UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

9269295756

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/03**

Paper 3 (Core) **October/November 2010**

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, highlighters, glue or correction fluid.
You may use a 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.

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This document consists of **14** printed pages and **2** blank pages.

UNIVERSITY of CAMBRIDGE International Examinations

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.	$V = \frac{4}{3}\pi r^3$

Answer **all** the questions.

For Examiner's Use

1 In 2008 the population of a city was 276 000.

(a) Write 276 000 in standard form.

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

(b) $\frac{197}{400}$ of the population were male.

Calculate the number of males in the population.

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

(c) A year later the population of 276 000 had increased by 4 %.

(i) Calculate the new population.

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

(ii) Write your answer to **part (c)(i)** correct to the nearest ten thousand.

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

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2 20 students answered questions in a quiz.

The number of correct answers for each student is shown in the table.

25	21	24	25	29	18	24	30	25	25
29	17	15	15	19	25	23	21	16	19

(a) (i) Complete the stem-and-leaf plot to show this information.
The numbers in the first row of the table above have been plotted.

Stem	Leaf
1	8
2	5 1 4 5 9 4 5 5
3	0

Key 1 | 8 = 18

[2]

(ii) Complete the **ordered** stem-and-leaf plot.

Stem	Leaf
1	
2	
3	

Key 1 | 8 = 18

[1]

(iii) Use your stem-and-leaf plot in **part(a)(ii)** to find the median.

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

(b) Complete the bar chart, which has already been started for you.

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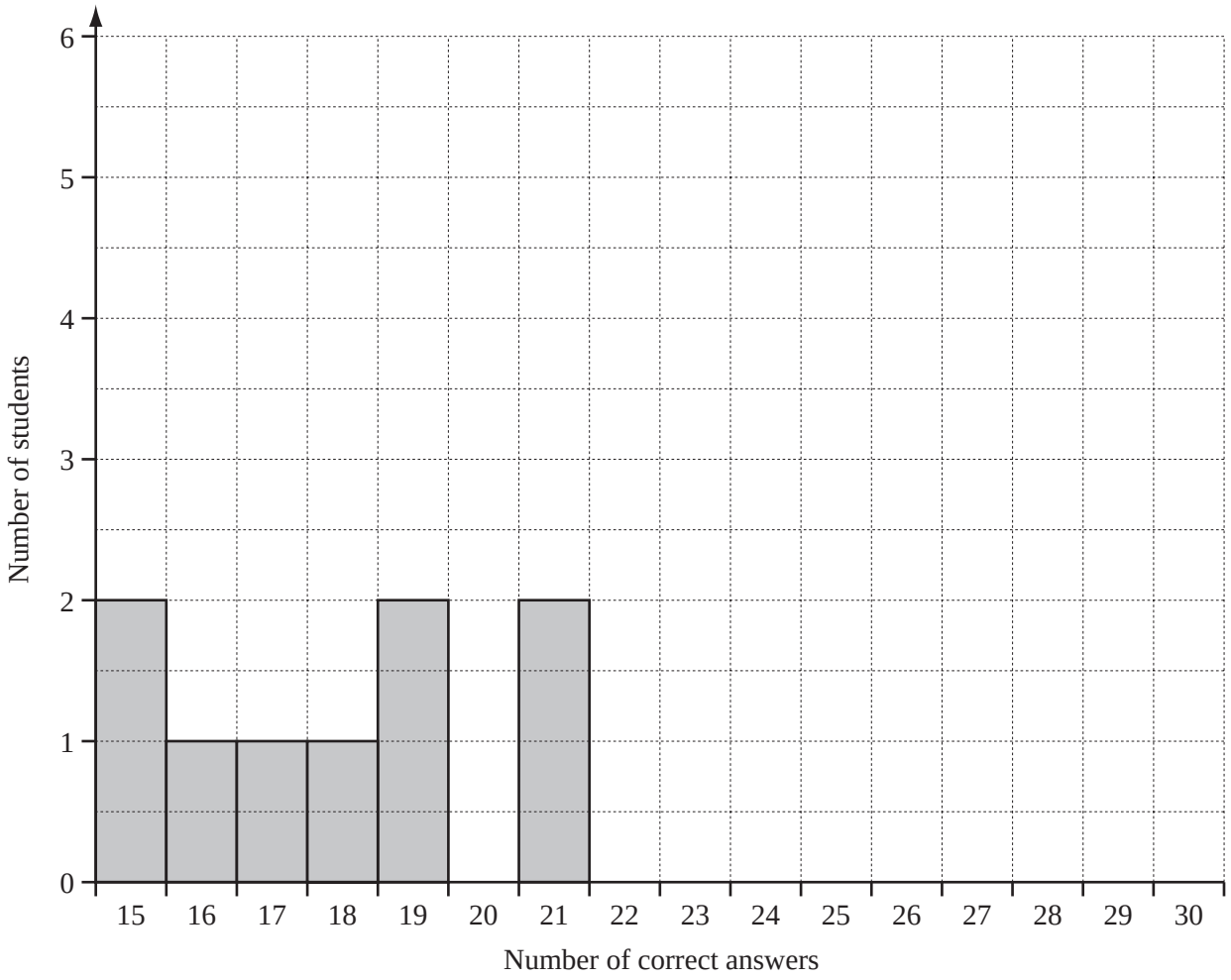

