Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

0878953678

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/31**

Paper 3 (Core) **October/November 2014**

1 hour 45 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 96.

This document consists of **16** printed pages.

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Formula List

Area, A, of triangle, base b, height h.	$A = \frac{1}{2}bh$
Area, A, of circle, radius r.	$A = \pi r^2$
Circumference, C, of circle, radius r.	$C = 2\pi r$
Curved surface area, A, of cylinder of radius r, height h.	$A = 2\pi rh$
Curved surface area, A, of cone of radius r, sloping edge l.	$A = \pi rl$
Curved surface area, A, of sphere of radius r.	$A = 4\pi r^2$
Volume, V, of prism, cross-sectional area A, length l.	$V = Al$
Volume, V, of pyramid, base area A, height h.	$V = \frac{1}{3}Ah$
Volume, V, of cylinder of radius r, height h.	$V = \pi r^2 h$
Volume, V, of cone of radius r, height h.	$V = \frac{1}{3}\pi r^2 h$
Volume, V, of sphere of radius r.	$V = \frac{4}{3}\pi r^3$

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Answer **all** the questions.

1 Write down

(a) a factor of 84 which is greater than 10,

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

(b) a multiple of 12,

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

(c) a prime number between 20 and 30,

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

(d) the value of 8^0,

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

(e) the cube root of 64,

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

(f) an example of an obtuse angle,

Answer(f) ..... [1]

(g) the order of rotational symmetry of a parallelogram.

Answer(g) ..... [1]

2 **(a)** Write 3648 correct to the nearest 100.

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

(b) Write 2.6351 correct to 2 decimal places.

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

(c) Write 3.0865 correct to 3 significant figures.

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

(d) Simplify.

$6a + 3b - 2a - b$

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

(e) Find the value of $3p - 2q$ when $p = -1$ and $q = 2$.

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

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3 **(a)** Work out.

(i) $\sqrt{183}$

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

(ii) $(0.34 + 1.27)^2$

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

(iii) $\frac{2}{7} \times 105$

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

(iv) $\frac{7}{8} - \frac{1}{4}$

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

(v) 45% of 63.8

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

(vi) $\frac{3.84}{5 \times 2.16}$

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

(b) Divide 52 in the ratio $6 : 7$.

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

(c) Dragon fruit cost \$1.79 each.
Calculate the maximum number of dragon fruit Sian can buy for \$20.
How much change should she receive from \$20?

Answer(c) Number of dragon fruit .....

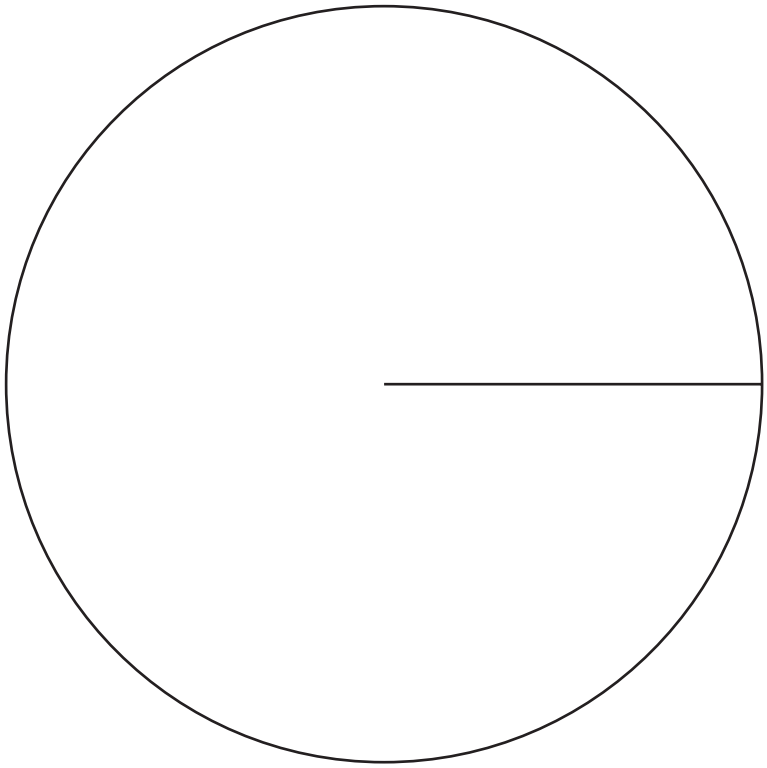
Change \$ ..... [3]

4 Dave has 3 cats, 2 dogs and 4 rabbits.
He shows this information in a pie chart.

(a) Calculate the sector angle for the 3 cats.

