Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

7260877325

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/41**

Paper 4 (Extended) **May/June 2015**

2 hours 15 minutes

Candidates answer on the Question Paper.

Additional Materials: Geometrical Instruments
Graphics Calculator

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
Do not use staples, paper clips, glue or correction fluid.
You may use an HB pencil for any diagrams or graphs.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** the questions.
Unless instructed otherwise, give your answers exactly or correct to three significant figures as appropriate.
Answers in degrees should be given to one decimal place.
For π, use your calculator value.
You must show all the relevant working to gain full marks and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
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 120.

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Formula List

For the equation $ax^2 + bx + c = 0$ $\quad x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Curved surface area, A, of cylinder of radius r, height h. $\quad A = 2\pi rh$

Curved surface area, A, of cone of radius r, sloping edge l. $\quad A = \pi rl$

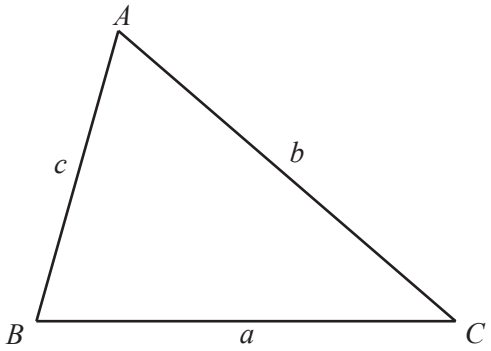
Curved surface area, A, of sphere of radius r. $\quad A = 4\pi r^2$

Volume, V, of pyramid, base area A, height h. $\quad V = \frac{1}{3}Ah$

Volume, V, of cylinder of radius r, height h. $\quad V = \pi r^2 h$

Volume, V, of cone of radius r, height h. $\quad V = \frac{1}{3}\pi r^2 h$

Volume, V, of sphere of radius r. $\quad V = \frac{4}{3}\pi r^3$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$\text{Area} = \frac{1}{2}bc\sin A$$

Answer **all** the questions.

1 The table shows the marks that 80 students scored in an examination.

Mark	0	1	2	3	4	5	6	7	8	9	10
Number of students	1	5	6	8	9	10	12	8	16	3	2

(a) Write down the mode.

Answer(a) ..... [1]

(b) Write down the range.

Answer(b) ..... [1]

(c) Find the median.

Answer(c) ..... [1]

(d) Find the interquartile range.

Answer(d) ..... [2]

(e) Calculate the mean.

Answer(e) ..... [1]

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2 Solve the simultaneous equations.
You must show all your working.

$$5x - 2y = 11.5$$
$$4x + 3y = 0$$

Answer $x =$ .....

$y =$ ..... [4]

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3 A car of length 4.5 metres is travelling at 72 km/h.
The car approaches a tunnel of length 260 metres.

(a) Change 72 km/h into m/s.

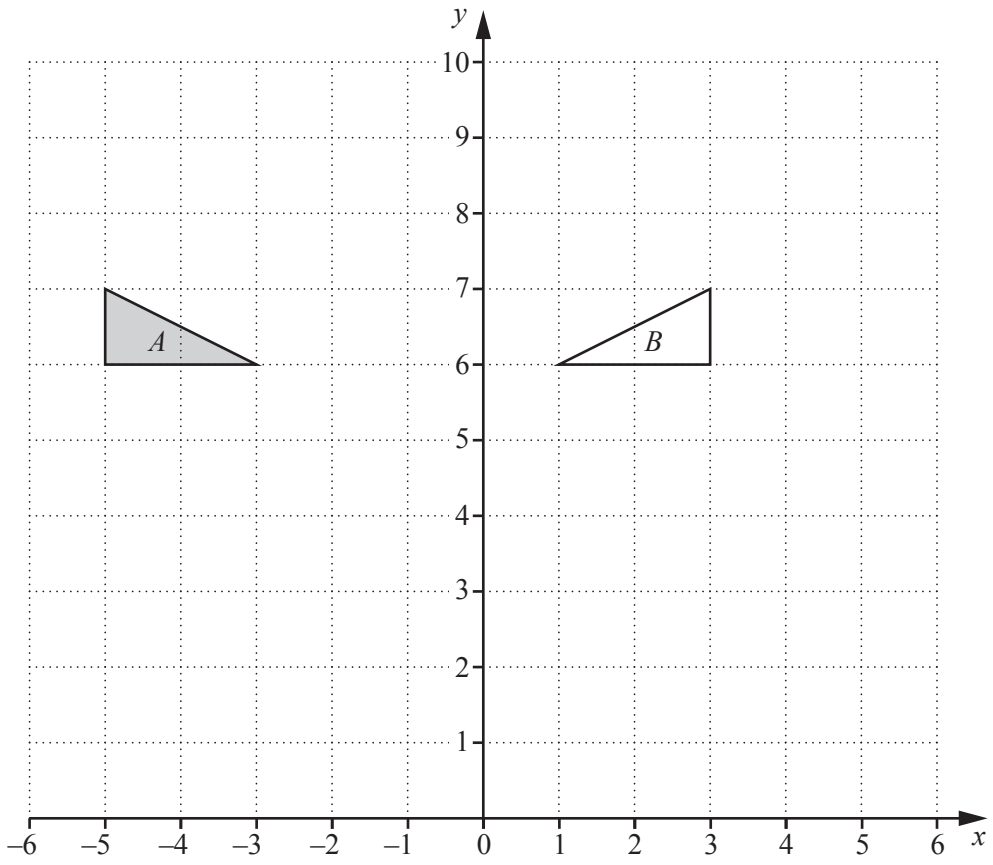
Answer(a) ..... m/s [1]