[3]

(c) Calculate the percentage of students who scored 29 correct answers.

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

3

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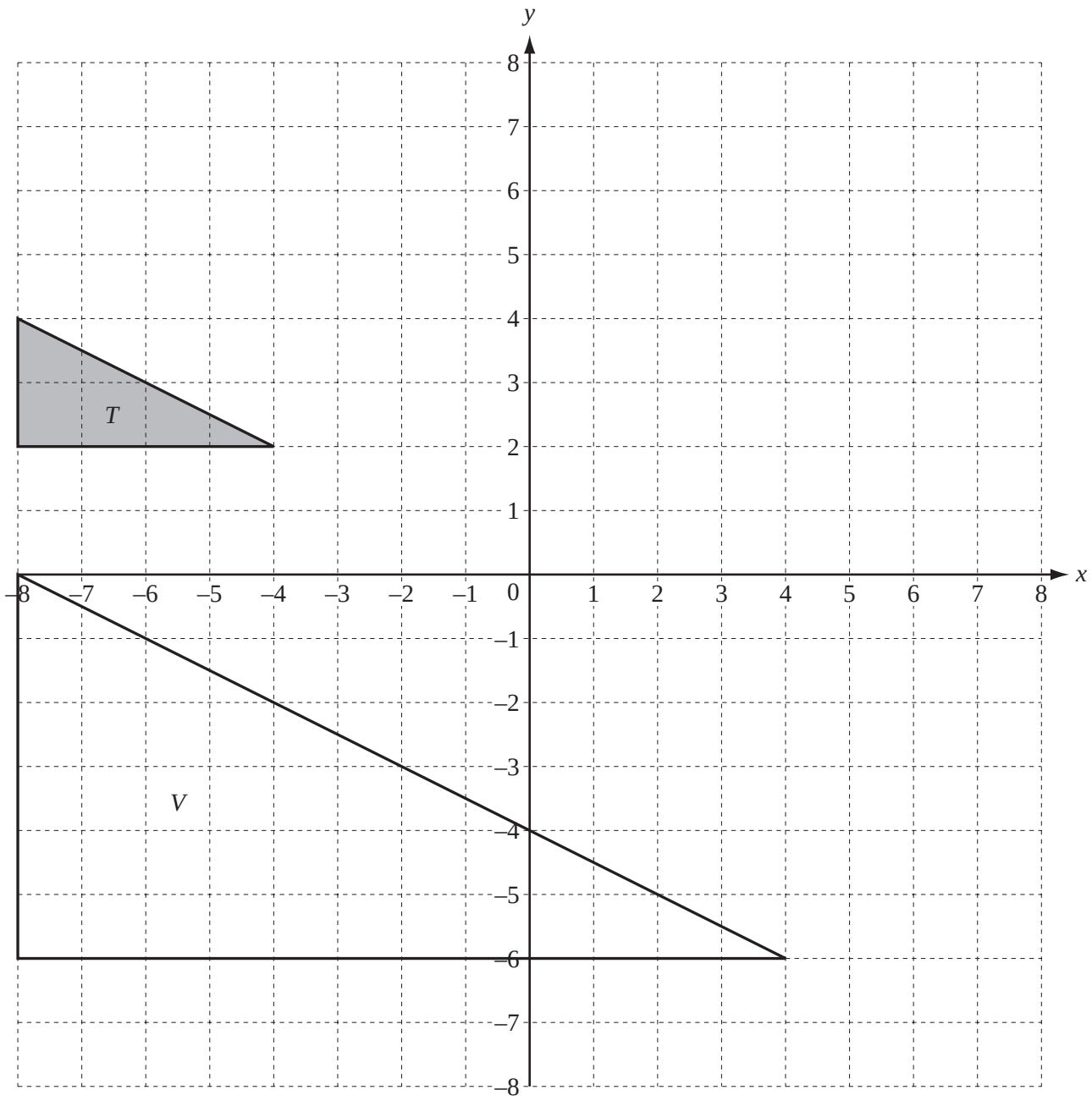

