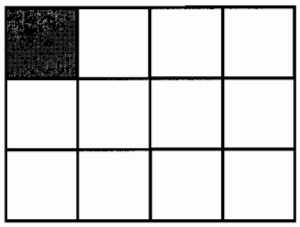
(d) Write C by the dot on the circumference of the circle. **[1]**

(e) Write M by the dot at the midpoint of the line AB. **[1]**

(f) Draw a line parallel to AB. **[1]**

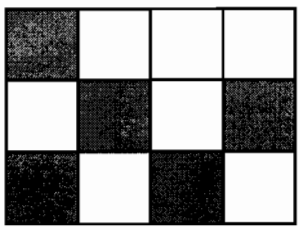
2 **(a)** What fraction of each shape is shaded?

(i)



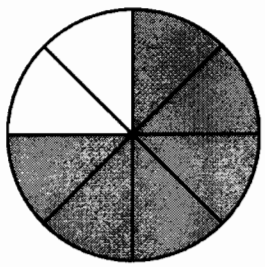
(a)(i) $\frac{1}{12}$ [1]

(ii)



(ii) $\frac{5}{12}$ [1]

(b) What fraction of this shape is shaded?
Write your answer in its simplest form.



$\frac{6}{8} = \frac{3}{4}$

(b) $\frac{3}{4}$ [2]

(c) Write down a fraction that is smaller than $\frac{1}{10}$.

$\frac{1}{11}$

.....

.....

(c) $\frac{1}{11}$ [1]

or $\frac{1}{\text{any number bigger than 10}}$

3 Edmund did a survey to find out what sort of pizza people in his school preferred.
He represented the results in a pictogram.

Pizza	Frequency
Cheese and tomato	○ ○ ○ ○ ○
Pepperoni	○ ○ ○
Pineapple	○ ○ ◐
Four Seasons	○ ◐
Mushroom	○ ○

Key: ○ represents 4 people

(a) 6 people preferred Four Seasons.

Show this on the pictogram. **[1]**

The pictogram is now complete.

(b) Which is the most popular sort of pizza?

(b) Cheese and tomato **[1]**

(c) How many people chose Pepperoni?

(c) 12 **[1]**

(d) How many more people chose Pineapple than Mushroom?

10 − 8 = 2

(d) 2 **[1]**

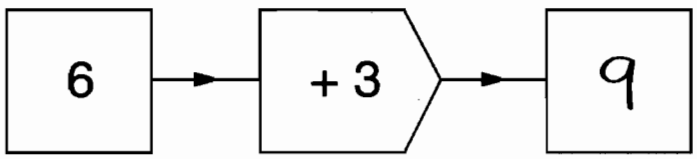
(e) How many people did Edmund ask altogether?

14 × 4 = 56

(e) 56 **[2]**

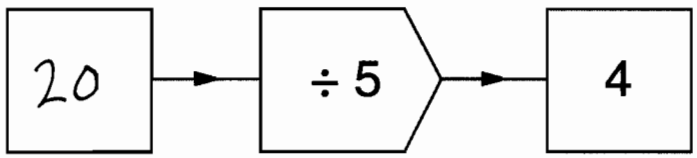
4 **(a)** Complete these number machine calculations by filling in the empty boxes.

(i)



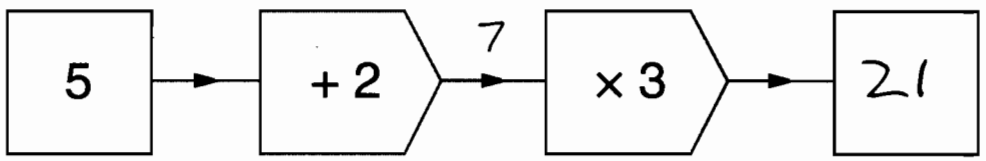
[1]

(ii)



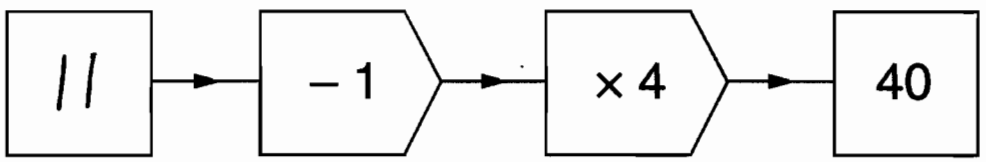
[1]