(b) Find the time it will take for the car to pass completely through the tunnel.
Give your answer in seconds.

Answer(b) ..... s [2]

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4



(a) Describe fully the **single** transformation that maps triangle *A* onto triangle *B*.

Answer(a) .....

..... [2]

(b) Rotate **triangle *B*** through 90° clockwise, centre (–1, 6). Draw this triangle and label it *C*. [3]

(c) Describe fully the **single** transformation that maps **triangle *C*** onto triangle *A*.

Answer(c) .....

..... [2]

5 **(a)** y varies inversely as the square root of x.
$y = 5$ when $x = 9$.

(i) Find the value of y when $x = 25$.

Answer(a)(i) $y =$ ..... [2]

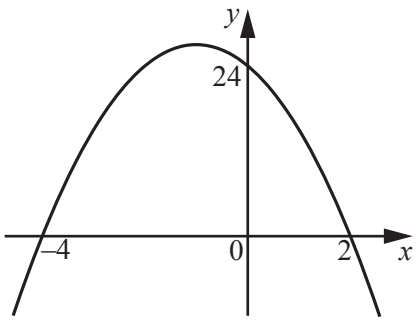
(ii) Find the value of x when $y = 25$.

Answer(a)(ii) $x =$ ..... [2]

(iii) Find x in terms of y.

Answer(a)(iii) $x =$ ..... [2]

(b)

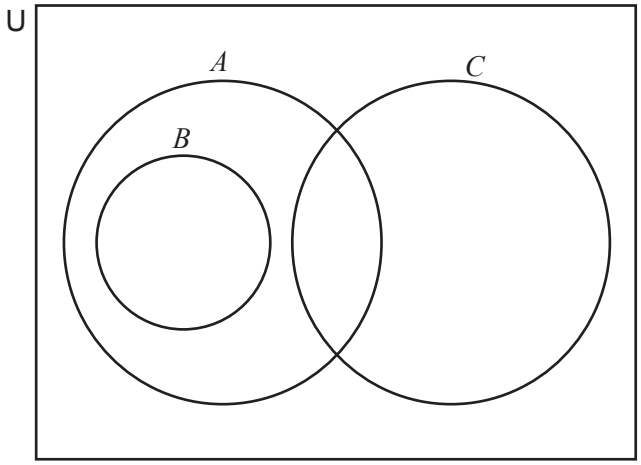


Find the equation of this quadratic curve.

Answer(b) ..... [3]

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6 The Venn diagram shows the sets A, B and C.



$\mathsf{U} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15\}$
$A = \{\text{factors of } 12\}$
$B = \{\text{factors of } 6\}$
$C = \{11, 12, 13, 14\}$

(a) List the elements of sets A and B.

Answer(a) $A = \{$ ..... $\}$

$B = \{$ ..... $\}$ [2]

(b) Write all the elements of U in the correct regions of the Venn diagram above. [3]

(c) List the elements of

(i) $A \cap B$,

Answer(c)(i) $\{$ ..... $\}$ [1]

(ii) $A' \cap C$,

Answer(c)(ii) $\{$ ..... $\}$ [1]

(iii) $B \cup C'$.

