

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 .

$$C = 2\pi r$$

Lateral surface area, A , of cylinder of radius r , height h .

$$A = 2\pi r h$$

Surface area, A , of sphere of radius r .

$$A = 4\pi r^2$$

Volume, V , of prism, cross-sectional area A , length l .

$$V = Al$$

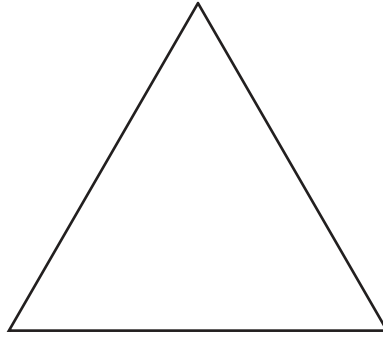
Volume, V , of cylinder of radius r , height h .

$$V = \pi r^2 h$$

Volume, V , of sphere of radius r .

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

- 1 The diagram shows a triangle with each side of length 5 cm.



- (a) Write down the mathematical name for this type of triangle.

..... [1]

- (b) (i) Measure the perpendicular height of the triangle.

..... cm [1]

- (ii) Calculate the area of the triangle.

..... cm^2 [2]

- (iii) The triangle is the cross-section of a prism with length 6 cm.

Calculate the volume of the prism.

..... cm^3 [2]

- 2 Gabriela designs the seating layout for a new theater. There are three sections of seats, A, B, and C.

- (a) Section A has 152 seats.
Section B has 12.5% more seats than Section A.

Section C has $\frac{3}{8}$ of the number of seats in Section A.

- (i) Show that the number of seats in Section B is 171.

[1]

- (ii) Show that the total number of seats is 380.

[2]

- (b) Write down and simplify the ratio of the number of seats in each section A : B : C.

A : B : C = : : [2]

- (c) In Section A:

- There are 12 seats in the front row.
- Each row has 2 more seats than the row in front of it.

Work out the number of rows for the 152 seats in Section A.

..... rows [2]

(d) For a concert in the theater, the ticket prices are in the ratio

$$A : B : C = 9 : 7 : 4.$$

A ticket for Section C costs \$6.

(i) Show that a ticket for Section B costs \$10.50 .

[1]

(ii) Find the cost of a ticket for Section A.

\$ [1]

(iii) The table shows the number of tickets sold in each section.

Section	Number of tickets sold
A	120
B	136
C	30

Calculate the total amount received from the ticket sales.

