



# Cambridge IGCSE™

CANDIDATE  
NAME

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NUMBER

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**CAMBRIDGE INTERNATIONAL MATHEMATICS**

**0607/42**

Paper 4 (Extended)

**February/March 2024**

**2 hours 15 minutes**

You must answer on the question paper.

You will need: Geometrical instruments

## INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a graphic display calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For  $\pi$ , use your calculator value.

## INFORMATION

- The total mark for this paper is 120.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **24** pages. Any blank pages are indicated.

## Formula List

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

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  $l$ .  $A = \pi rl$

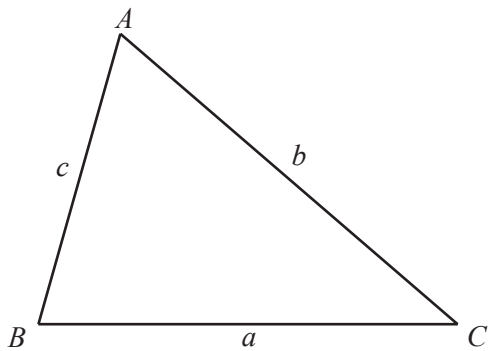
Curved surface area,  $A$ , of sphere of radius  $r$ .  $A = 4\pi r^2$

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



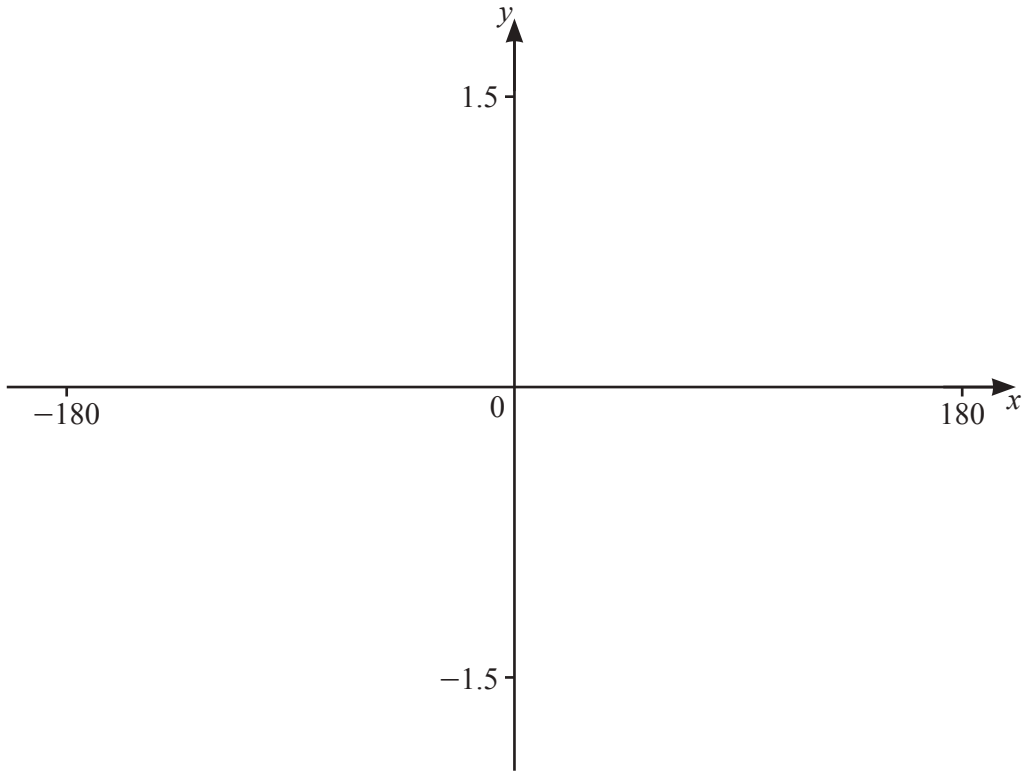
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

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

Answer **all** the questions.

1



$$f(x) = (\sin x^\circ)^2$$

(a) On the diagram, sketch the graph of  $y = f(x)$  for  $-180 \leq x \leq 180$ . [2]

(b) Write down the amplitude and period of  $f(x)$ .