(iii)



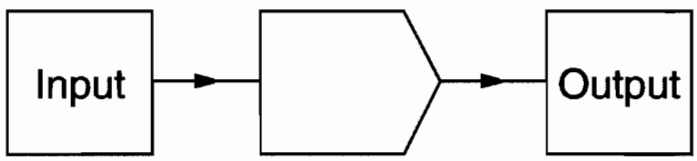
[2]

(iv)

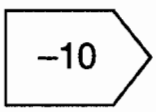


[2]

(b) Caroline uses this number machine.



She says that when the Input is 20, the Output will be 10.

Barney says the rule **must** be 

.

Explain why Barney may be wrong.

Could be ÷2

[1]

5 **(a)** Work out.

(i) 32×100

(a)(i) 3200 [1]

(ii) 160×10

(ii) 1600 [1]

(iii) $27\,000 \div 10$

(iii) 2700 [1]

(iv) $240 \div 100$

(iv) 2·4 [1]

(b) **(i)** Write 4766 correct to the nearest 100.

(b)(i) 4800 [1]

(ii) Write 2981 correct to the nearest 10.

(ii) 2980 [1]

6 Here is a list of scores.

4 4 4 4 5 5 5 6 6 10 11 11 14 19

For these scores, work out

(a) the range,

19 − 4 = 15

(a) 15 [1]

(b) the median.

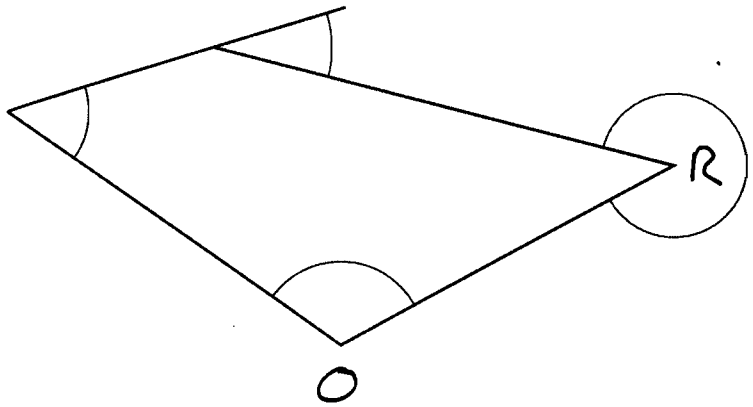
14 items $\frac{14+1}{2} = 7.5$ Median average of 7th and 8th

(b) 5·5 [2]

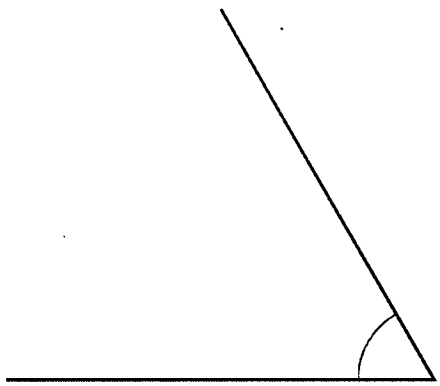
7 **(a)** In this diagram, four angles have been marked with arcs.

(i) One of the four angles is obtuse. Label it O. **[1]**

(ii) One of the four angles is reflex. Label it R. **[1]**

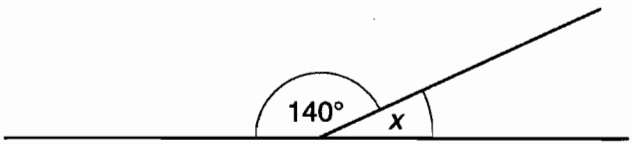


(b) Measure the size of the angle below.



(b) 60° ° **[1]**

(c) (i) Work out the size of angle x.
Give a reason for your answer.