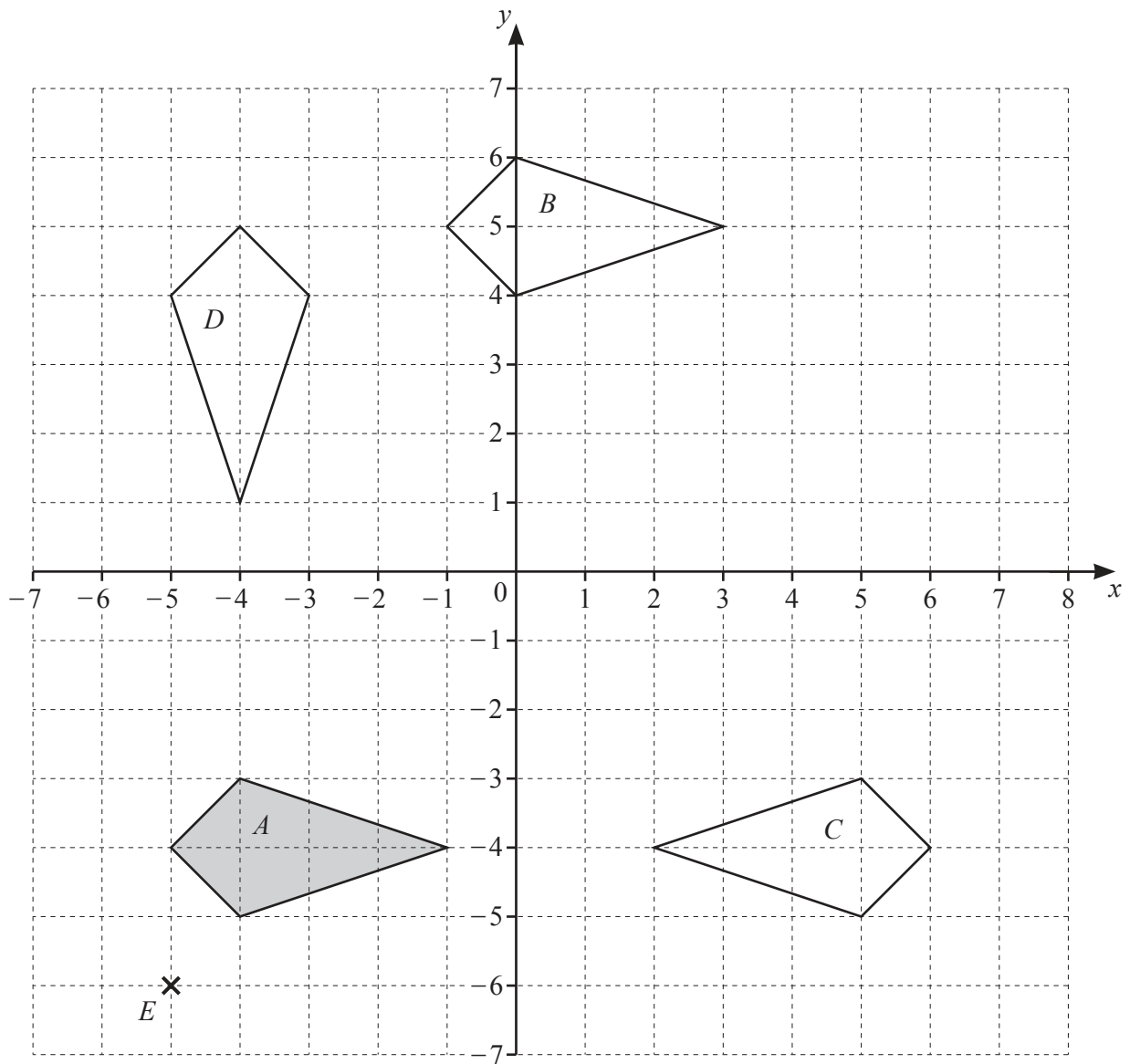
\$ [3]

(iv) The concert costs \$4500 to organize.

Calculate the amount received from the ticket sales as a percentage of the \$4500.

..... % [1]

- 3 The grid shows a point E and four quadrilaterals, A , B , C , and D .



- (a) Write down the mathematical name of shape A .

..... [1]

(b) Describe fully the **single** transformation that maps

(i) shape A onto shape B ,

.....
 [2]

(ii) shape A onto shape C ,

.....
 [2]

(iii) shape A onto shape D .

.....
 [3]

(c) (i) Write down the coordinates of the point E .

(..... ,) [1]