Answer(c)(iii) $\{$ ..... $\}$ [1]

(d) Find

(i) $\mathrm{n}(A \cup B \cup C)'$,

Answer(d)(i) ..... [1]

(ii) $\mathrm{n}(A \cap B \cap C)'$.

Answer(d)(ii) ..... [1]

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7 Squash balls have radius 1.5 cm.
They are sold in boxes. Each box is a cuboid.
Each box has length 15 cm, width 12 cm and height 3 cm.

(a) Show that the maximum number of balls in a box is 20.

[1]

(b) Calculate the volume of **one** ball.

Answer(b) ..... cm^3 [2]

(c) Calculate the total volume of 20 balls.

Answer(c) ..... cm^3 [1]

(d) Write your answer to **part (c)** in standard form.

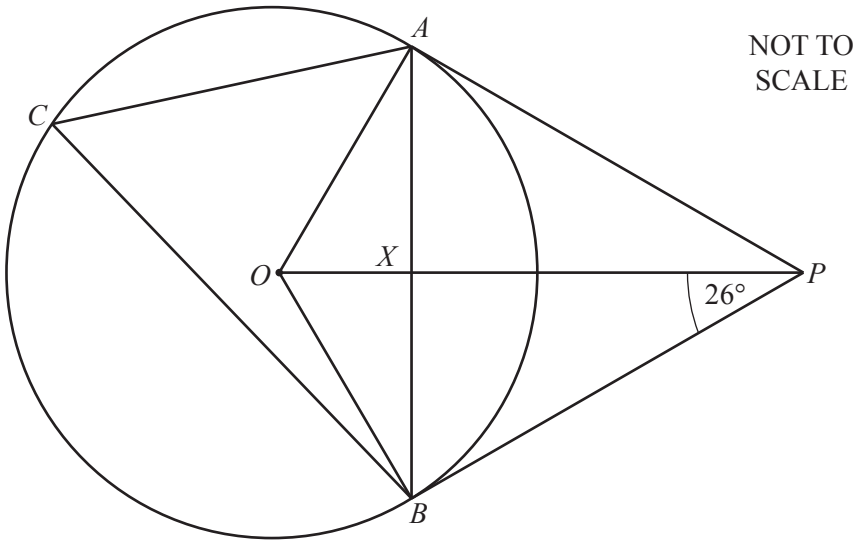
Answer(d) ..... cm^3 [1]

(e) Calculate the percentage of the volume of the box that the 20 balls fill.

Answer(e) ..... % [2]

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8



A, *B* and *C* lie on a circle, centre *O*.
AP and *BP* are tangents to the circle.
AB intersects *OP* at the point *X* and angle *OPB* = 26°.

(a) Find the size of

(i) angle *ABP*,

Answer(a)(i) ..... [1]

(ii) angle *OBA*,

Answer(a)(ii) ..... [1]

(iii) angle *ACB*.

Answer(a)(iii) ..... [1]

(b) Write down the mathematical name of quadrilateral *AOBP*.

Answer(b) ..... [1]

(c) Complete these statements.

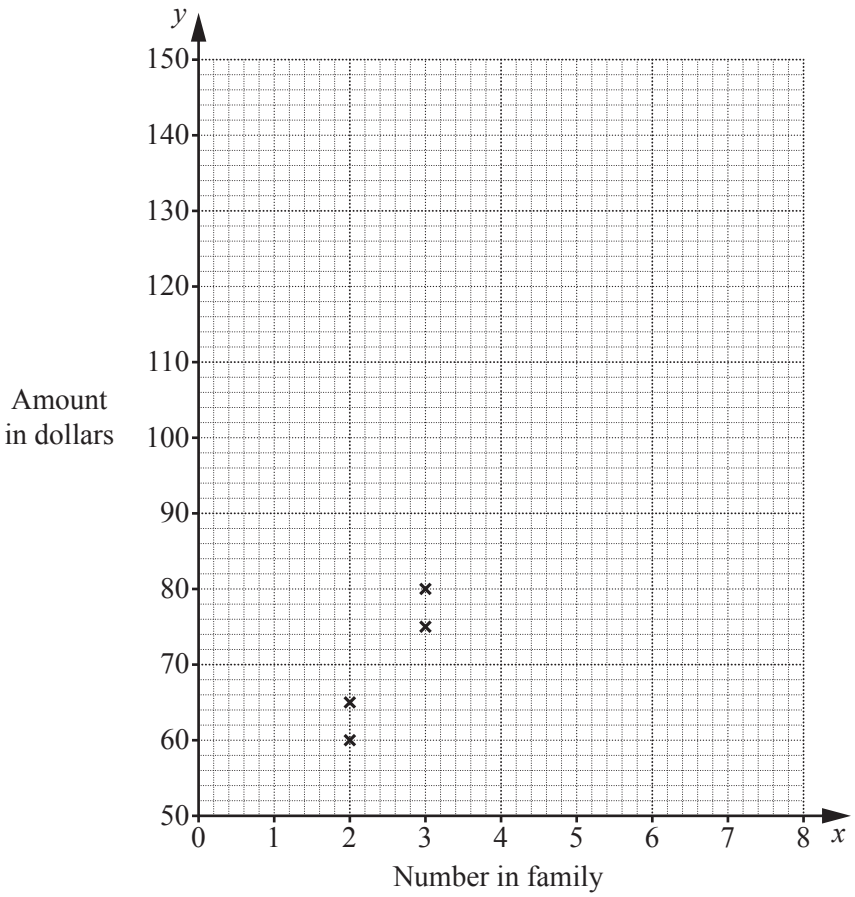
(i) Triangle *OBP* is congruent to triangle ..... . [1]