Amplitude .....

Period ..... [2]

(c)  $g(x) = 0.002x + 0.5$

(i) On the diagram, sketch the graph of  $y = g(x)$  for  $-180 \leq x \leq 180$ . [2]

(ii) Solve  $g(x) = f(x)$  for  $-180 \leq x \leq 180$ .

..... [4]

(iii) Solve  $g(x) < f(x)$  for  $-180 \leq x \leq 180$ .

..... [2]

2 Asif, Basheera and Chelsea make baskets.

- (a) The selling price of a basket increases by 8%.  
The new selling price is \$4.86 .

Find the original selling price of a basket.

\$ ..... [2]

- (b) Asif earns \$4.70 per hour plus \$1.21 for each basket he makes.  
Each week he works 8 hours a day for 5 days.  
Each day Asif makes 18 baskets.

Calculate the total amount Asif earns in one week.

\$ ..... [3]

- (c) One day Basheera and Chelsea make a total of 36 baskets.  
They each work for 8 hours.  
Basheera takes  $x$  minutes to make a basket.  
Basheera takes 6 minutes longer than Chelsea to make a basket.

- (i) Write down an expression in terms of  $x$  for the number of baskets Chelsea makes.

..... [1]

- (ii) Write down an equation in terms of  $x$  and show that it simplifies to

$$3x^2 - 98x + 240 = 0.$$

[3]

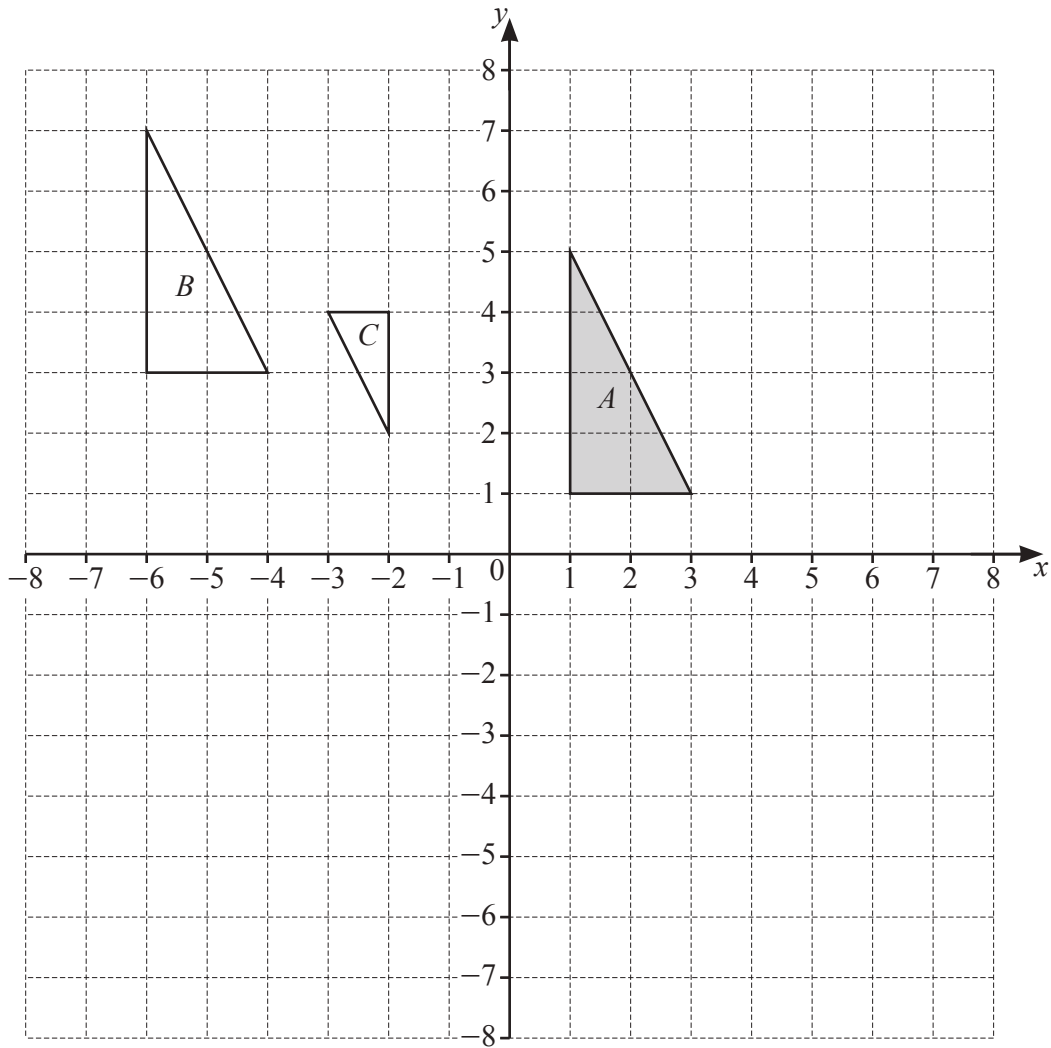
(iii) Solve the equation  $3x^2 - 98x + 240 = 0$ .