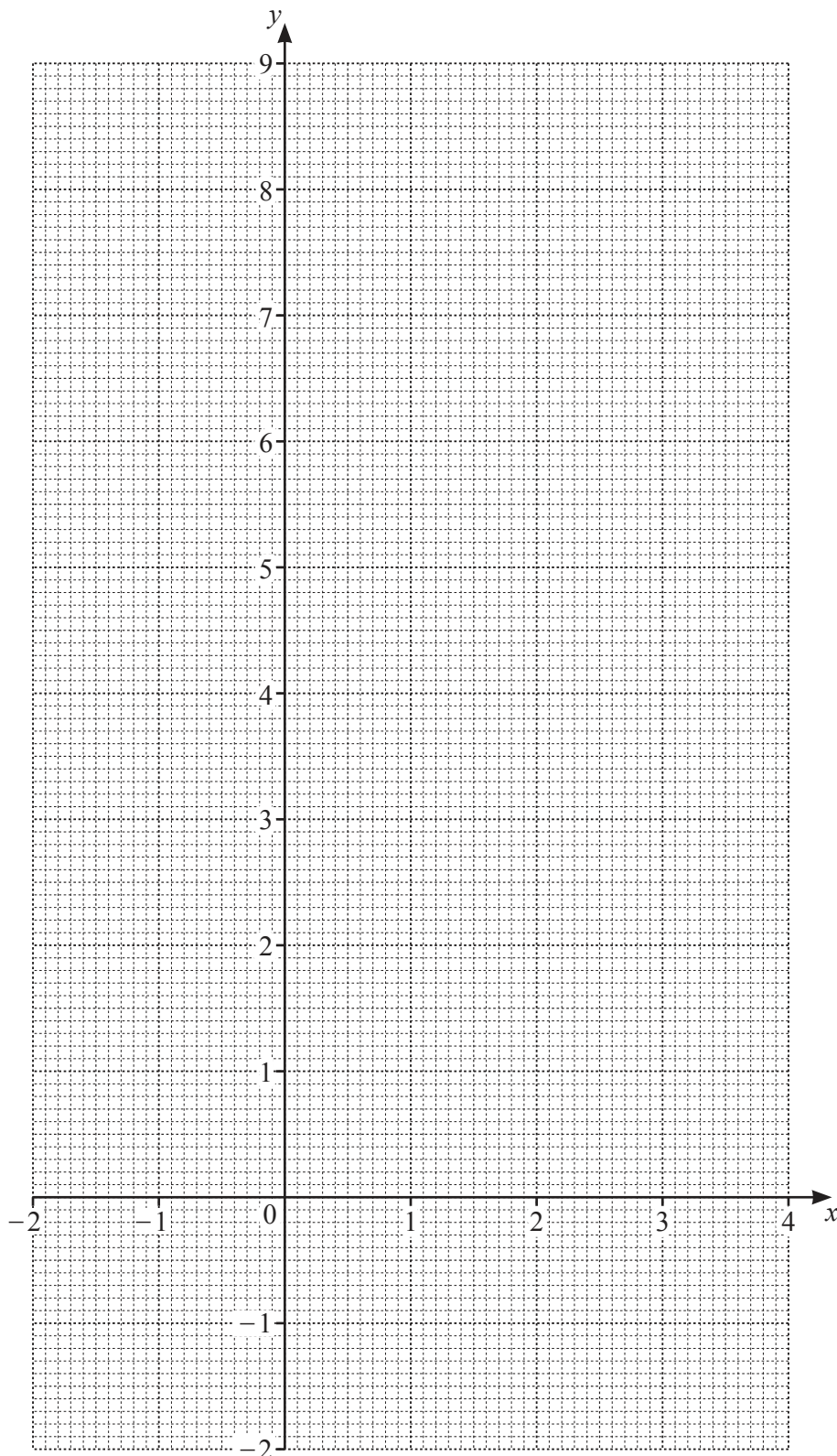
(ii) On the grid, draw the image of shape A after an enlargement by scale factor 3, center E . [2]

- 4 (a) Complete the table of values for $y = 7 + 2x - x^2$.

x	-2	-1	0	1	2	3	4
y	-1			8	7		-1

[2]

- (b) On the grid, draw the graph of $y = 7 + 2x - x^2$ for $-2 \leq x \leq 4$.



[4]

(c) Write down the equation of the line of symmetry of the graph.

..... [1]

(d) Use your graph to solve the equation $7 + 2x - x^2 = 0$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [2]

5 (a) Using the integers from 60 to 75 only, find

(i) a multiple of 17,

..... [1]

(ii) the prime numbers.

..... [2]

(b) Find

(i) the square root of 4489,

..... [1]

(ii) 4^3 ,

..... [1]

(iii) $\sqrt[3]{274\,625}$,

..... [1]

(iv) $2^{-3} \times 24^2$.

..... [1]

(c) Write 0.0379 correct to 2 significant figures.

..... [1]

(d) Find the least common multiple (LCM) of 8 and 14.

..... [2]

(e) Write 479 000 000 in scientific notation.