(a) On the grid,

(i) draw the translation of triangle T by $\begin{pmatrix} 4 \\ 2 \end{pmatrix}$, [2]

(ii) draw the reflection of triangle T in the y-axis, [2]

(iii) draw the rotation of triangle T about (0, 0) through 180°. [2]

(b) Describe fully the **single** transformation that maps triangle T onto triangle V.

.....

..... [3]

4 Farah takes 19 minutes to walk from home to school.

The distance from her home to school is 850 metres.

(a) She leaves home at 07 51.

At what time does she arrive at school?

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

(b) Calculate her average speed in

(i) metres per minute,

Answer(b)(i) ..... m/min [2]

(ii) kilometres per hour.

Answer(b)(ii) ..... km/h [2]

(c) Each day, in a week of 5 school days, Farah walks to and from school.

Calculate the **total** distance Farah walks.
Give your answer in kilometres.

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

5

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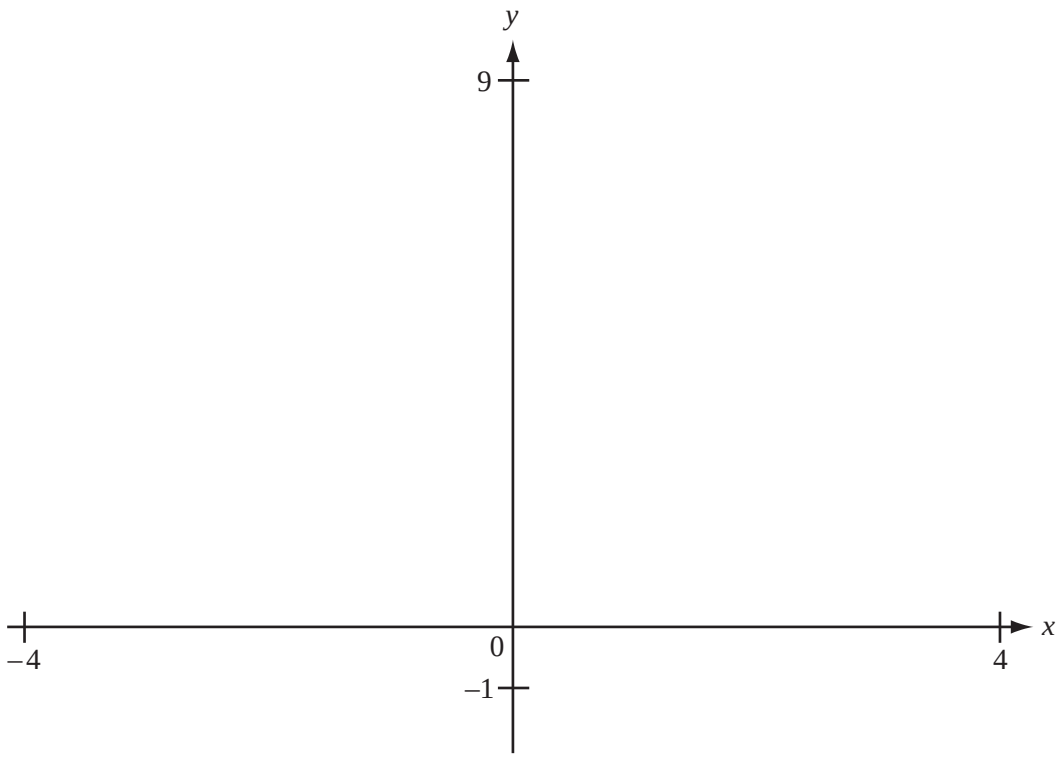

$f(x) = x^2$ $g(x) = (x - 1)^2$

(a) Sketch the graphs of $y = f(x)$ and $y = g(x)$ on the axes above. [4]

(b) Describe fully the **single** transformation that maps the graph of $y = f(x)$ onto the graph of $y = g(x)$.