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

(b) Construct and label the pie chart.



[3]

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5 **(a)** Colin invests \$600 at a rate of 2.1% per year simple interest.

Calculate how much interest he receives at the end of 3 years.

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

(b) Ryan invests \$600 at a rate of 2% per year compound interest.

Calculate how much interest Ryan receives at the end of 3 years.

Answer(b) \$ ..... [4]

6 To make 10 cupcakes, Nadia uses 250 g flour, 125 g sugar, 100 g butter and 3 eggs.

(a) The ratio flour : sugar : butter = 250 : 125 : 100.
Write this ratio in its simplest form.

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

(b) The table shows the cost of ingredients.

Ingredient	Cost ($)
500 g flour	1.20
500 g sugar	1.40
250 g butter	2.00
6 eggs	0.90

(i) Find the **total** cost of the ingredients which Nadia uses to make 10 cupcakes.

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

(ii) Find the cost of making one cupcake.

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

(iii) Nadia sells the cupcakes at the school bake sale for $0.50 each.

Find the profit she makes on one cupcake.

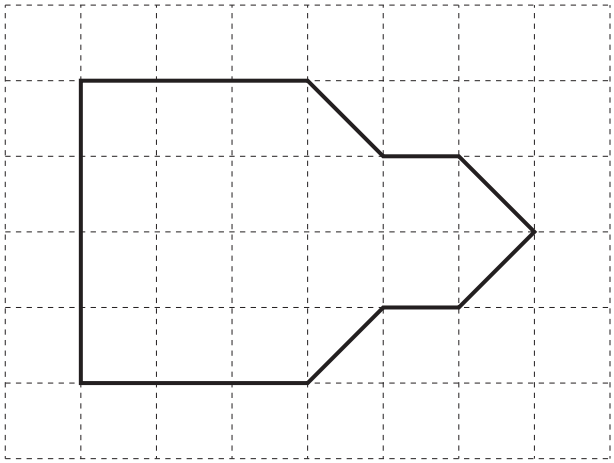
Answer(b)(iii) $ ..... [1]

(iv) Calculate the percentage profit on one cupcake.

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

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7 This shape is drawn on a 1cm^2 grid.



(a) Draw the line of symmetry on this shape. [1]

(b) Find the area of this shape in square centimetres.

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

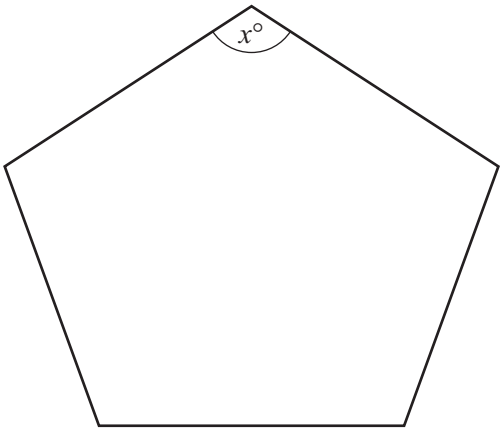
(c) Use Pythagoras' Theorem to help you calculate the perimeter of this shape.

Answer(c) ..... cm [4]

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

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

8



NOT TO SCALE

The diagram shows a regular polygon.

(a) Write down the mathematical name for this polygon.

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

(b) Calculate the value of x.

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

9

15, 11, 7, 3, …

(a) Write down the next two numbers in this sequence.

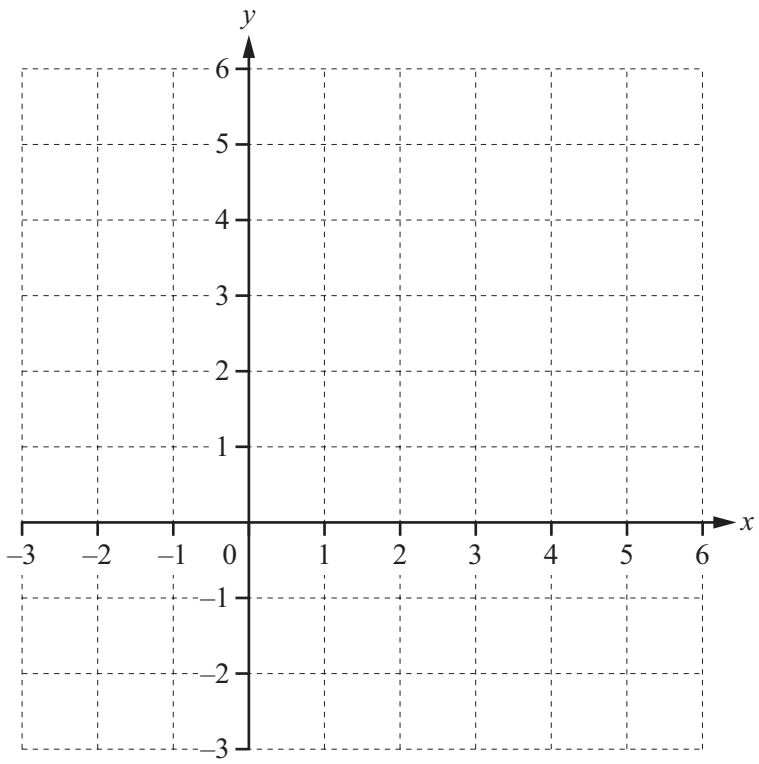
Answer(a) ..... , ... [2]