(ii) Triangle *OBP* is similar, but not congruent to, triangle ..... . [1]

9 The table shows the amount in dollars, y, that 10 families of different size, x, spend in one week.

Number in family, (x)	2	2	3	3	5	5	6	6	6	6
Amount in dollars, (y).	60	65	80	75	100	105	120	135	125	115

(a) (i) Complete the scatter diagram.
The first four points have been plotted for you.



[2]

(ii) What type of correlation is shown by the scatter diagram?

Answer(a)(ii) ..... [1]

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(b) Find

(i) the mean family size,

Answer(b)(i) ..... [1]

(ii) the mean amount spent in one week.

Answer(b)(ii) $ ..... [1]

(c) **(i)** Find the equation of the regression line in the form $y = mx + c$.

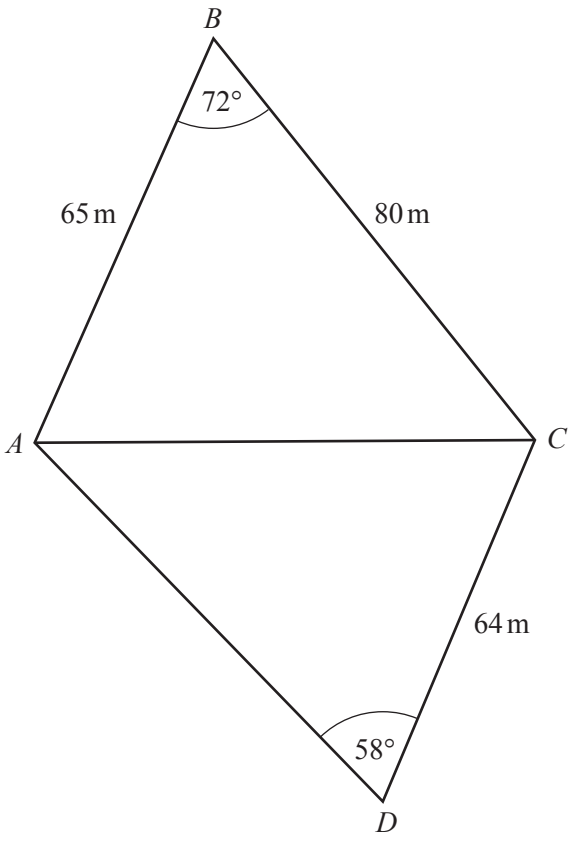
Answer(c)(i) $y =$ ..... [2]

(ii) Use your answer to **part (c)(i)** to estimate the amount spent in one week by a family of 4.

Answer(c)(ii) $ ..... [1]

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10



(a) Find AC.

Answer(a) ..... m [2]

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(b) Calculate angle *CAD*.

Answer(b) ..... [3]

(c) Calculate the area of the quadrilateral *ABCD*.

Answer(c) ..... m^2 [4]

11 Paula invests \$3000 in Bank *A* and \$3000 in Bank *B*.

(a) Bank *A* pays compound interest at a rate of 4% each year.

(i) Find the total amount that Paula has in Bank *A* at the end of 3 years.

Answer(a)(i) \$ ..... [2]

(ii) After how many complete years is the total amount that Paula has in Bank *A* greater than \$4000?