.....

..... [2]

(c) The graph of $y = h(x)$ is a translation of the graph of $y = f(x)$ by the vector $\begin{pmatrix} 0 \\ 3 \end{pmatrix}$.

Write down $h(x)$ in terms of x.

Answer(c) $h(x) =$ ..... [2]

6

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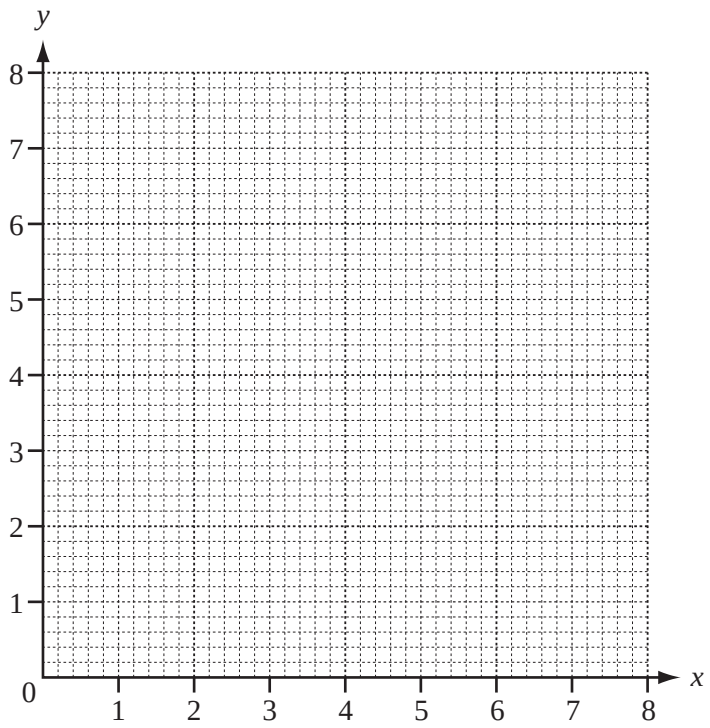


(a) (i) On the grid, draw accurately the line $y = \frac{1}{2}x + 2$, for $0 \leqslant x \leqslant 8$. [2]

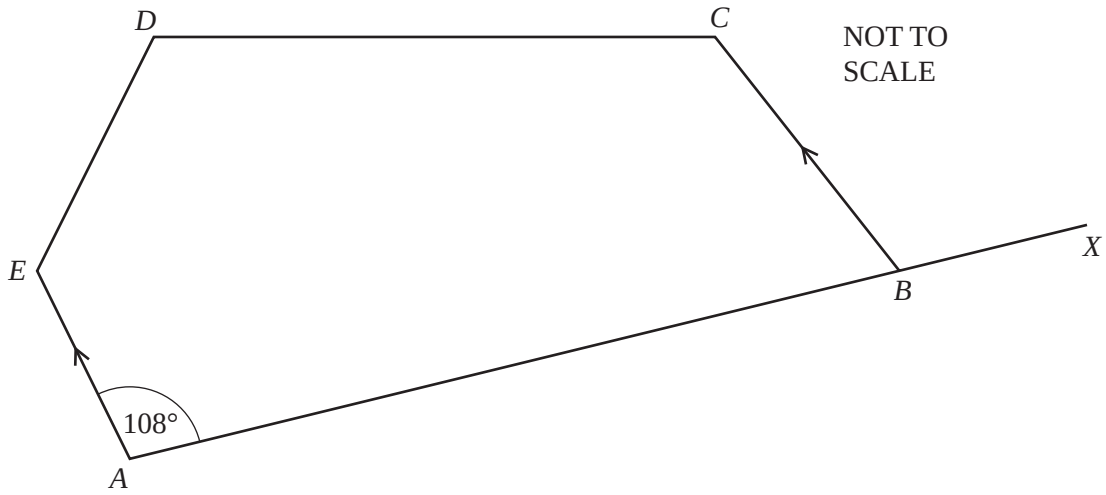
(ii) P is the point where the line cuts the y-axis.
Q is the point on the line where $x = 6$.
Mark the points P and Q on the grid. [2]

(b) Mark the point R (6, 2) on the grid and draw the triangle QPR. [1]

(c) Use trigonometry to calculate angle QPR.
Give your answer correct to 1 decimal place.