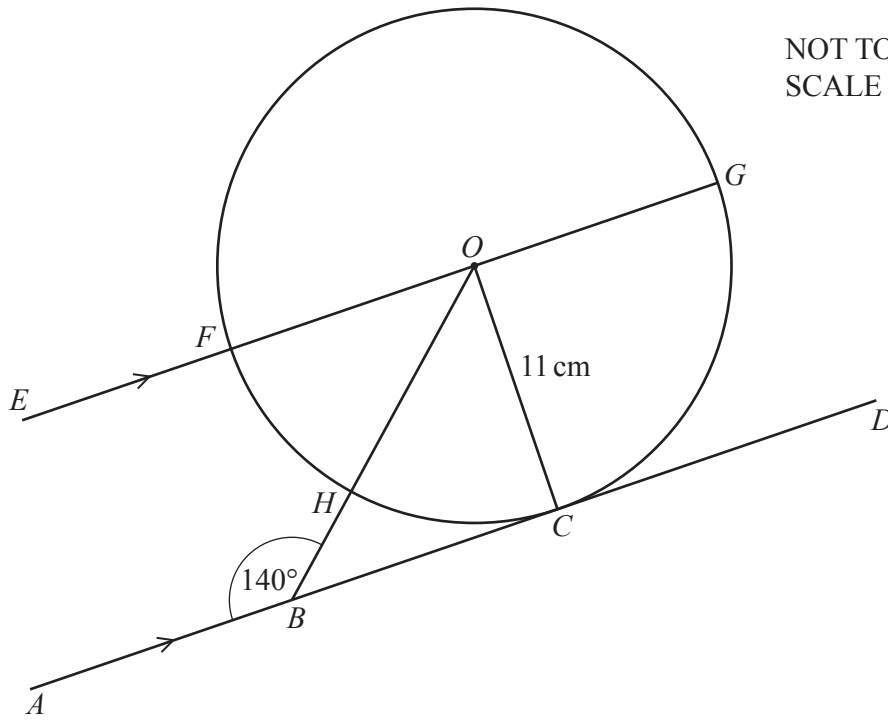
..... [1]

(f) George invests \$8000 at a rate of 3.6% per year compound interest.

Calculate the value of his investment at the end of 9 years.

\$ [2]

NOT TO SCALE



The diagram shows a circle, center O , radius 11 cm.
 $C, F, G,$ and H are points on the circumference of the circle.
 The line AD touches the circle at C and is parallel to the line EG .
 B is a point on AD and angle $ABO = 140^\circ$.

(a) Write down the mathematical name of the straight line AD .

..... [1]

(b) (i) Calculate the circumference of the circle.

..... cm [2]

(ii) Work out angle FOH .

Angle $FOH =$ [2]

(iii) Calculate the length of the minor arc FH .

..... cm [2]

(c) (i) Give a reason why angle BCO is 90° .

..... [1]

(ii) Show that $BC = 13.11$ cm, correct to 2 decimal places.

[3]

(iii) Calculate BH .

$BH =$ cm [3]

- 7 (a) 20 students from College A each run 5 km.
The times, correct to the nearest minute, are recorded.

32 51 25 40 47 21 37 32 48 36
46 39 30 29 44 39 53 35 40 31

(i) Find the median of the times.
..... min [1]

(ii) Explain why mode is not a suitable measure of average in this case.
..... [1]

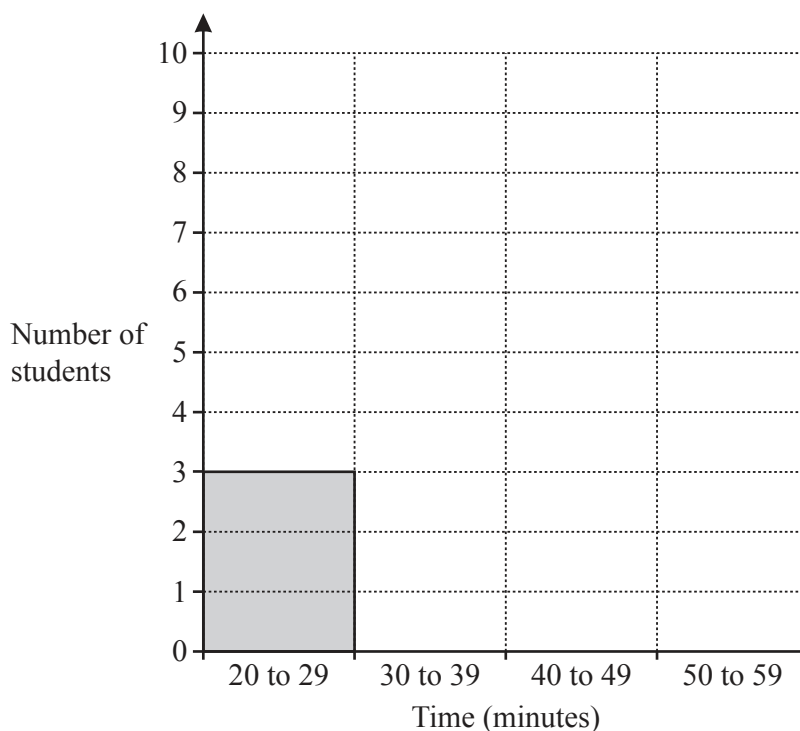
(iii) Find the probability that a student, chosen at random, took less than 33 minutes.
..... [1]