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

(iv) Find the number of baskets Chelsea makes.

$\dots\dots\dots$  [2]

3



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

.....  
 ..... [2]

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

.....  
 ..... [3]

- (c) (i) Rotate triangle  $A$  through  $90^\circ$  clockwise about  $(-1, -1)$ . Label the image  $D$ . [2]
- (ii) Reflect triangle  $D$  in the line  $x = -1$ . Label the image  $E$ . [2]
- (iii) Describe fully the **single** transformation that maps triangle  $A$  onto triangle  $E$ .

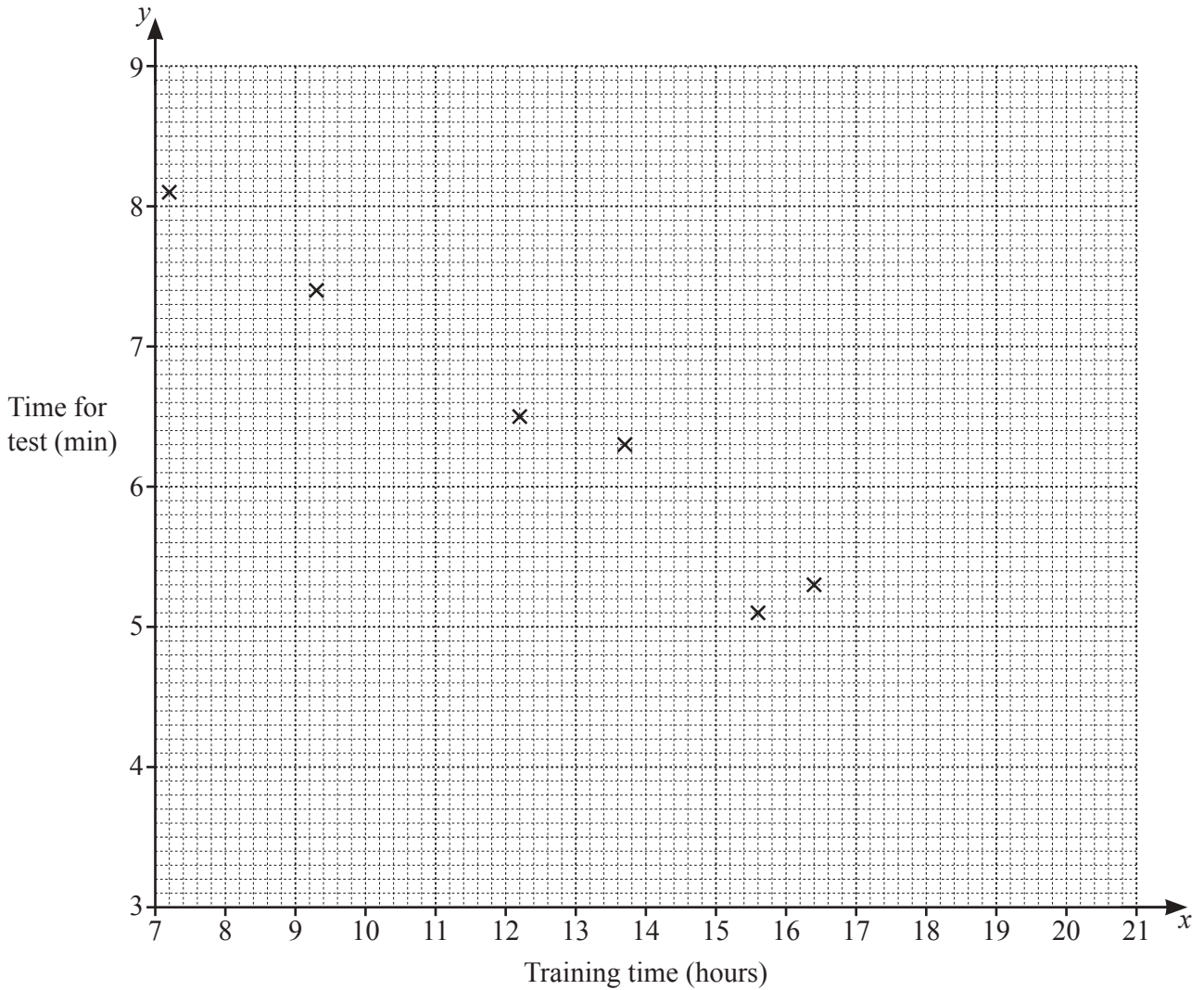
.....