Answer(c) Angle QPR = ... [3]

7



The diagram shows a five-sided polygon *ABCDE*, with the side *AB* extended to *X*.

(a) Write down the geometrical name of the polygon *ABCDE*.

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

(b) *AE* is parallel to *BC* and angle *EAB* = 108°.
Write down the size of angle *CBX*.

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

(c) Calculate the sum of the five interior angles of the polygon *ABCDE*.

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

(d) The angles *BCD*, *CDE* and *DEA* are equal.
Calculate the size of one of these angles.

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

(e) **(i)** On the diagram, extend the sides *CD* and *AE* until they meet at *F*. [1]

(ii) Write down the special name of the quadrilateral *ABCF*.

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

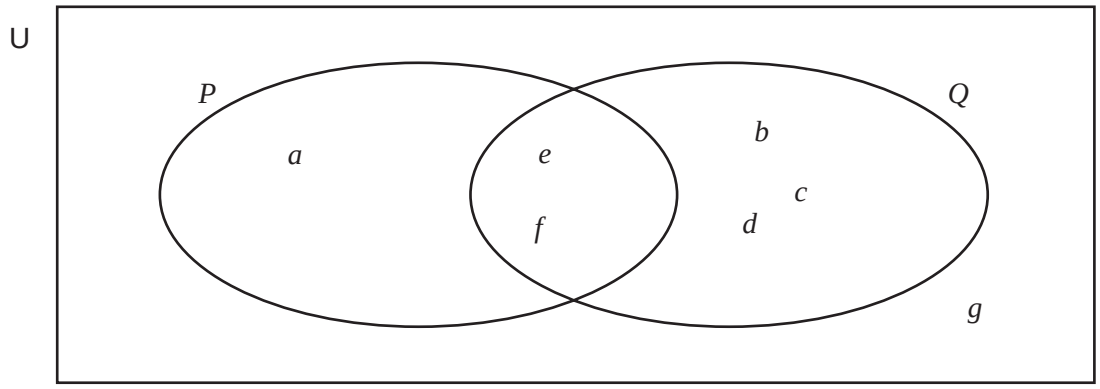
(iii) Calculate the size of angle *DFE*.

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

(iv) Write down the special name of the triangle *DEF*.

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

8



The Venn diagram shows a universal set, U = {*a*, *b*, *c*, *d*, *e*, *f*, *g*}, and the sets *P* and *Q*.

(a) Complete the following statements.

(i) P = { ..... } [1]

(ii) ..... = { *b*, *c*, *d*, *g* } [1]

(iii) $P \cap Q$ = { ..... } [1]

(iv) n($P \cup Q$) = ... [1]

(b) On the Venn diagram, shade the region $P \cap Q'$. [1]

(c) An element is chosen at random from U.

(i) Write down the probability that the element is *e*.

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

(ii) Write down the probability that the element is *h*.

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

(d) An element is chosen at random from set *P*.
Write down the probability that the element is *e*.

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

(e) 70 students are asked to choose a letter at random from U.
How many students would you expect to choose a letter from set *P*?

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

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9 Fahran counted the number of steps it took each student to walk across the sports hall.

The results for the 100 students are shown in the table.

Number of steps	18	19	20	21	22	23	24
Frequency	3	7	9	11	20	31	19

(a) Calculate the fraction of students who took 22 steps.
Give your answer in its lowest terms.

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

(b) Find

(i) the range,

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

(ii) the mean,

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

(iii) the median,

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

(iv) the mode.

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

(c) Fahran planned to draw a pie chart to show his results.
Calculate the sector angle for the number of students who took 23 steps.
Do not draw the pie chart.