Answer(a)(ii) ..... [3]

(b) Bank *B* pays simple interest at a rate of 5% each year.

(i) Find the total amount that Paula has in Bank *B* at the end of 3 years.

Answer(b)(i) \$ ..... [1]

(ii) After how many complete years is the total amount that Paula has in Bank *B* greater than \$4000?

Answer(b)(ii) ..... [1]

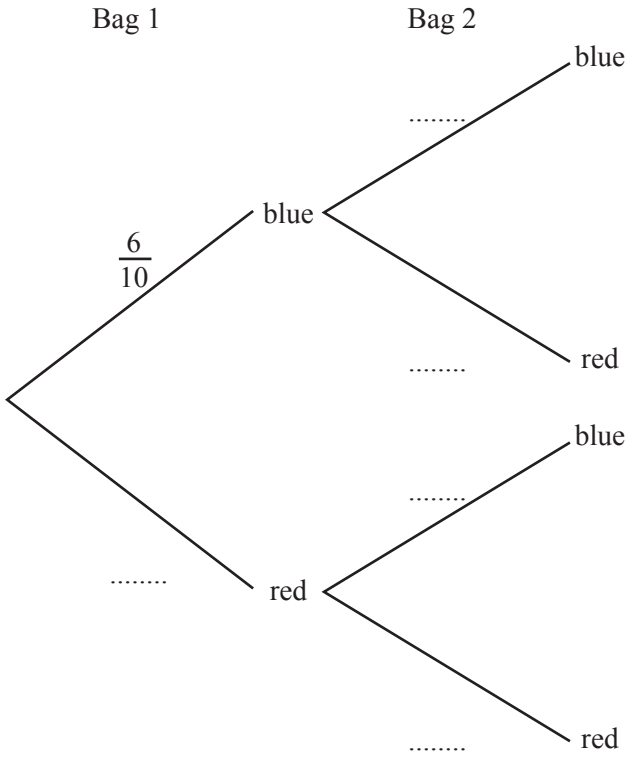
(c) After how many complete years will the total amount that Paula has in Bank *A* be greater than the total amount that Paula has in Bank *B*?

Answer(c) ..... [3]

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12 Bag 1 only contains 6 blue balls and 4 red balls.
Bag 2 only contains 8 blue balls and 2 red balls.
Marco chooses a ball at random from Bag 1 and puts it in Bag 2.
He then chooses a ball at random from Bag 2 and puts it in Bag 1.

(a) Complete the tree diagram.



[2]

(b) Find the probability that the two balls chosen are

(i) both blue,

Answer(b)(i) ..... [2]

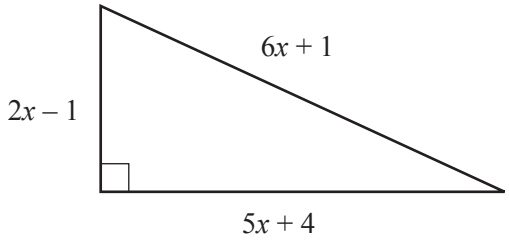
(ii) one red and one blue.

Answer(b)(ii) ..... [3]

(c) Find the probability that, after Marco chooses the two balls, there are exactly 6 blue balls in Bag 1.

Answer(c) ..... [3]

13 In this question all lengths are in centimetres.



(a) Write down a quadratic equation, in terms of x, and show that it simplifies to

$$7x^2 - 24x - 16 = 0.$$

[3]

(b) Factorise $7x^2 - 24x - 16$.

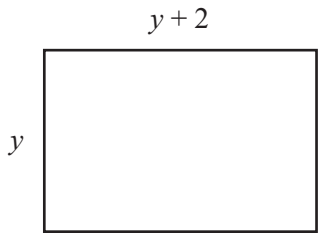
Answer(b) ..... [2]

(c) Show that the area of the triangle is $84\,cm^2$.

[2]

(d) The area of this rectangle is equal to the area of the triangle.

Find the value of y.