..... [2]

- 4 Ten people trained for a fitness test.  
The table shows the amount of time they each trained and the time they each took to do the test.

Training time ( $x$ hours)	12.2	9.3	16.4	7.2	15.6	13.7	9.4	13.1	12.8	14.2
Time for test ( $y$ minutes)	6.5	7.4	5.3	8.1	5.1	6.3	7.6	6.6	6.9	5.7

- (a) Complete the scatter diagram.  
The first 6 points have been plotted for you.



[2]

- (b) What type of correlation is shown on the scatter diagram?

..... [1]



- (c) Find the equation of the regression line.  
Give your answer in the form  $y = mx + c$ .

$$y = \dots\dots\dots [2]$$

- (d) Anna trained for 10.8 hours.

Use your equation to estimate the time Anna took for the test.

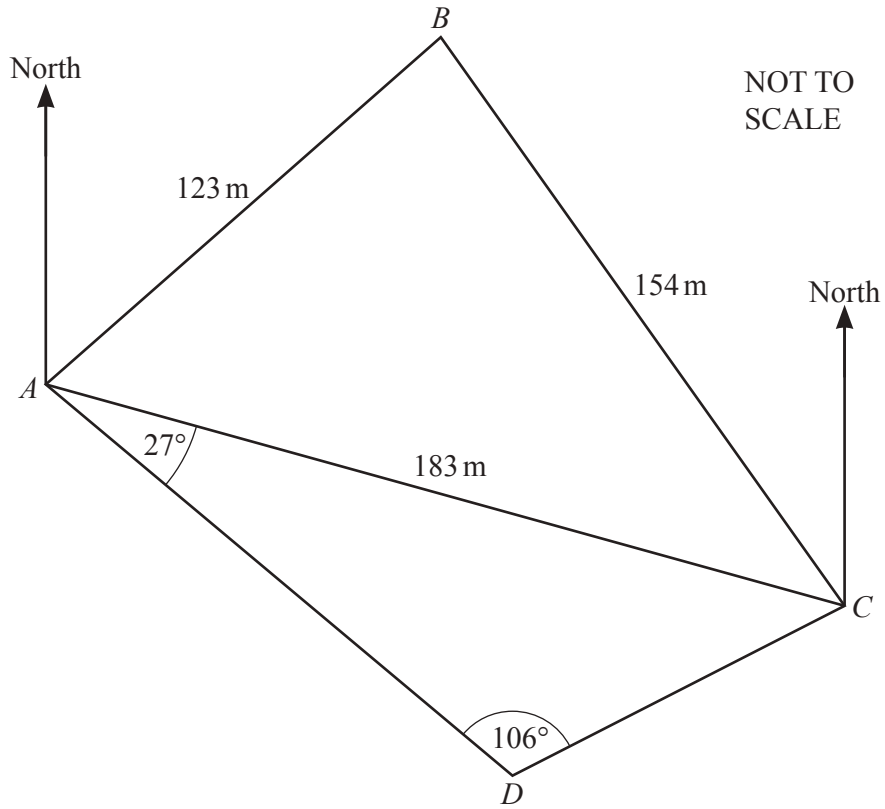
$$\dots\dots\dots \text{ min } [1]$$

- (e) Ben trained for 20.5 hours.