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

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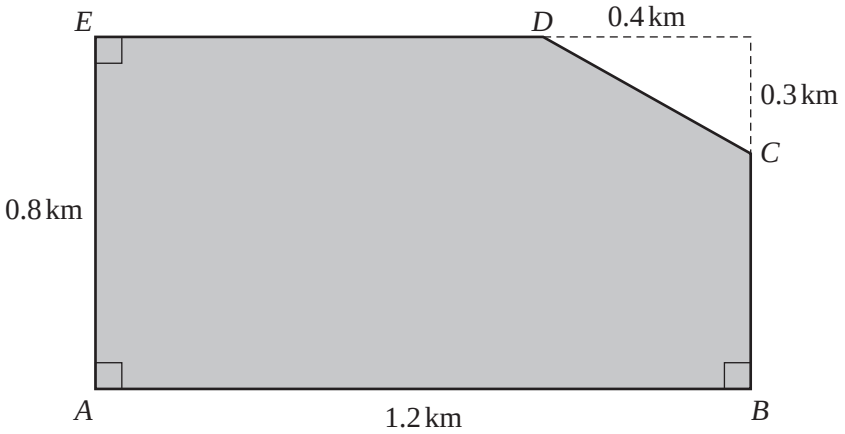
10 **(a)** 1 hectare (ha) = 10 000 m^2
Calculate the number of hectares in 1 km^2.

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

(b)



NOT TO SCALE

The diagram shows a field *ABCDE*.
Calculate the area of the field

(i) in km^2,

Answer(b)(i) ..... km^2 [3]

(ii) in hectares.

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

(c) **(i)** There is a fence around the field *ABCDE*.
Calculate the length of the fence.

Answer(c)(i) ..... km [4]

(ii) The cost of the fence is $450 per kilometre.
Calculate the total cost of the fence.

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

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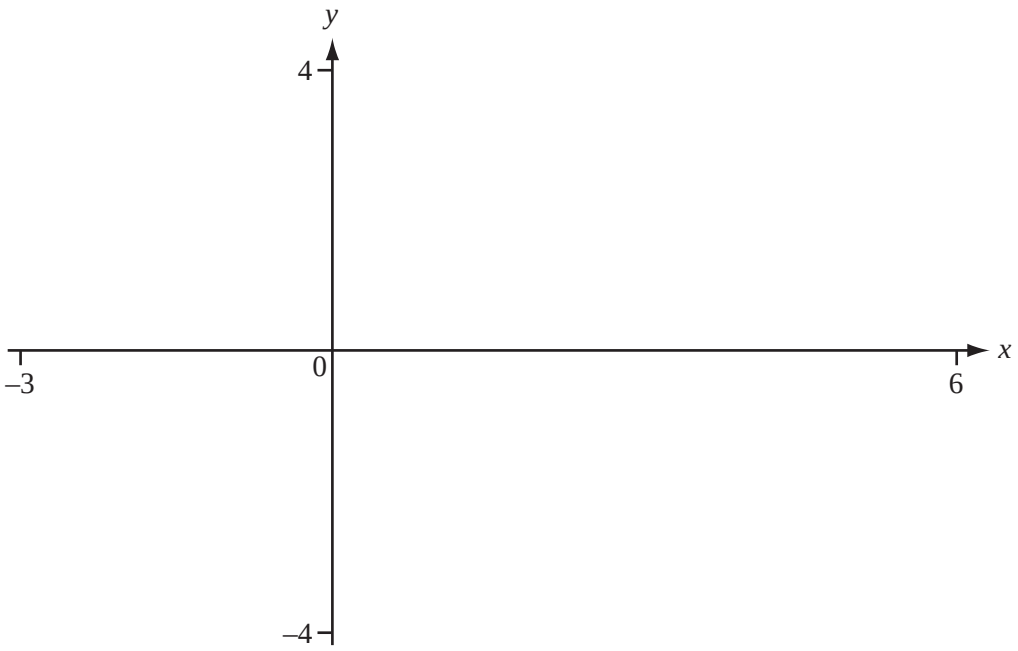

$f(x) = \dfrac{x}{x-2}, x \neq 2$

(a) On the diagram, sketch the graph of $y = \dfrac{x}{x-2}$. [3]

(b) The graph has two asymptotes.
Write down the equation of each asymptote.

Answer(b) .....

..... [2]

(c) Write down the range of $f(x)$.

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

(d) **(i)** On the same diagram, sketch the graph of $y = \dfrac{x}{2}$. [1]

(ii) Solve the equation $\dfrac{x}{x-2} = \dfrac{x}{2}$.

Answer(d)(ii) $x =$ ..... or $x =$ ..... [2]

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