(iv) Complete the frequency table.

Time (minutes)	Frequency
20 to 29	3
30 to 39	
40 to 49	
50 to 59	

[1]

(v) Complete the bar chart for the times of the students.

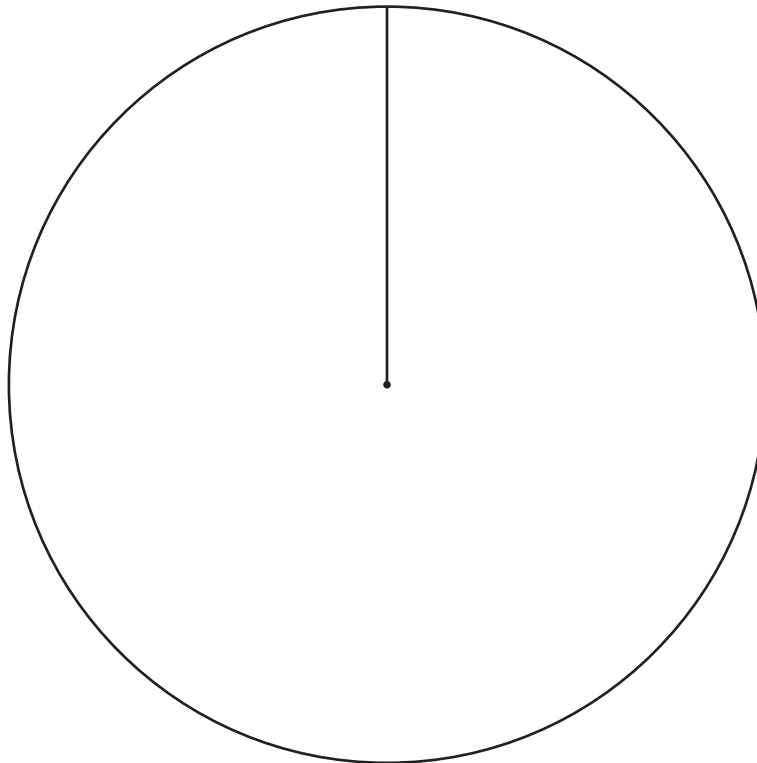


[2]

- (b) 20 students from College B each run 5 km.
 Their times, correct to the nearest minute, are recorded and the results are shown in the table.

Time (minutes)	Number of students	Pie chart sector angle
30 to 39	5	90°
40 to 49	8	
50 to 59	7	

- (i) Complete the table. [2]



- (ii) Complete the pie chart. [2]

- (c) Write down two comments comparing the times of students from College A with the times of students from College B.

1

.....

2

..... [2]

8 (a) Simplify $3c - 5d - c + 2d$.

..... [2]

(b) Solve the equation $12x - 7 = 23$.

$x =$ [2]

(c) Expand.

$$9(3 - x)$$

..... [1]

(d) $A = \frac{(a+b)h}{2}$

Work out the value of h when $A = 38.64$, $a = 5.5$, and $b = 3.7$.

$h =$ [3]

- (e) Alphonse is x years old and Beatrice is y years old.
Three times Alphonse's age is equal to 5 times Beatrice's age.
Twice Beatrice's age is 4 years more than Alphonse's age.

- (i) Use this information to write down two equations in x and y .

.....