Explain why you should not use your equation to estimate the time Ben took for the test.

$$\dots\dots\dots [1]$$

5



The diagram shows a field  $ABCD$ , with a straight path  $AC$ .  
The bearing of  $C$  from  $A$  is  $122^\circ$ .

(a) Calculate the bearing of  $D$  from  $C$ .

..... [3]

(b) Show that angle  $ABC = 81.9^\circ$  correct to one decimal place.

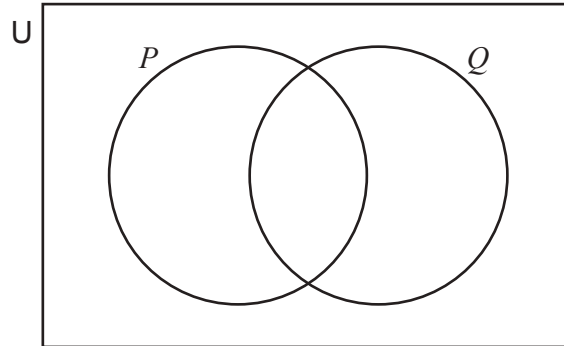
[3]

(c) Find the total area of the field  $ABCD$ .

.....  $\text{m}^2$  [5]

- 6 (a)  $U = \{\text{integers from 1 to 15}\}$   
 $P = \{\text{factors of 12}\}$   
 $Q = \{\text{multiples of 3}\}$

(i) Complete the Venn diagram.



[2]

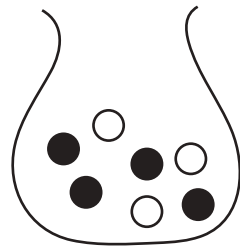
(ii) Write down the elements of  $P \cap Q$ .

..... [1]

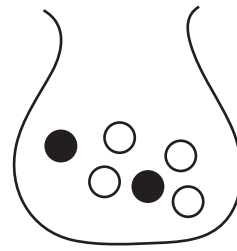
(iii) Find  $n((P' \cap Q) \cup (P \cap Q'))$ .

..... [1]

(b)



Bag *A*



Bag *B*

Bag *A* contains 4 black balls and 3 white balls.  
 Bag *B* contains 2 black balls and 4 white balls.

- (i) Amy picks a ball at random from bag *A*.  
 She notes the colour of the ball and replaces it in bag *A*.

Find the probability that Amy's ball is black.

..... [1]

- (ii) Basma picks two balls at random from bag *B*.  
 She notes the colour of each ball and replaces them in bag *B*.

Find the probability that both balls are white.

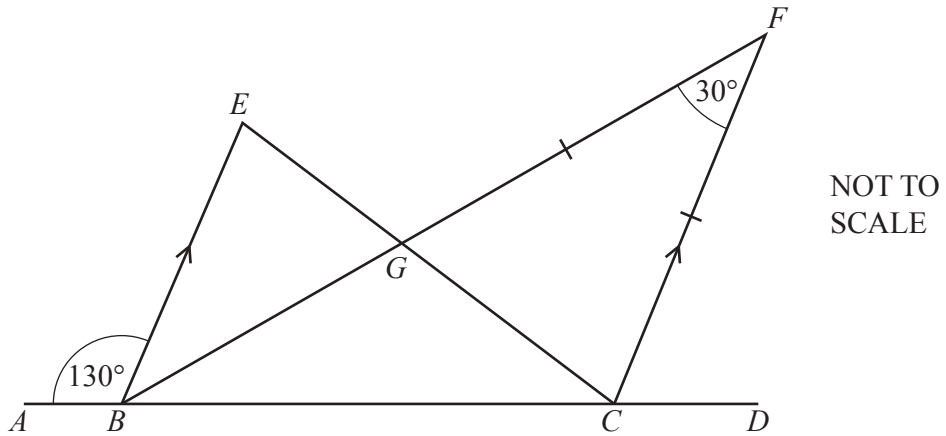
..... [2]

- (iii) Basma chooses one bag at random.  
 She picks one ball at random from this bag.