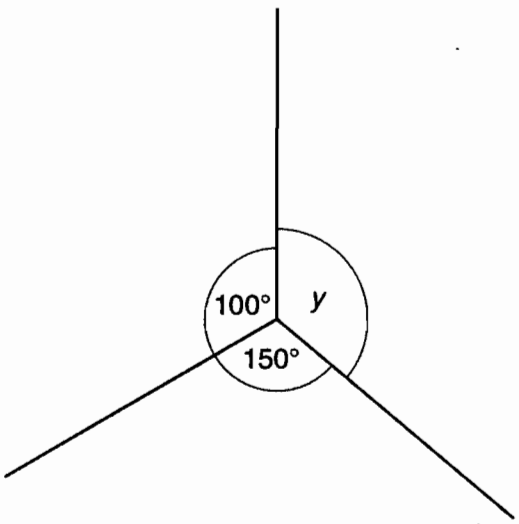


NOT TO SCALE

180 - 140 = 40

$x =$ 40° ° because Angles on a straight line add up to 180° [2]

(ii) Work out the size of angle y.
Give a reason for your answer.



NOT TO SCALE

100 + 150 = 250

360 − 250 = 110

$y =$ 110° ° because Angles at a point add up to 360° [2]

8 Ruth is raising money for charity.
She buys candy canes and sells them at a higher price.

(a) Ruth buys 35 candy canes for 50p each.

How much change should she get from a £20 note?

$35 \times 50 = \frac{35 \times 100}{2} = \frac{3500}{2} = 1750$p

£20 − £17.50 = £2.50

(a) £ 2.50 [3]

(b) She makes 30% profit on each candy cane.

Find 30% of 50p.

10% = 5p

30% = 15p

(b) 15p p [2]

9 **(a)** Simplify.

(i) $5y + 2y$

(a)(i) 7y [1]

(ii) $4w + 3z - 2w + z$

$4w - 2w + 3z + z$

(ii) 2w + 4z [2]

(b) Work out the value of $2j + 5k$ when $j = 7$ and $k = 3$.

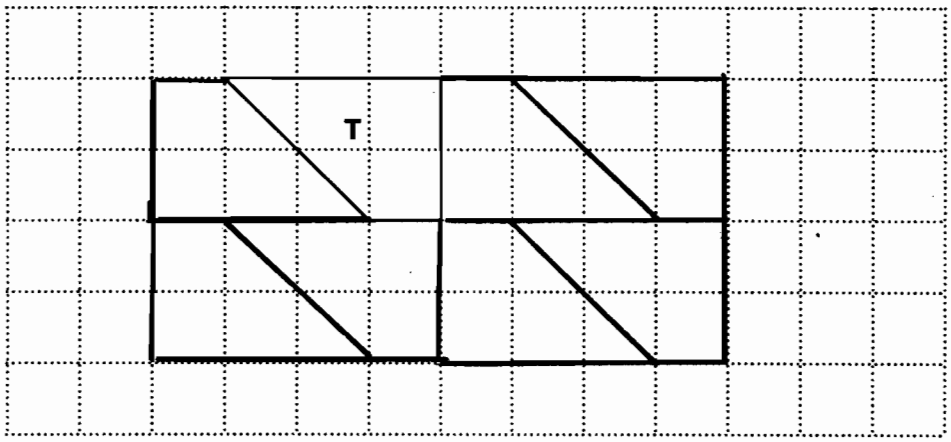
$2(7) + 5(3)$

$= 14 + 15$

$= 29$

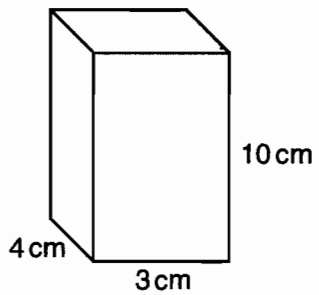
(b) 29 [2]

10 (a) Shape **T** is drawn on a centimetre grid.



Show how shape **T** will tessellate. Draw at least 7 more shapes. **[2]**

(b) (i) Work out the volume of this cuboid.
Give the units of your answer.



Length x Width x Height = 4 x 3 x 10 = 120

(b)(i) 120 cm^3 **[3]**

(ii) Write down the dimensions of a **different** cuboid that has the same volume as the one in part **(b)(i)**.

Length 10 cm, Width 2 cm, Height 6 cm **[1]**

Could be other answers.