(b) Find an expression for the nth term of this sequence.

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

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(a) Plot and label the points $A(-2, 6)$ and $B(3, 1)$ and join them with a straight line. [2]

(b) Calculate the length of AB.

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

(c) Find the gradient of AB.

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

(d) Find the equation of the line parallel to AB passing through the point $(0, 1)$.

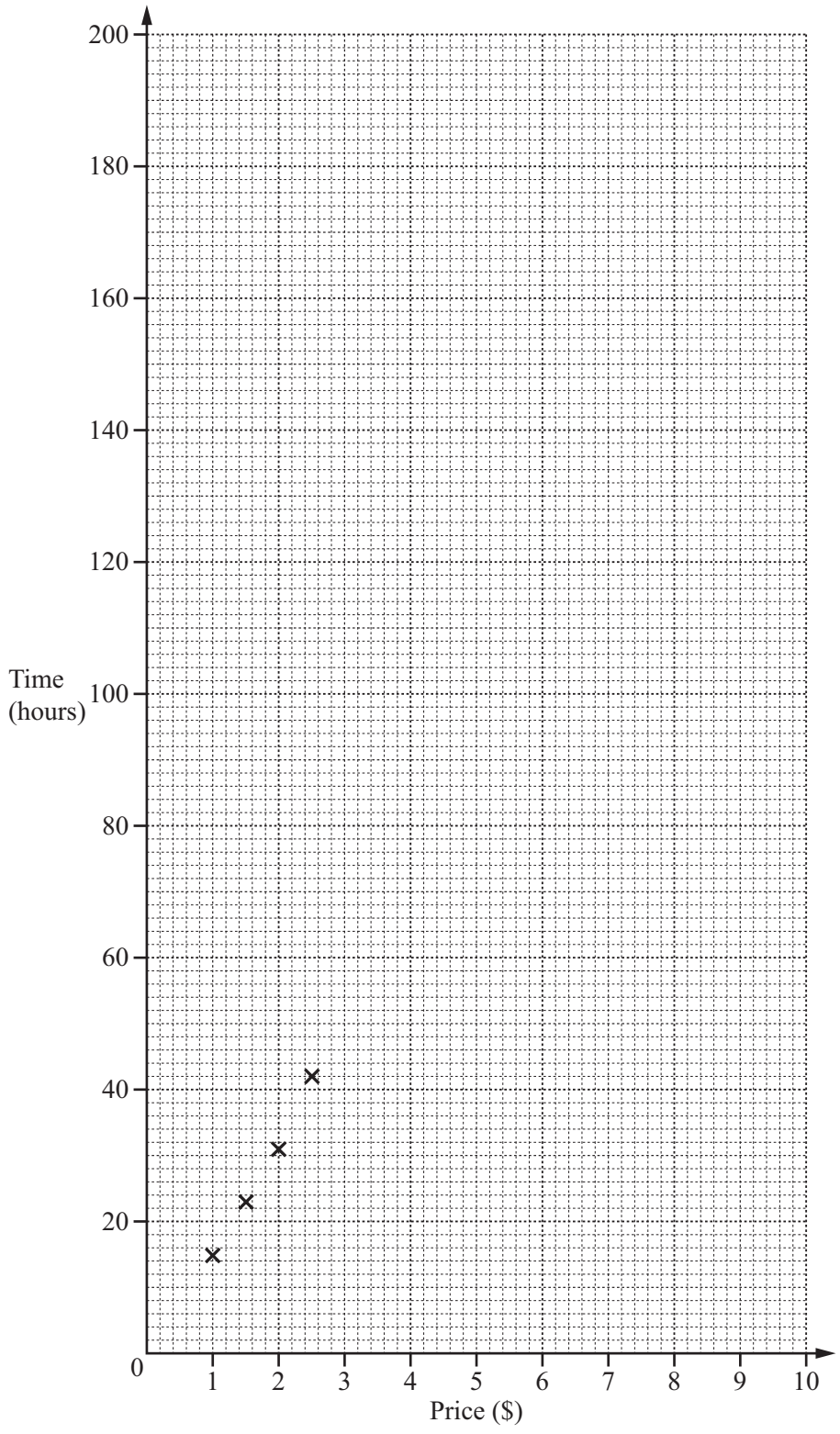
Give your answer in the form $y = mx + c$.