Find the probability that the ball is white.

..... [3]

7 (a)



*ABCD* is a straight line and *EC* and *BF* meet at *G*.  
*BE* is parallel to *CF* and  $GF = CF$ .  
 Angle  $ABE = 130^\circ$  and angle  $BFC = 30^\circ$ .

Find

(i) angle *FCD*

Angle *FCD* = ..... [2]

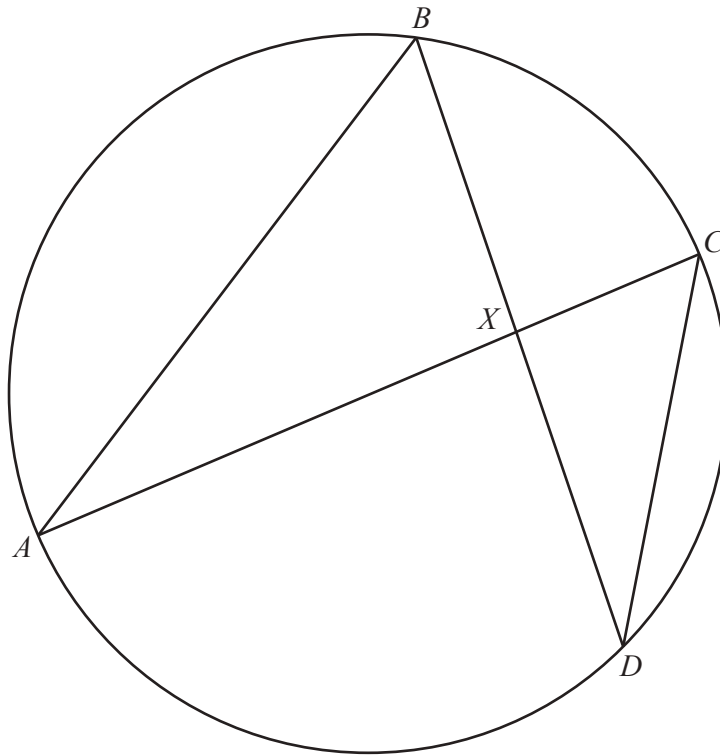
(ii) angle *FBC*

Angle *FBC* = ..... [1]

(iii) angle *BGE*.

Angle *BGE* = ..... [2]

(b)



NOT TO SCALE

$A, B, C$  and  $D$  are points on the circle.  
 $AC$  and  $BD$  meet at  $X$ .

- (i) Show that triangles  $AXB$  and  $DXC$  are similar.  
 Give a reason for each statement you make.

.....

.....

.....

.....

.....

..... [2]

- (ii)  $AX = 5$  cm,  $XC = 2$  cm and  $XD = 4$  cm.