11 Work out.

(a) 7^2

$7 \times 7 = 49$

(a) 49 [1]

(b) $2^4 + \sqrt{100}$

$= 16 + 10 = 26$

(b) 26 [2]

(c) 5.5 – 2.22

$$\begin{array}{r} 4 \\ 5.^{1}\!\not{5}0 \\ 2.22 - \\ \hline 3.28 \end{array}$$

(c) 3.28 [1]

(d) $\frac{5}{6}$ of 78

$$6\overline{)78} = 13$$

$13 \times 5 = 65$

$= 78 \div 6 \times 5$

(d) 65 [2]

12 Mr Smith did a survey of how students travelled to school.
The table shows some of the results.

Complete the table.

.....

.....

.....

	Bus	Walk	Car	Total
Boys	21	23	13	57
Girls	19	8	16	43
Total	40	31	29	100

[3]

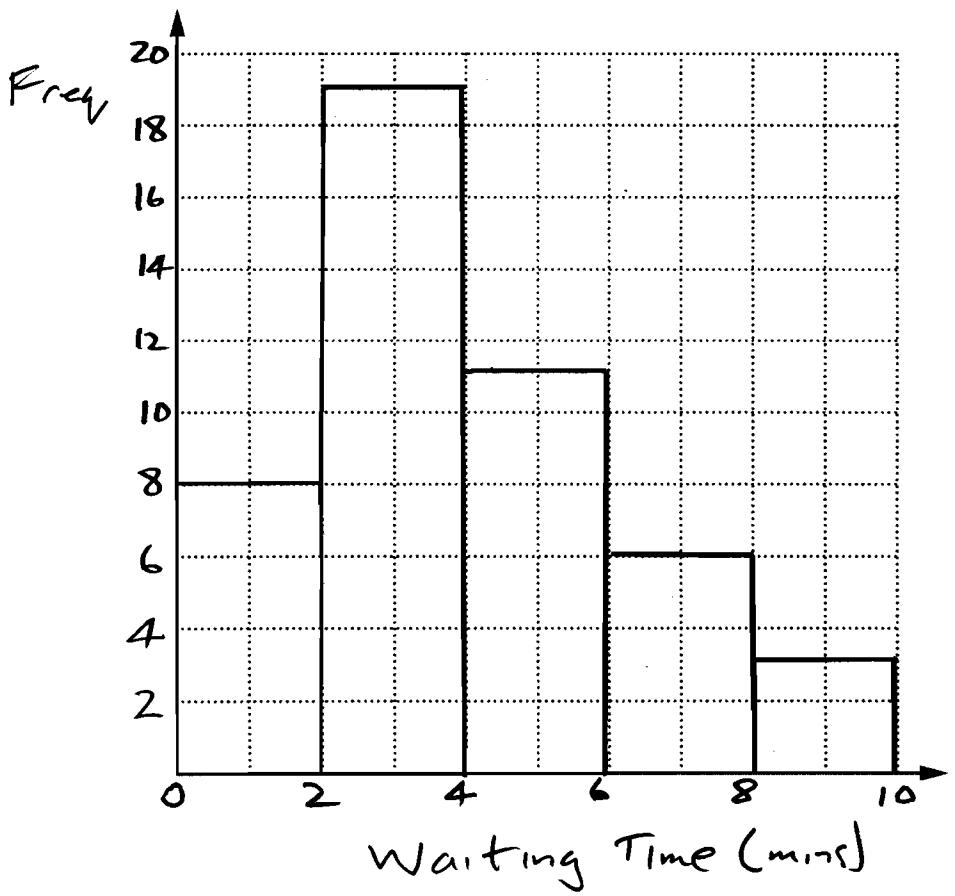
21
13
34

57
34 −
23

13 The table shows the distribution of waiting times (in minutes) that customers spent at the checkout of a supermarket.

Waiting time (minutes)	Frequency
0 up to 2	8
2 up to 4	19
4 up to 6	11
6 up to 8	6
8 up to 10	3

(a) Draw a grouped frequency diagram to show this information.
Show your scales and label your axes clearly.



[3]

(b) Write down the modal class for these waiting times.

Most often

(b) 2 up to 4 minutes **[1]**

(c) One of these customers is chosen at random.

What is the probability that this customer waited 6 minutes or more?