Answer(d) $y =$ ..... [2]

11 Sateja tests seven candles to find the time they take to burn.
The price, in dollars, and the time, in hours, are shown in the table.

Price ($)	1.00	1.50	2.00	2.50	5.00	7.50	10.00
Time (hours)	15	23	31	42	75	135	170

(a) Complete the scatter diagram.
The first 4 points have been plotted for you.



[2]

(b) What type of correlation does your scatter diagram show?

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

(c) (i) Find the mean price.

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

(ii) Find the mean time.

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

(iii) Plot the mean point on the scatter diagram. [1]

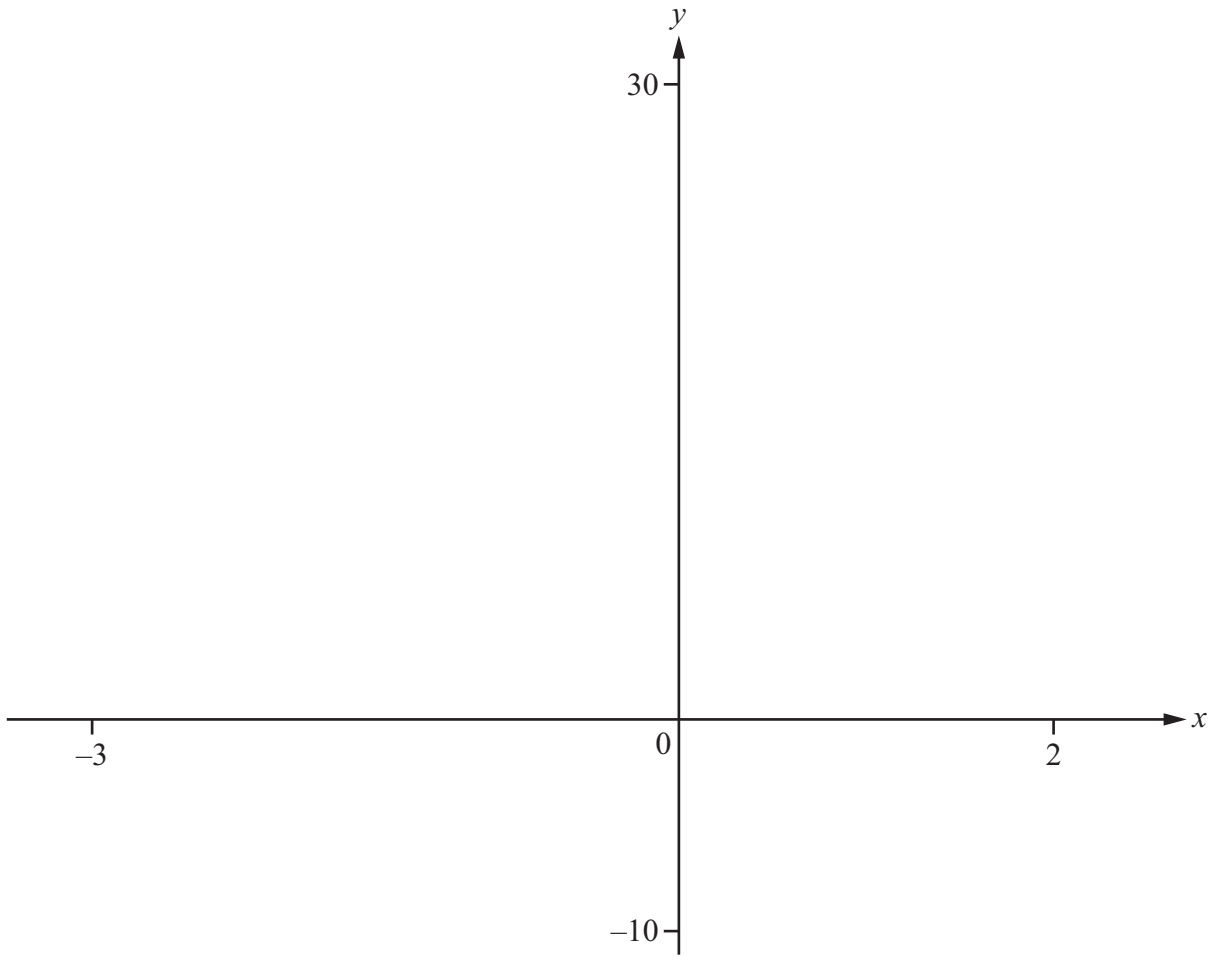
(iv) On the diagram, draw a line of best fit by eye. [2]

(d) Use your line of best fit to estimate the time taken to burn a candle that costs \$6.50 .