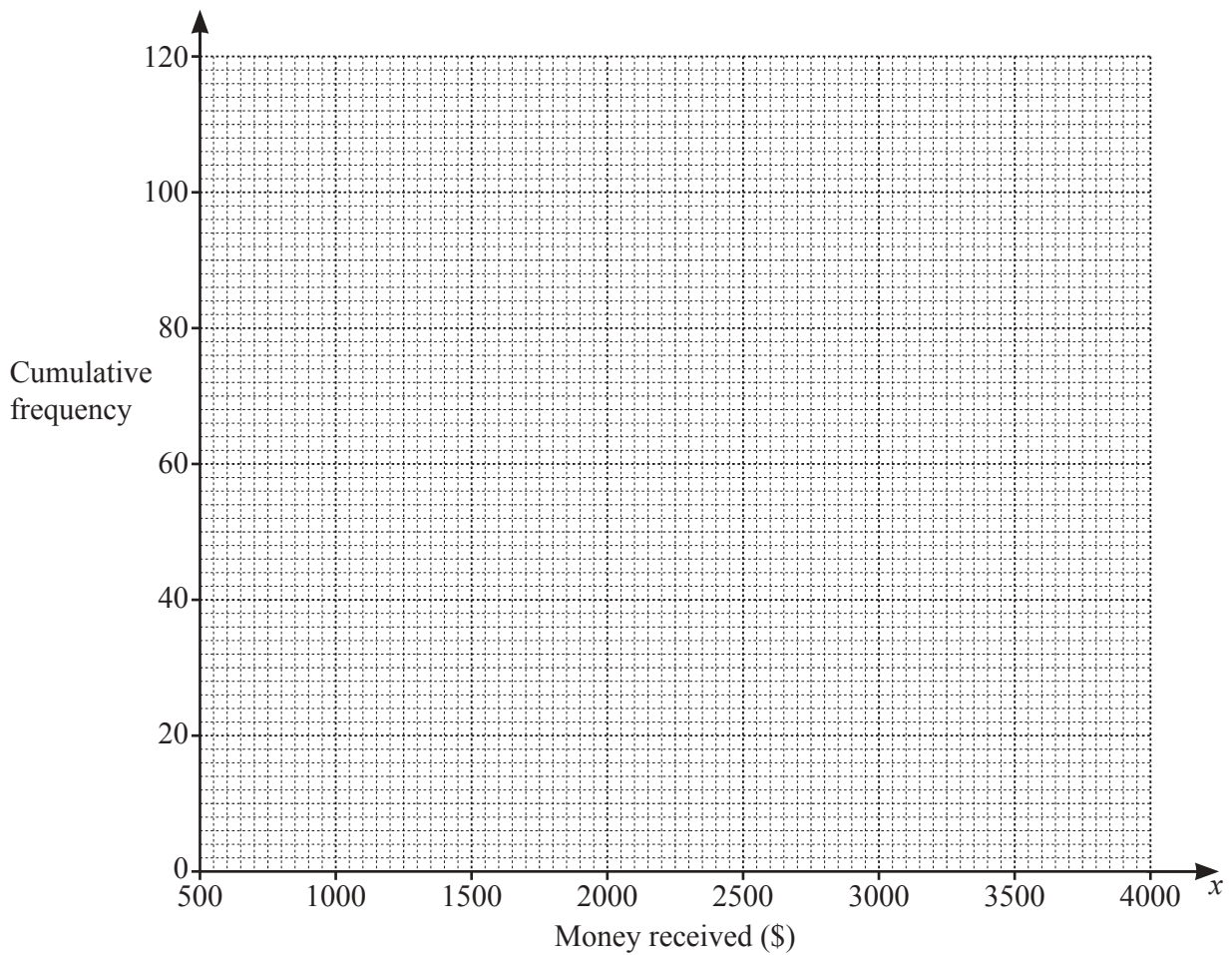
Find the length of  $BD$ .

$BD =$  ..... cm [3]

8 The table shows the money received in a shop for 120 days.

Money received (\$ $x$ )	Frequency
$500 < x \leq 1000$	6
$1000 < x \leq 1500$	16
$1500 < x \leq 2000$	24
$2000 < x \leq 2500$	36
$2500 < x \leq 3000$	20
$3000 < x \leq 3500$	14
$3500 < x \leq 4000$	4

(a) On the grid, draw a cumulative frequency curve to show this information.



[4]



(b) Use your curve to estimate

(i) the median

\$ ..... [1]

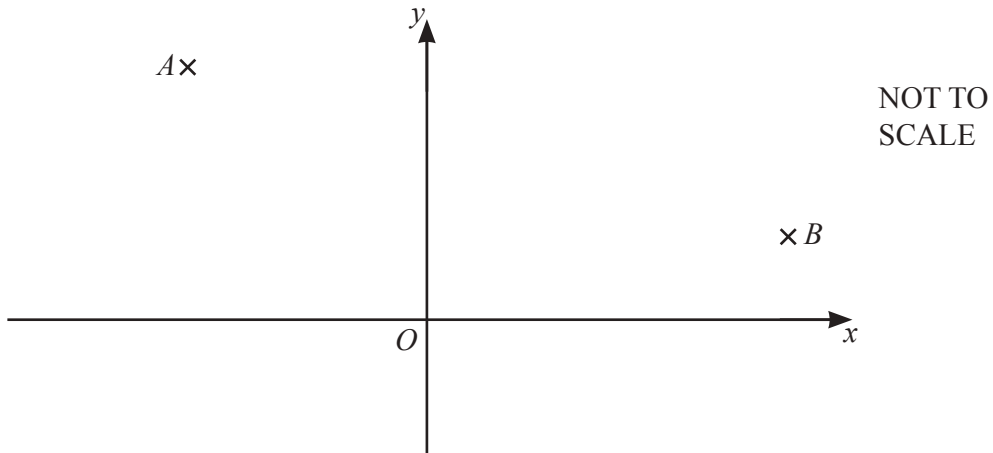
(ii) the interquartile range.