TOTAL FREQUENCY = 8+19+11+6+3 = 47

NUMBER OF CUSTOMERS ABOVE 6 MINUTES = 6+3 = 9

(c) $\frac{9}{47}$ **[2]**

14 (a) The probability that Nouri wins a tennis match is 0.47.

What is the probability that he does not win the match?
Give a reason for your answer.

0.53 because only 2 outcomes win or lose so probabilities add to 1 **[2]**

(b) Sam is told that the probability that his football team will win on Saturday is 0.7.
Lizzie says "This means the probability the team will **lose** on Saturday is 0.3."

Explain why Lizzie may be wrong.

Could be a draw

[1]

$2(2)+2 = 4+2 = 6$

$2(3)+2 = 6+2 = 8$

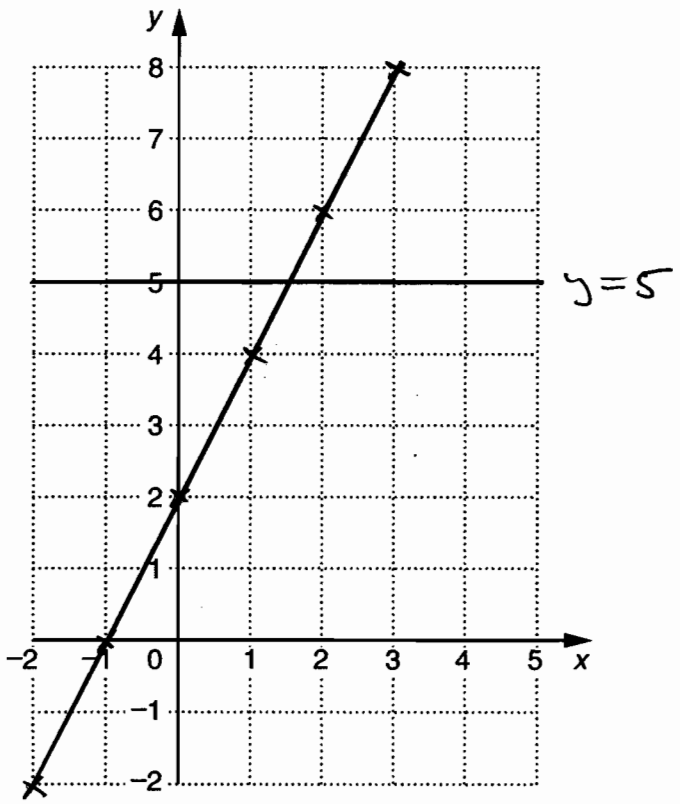
15 (a) Complete this table for $y = 2x + 2$.

x	–2	–1	0	1	2	3
y	–2	0	2	4	6	8

[1]

$2(-1)+2 = -2+2 = 0$

(b) On the grid, draw the graph of $y = 2x + 2$ for values of x from –2 to 3.



[2]

(c) On the grid, draw the graph of $y = 5$. [1]

16 (a) Solve.

$6y - 1 = 29$

$6y - 1 = 29$
$6y = 29 + 1$
$6y = 30$
$y = \frac{30}{6}$

(a) $y = 5$ [2]

(b) Show that $x = 2$ is the solution of this equation.

$9x - 1 = 4x + 9$

Show 2 makes it true $9(2) - 1 = 17 = 4(2) + 9$

or solve it

$9x - 1 = 4x + 9$

$9x - 4x = +9 + 1$

$5x = 10$

$x = \frac{10}{5}$ $x = 2$ [2]

(c) Solve.

$\frac{x}{2} - 3 = 5$ $\frac{x}{2} = 5 + 3$

$\frac{x}{2} = 8$

$x = 8 \times 2$

$x = 16$

(c) $x = 16$ [2]

17 (a) In a carton of *Squashy*, orange juice and water are mixed in the ratio 3 : 7.

How many litres of orange juice are needed to make 60 litres of *Squashy*?