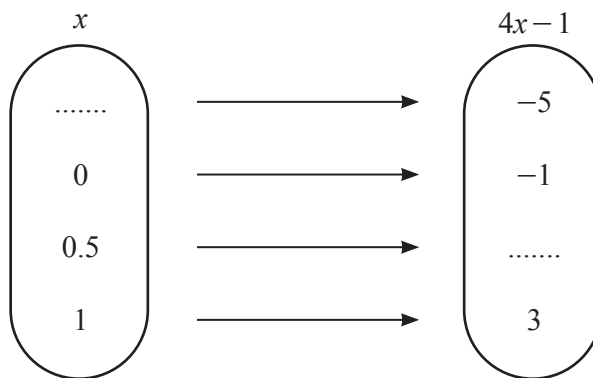
..... [2]

- (ii) Find the age of Alphonse and the age of Beatrice.

Alphonse years old

Beatrice years old [3]

9 (a) (i) Complete the mapping diagram for the function $f: x \rightarrow 4x - 1$.

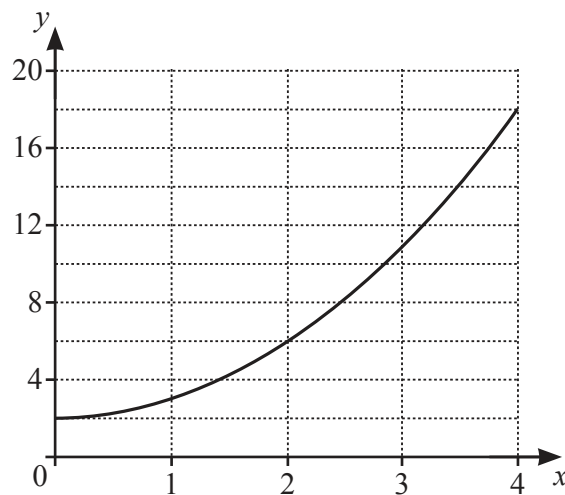


[2]

(ii) Write down the domain of the function f .

..... [1]

(b)

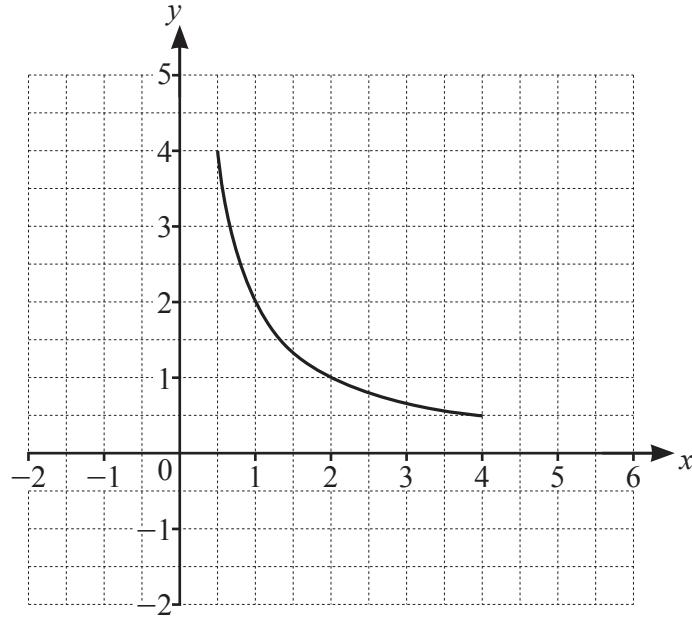


The diagram shows the graph of the function $y = g(x)$ where $g(x) = x^2 + 2$ for $0 \leq x \leq 4$.

Complete the range of $g(x)$.

..... $\leq g \leq$ [2]

(c)



The graph of $y = h(x)$ is shown on the grid.

On this grid, draw the graph of $y = h(x - 1)$.

[2]

Question 10 is printed on the next page.

10 Point B is 36 km from point A on a bearing of 140° .

(a) Using a scale of 1 centimeter to represent 4 kilometers, mark the position of B .



Scale: 1 cm to 4 km

[2]

(b) (i) Point C is 28 km from A and 20 km from B .
The bearing of C from A is less than 140° .

Using a ruler and compasses only, construct triangle ABC .
Show all your construction arcs.

[3]

(ii) Measure angle ACB .

Angle $ACB = \dots\dots\dots$ [1]

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