\$ ..... [2]

(c) Use your curve to estimate the percentage of these 120 days where the shop received more than \$1800.

..... % [3]

9



$A$  is the point  $(-4, 6)$  and  $B$  is the point  $(8, 2)$ .

(a) Find the coordinates of the mid-point of  $AB$ .

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

(b) Find the equation of  $AB$ .

..... [3]

(c) Show that the equation of the perpendicular bisector of  $AB$  is  $y = 3x - 2$ .

[3]

(d) The point  $C$  has coordinates  $(3, 7)$ .

Show that  $C$  lies on the perpendicular bisector of  $AB$ .

[1]

(e) Find the area of triangle  $ABC$ .

..... [4]

10             $f(x) = 3x - 2$          $g(x) = 5 - 2x$          $h(x) = x^2$

(a) (i) Find  $g(-2)$ .

..... [1]

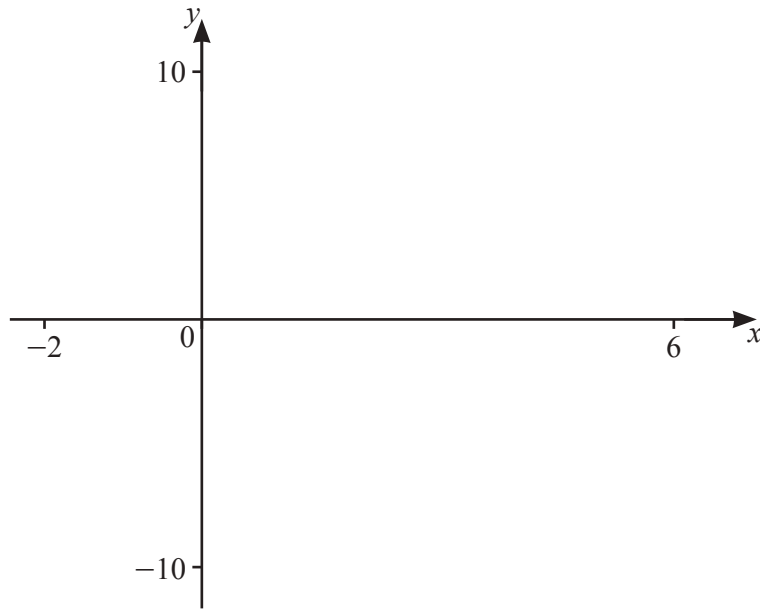
(ii) Find  $h(g(x))$ .  
Write your answer in the form  $ax^2 + bx + c$ .

..... [3]

(iii) Find  $g^{-1}(x)$ .

$g^{-1}(x) =$  ..... [2]

- (b) (i) On the diagram, sketch the graph of  $y = \frac{f(x)}{g(x)}$  for values of  $x$  between  $-2$  and  $6$ .



[3]

- (ii) An asymptote to the graph of  $y = \frac{f(x)}{g(x)}$  is parallel to the  $y$ -axis.  
Find the equation of this asymptote.

..... [1]

- (iii) Solve  $\frac{f(x)}{g(x)} = 5 - 2^x$ .

..... [3]

11 (a) Solve.

$$3x + 2 > 7x - 8$$

..... [2]

(b) Factorise fully.

$$75x^2 - 3$$

..... [2]

(c) Simplify.

(i)  $\frac{2}{3x} + \frac{1}{6x} - \frac{1}{5x}$

..... [2]

(ii)  $\frac{2x^2 + 3x - 2bx - 3b}{2x^2 - 7x - 15}$

..... [4]