10 parts = 60 litres

1 part = $\frac{60}{10}$ = 6 litres

Orange juice = 3 parts $\Rightarrow$ 3 × 6 = 18 litres

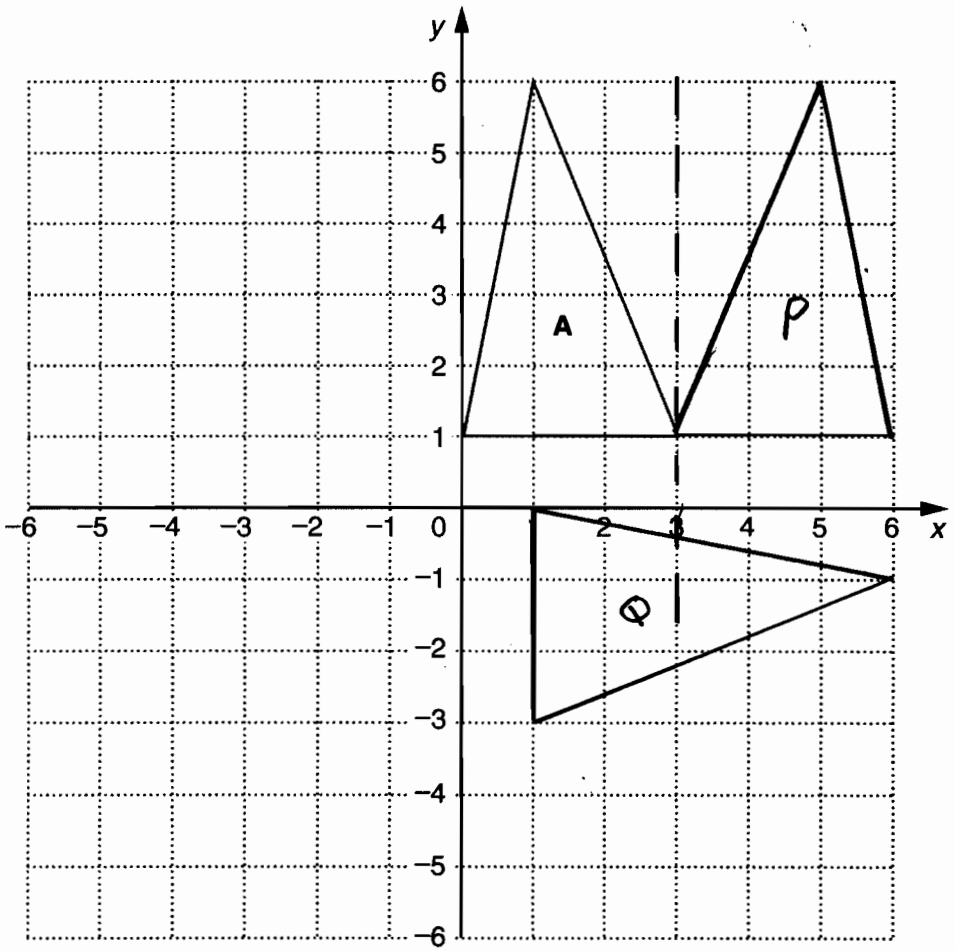
(a) 18 litres litres **[2]**

(b) One carton contains 150 ml of *Squashy*, correct to the nearest millilitre.

What is the least possible amount of *Squashy* that could be in the carton?

(b) 149.5 ml **[1]**

18



(a) Triangle **A** is drawn on a 1 cm square grid.

Work out the area of triangle **A**. $\frac{1}{2}$ base × height

$\frac{1}{2} \times 3 \times 5 = \frac{15}{2} = 7.5 \text{ cm}^2$

(a) 7.5 cm² **[2]**

(b) Reflect triangle **A** in the line $x = 3$.
Label the image **P**. **[2]**

(c) Rotate triangle **A** 90° clockwise about (0,0).
Label the image **Q**. **[3]**

TURN OVER FOR QUESTION 19

19 As a product of prime factors,

$24 = 2 \times 2 \times 2 \times 3.$

2|40
2|20
2|10
5|5
1

(a) Write 40 as a product of prime factors.

.....

.....

(a) $40 = 2 \times 2 \times 2 \times 5$ [2]

(b) (i) Work out the highest common factor (HCF) of 24 and 40.

What they have in common is $2 \times 2 \times 2 = 8$

.....

(b)(i) 8 [2]

(ii) Work out the least common multiple (LCM) of 24 and 40.

24x TABLE 24 48 72 96 (120)

40x TABLE 40 80 (120)

(ii) 120 [2]