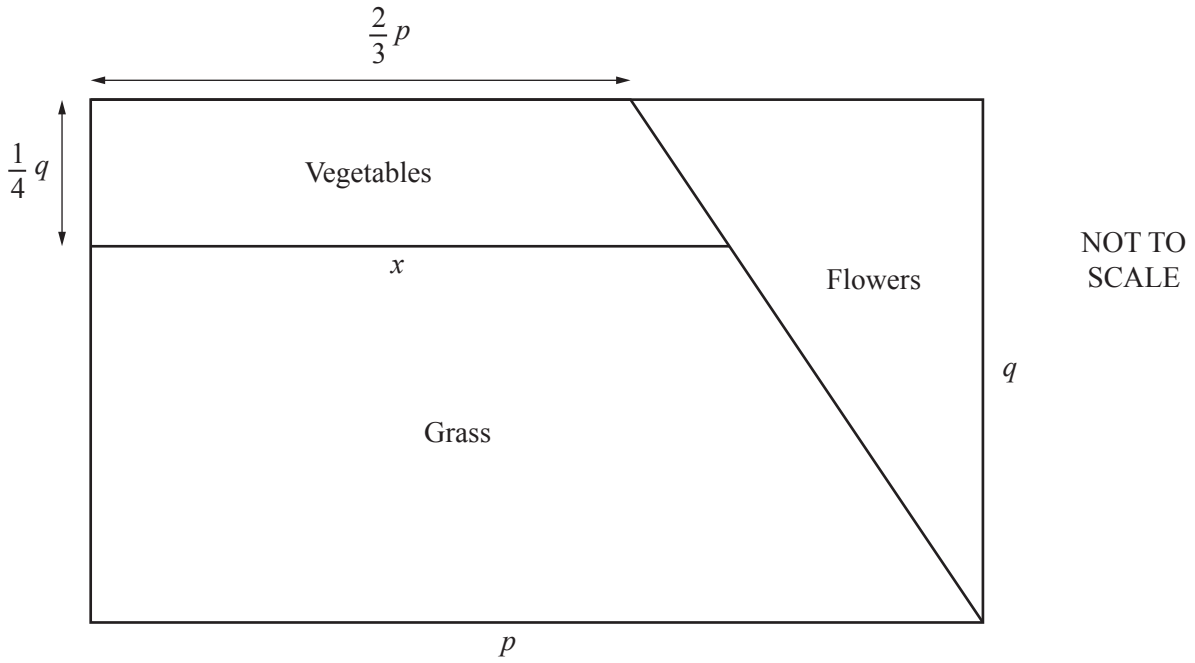


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Answer(d) $y =$ ..... [4]

14 In this question all measurements are in metres.

A rectangular garden has length p and width q.
The garden is divided into 3 sections as shown in the diagram.



(a) Write down an expression, in terms of p and q, for the area for flowers.

Answer(a) .....m^2 [1]

(b) Show that $x = \frac{3}{4}p$.

[2]

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(c) Find an expression, in terms of p and q, for the area for grass.
Give your answer in its simplest form.

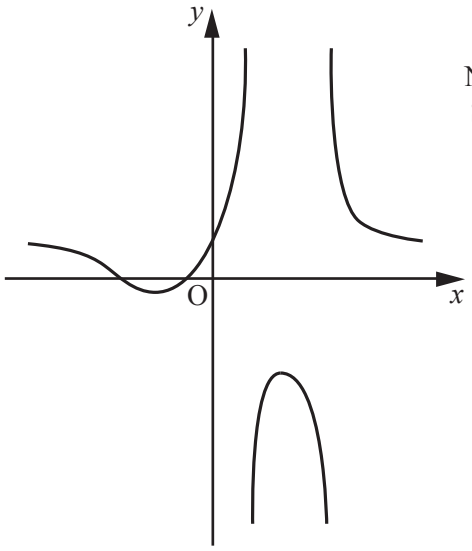
Answer(c) .....m^2 [2]

(d) Find the ratio area for vegetables : area for grass .

Answer(d) ..... : ..... [2]

Question 15 is printed on the next page.

15 The diagram shows a sketch of the graph of $y = \mathrm{f}(x)$ where $\mathrm{f}(x) = \dfrac{x^2 + 4x + 3}{x^2 - 4x + 3}$.



(a) **(i)** Find the equations of the three asymptotes.

Answer(a)(i) ..... , ... , ... [3]

(ii) Find the co-ordinates of the local maximum point.

Answer(a)(ii) (..... , ...) [2]

(iii) Find the co-ordinates of the local minimum point.

Answer(a)(iii) (..... , ...) [2]

(b) Find the values of k, when

(i) $\mathrm{f}(x) = k$ has no solutions,

Answer(b)(i) ..... [2]

(ii) $\mathrm{f}(x) = k$ has one solution.

Answer(b)(ii) ..... [1]

(c) Solve the inequality $\mathrm{f}(x) > 0$.

Answer(c) ..... [3]

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