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

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$f(x) = 2x^3 + 5x^2 - 2x - 5$

(a) On the diagram, sketch the graph of $y = f(x)$ for $-3 \leqslant x \leqslant 2$. [2]

(b) Find the zeros of $f(x)$.

Answer(b) $x =$ .....

$x =$ .....

$x =$ ..... [2]

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(c) Find the co-ordinates of the local maximum and local minimum points.

Answer(c) Maximum (..... , ...)

Minimum (..... , ...) [2]

(d) Write down the number of solutions to the equations

(i) f(x) = 8,

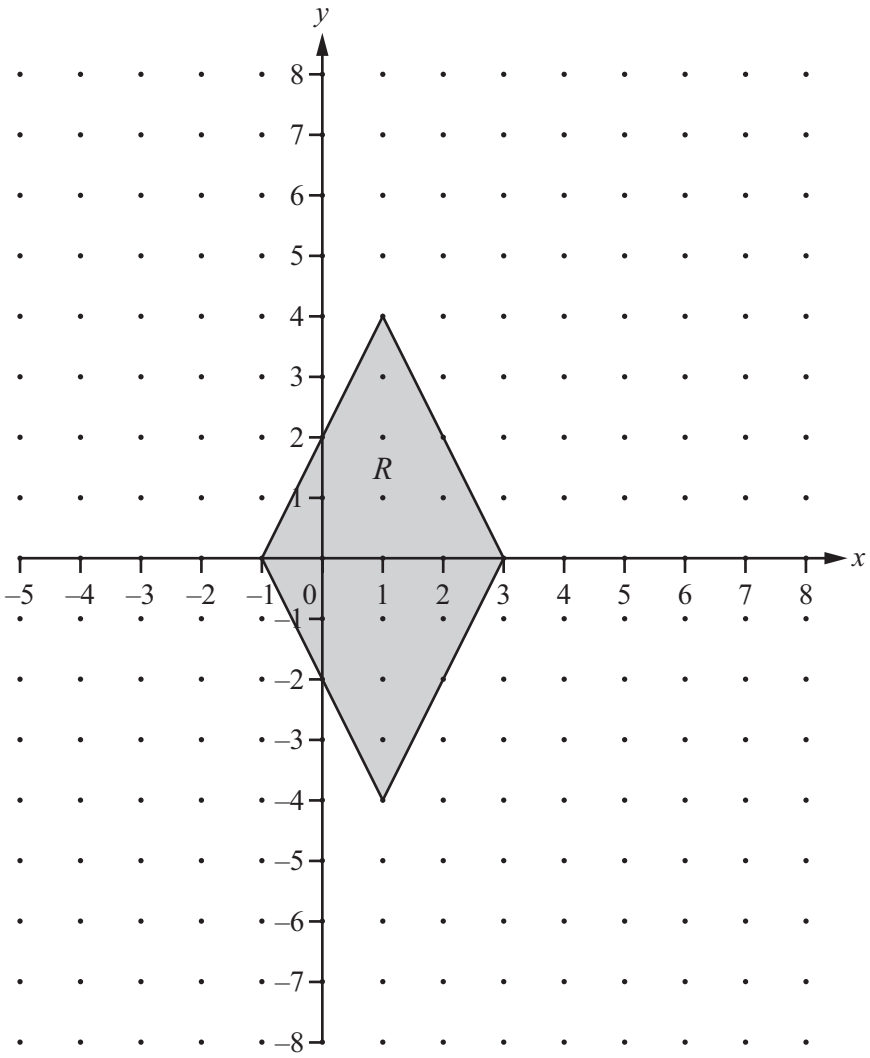
Answer(d)(i) ..... [1]

(ii) f(x) = 2.

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

Question 13 is printed on the next page.

13



The diagram shows a quadrilateral R.

(a) Reflect R in the line $x = 3$. Label the image S. [2]

(b) Translate the image $\boldsymbol{S}$ by the vector $\begin{pmatrix} -2 \\ 4 \end{pmatrix}$. Label the image T. [2]

(c) Rotate the image $\boldsymbol{T}$ through 180° about the point (3, 0). Label the image U. [2]

(d) The three images join R to form one shape.

Write down the mathematical name for this shape.

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

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