Mock Grade 7

Maths Booklet 3

Paper 3H
Calculator

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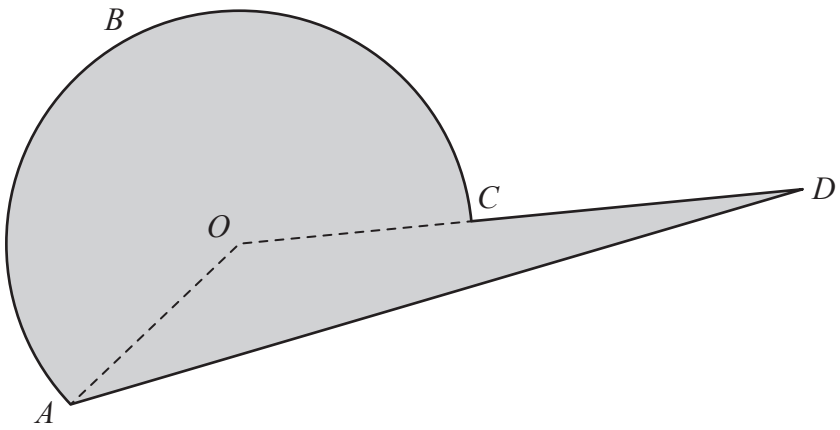
1 Here is a shaded shape *ABCD*.



The shape is made from a triangle and a sector of a circle, centre *O* and radius 6 cm.
OCD is a straight line.

AD = 22 cm
Angle *AOD* = 120°
Angle *OAD* = 38°

Calculate the perimeter of the shape.
Give your answer correct to 3 significant figures.

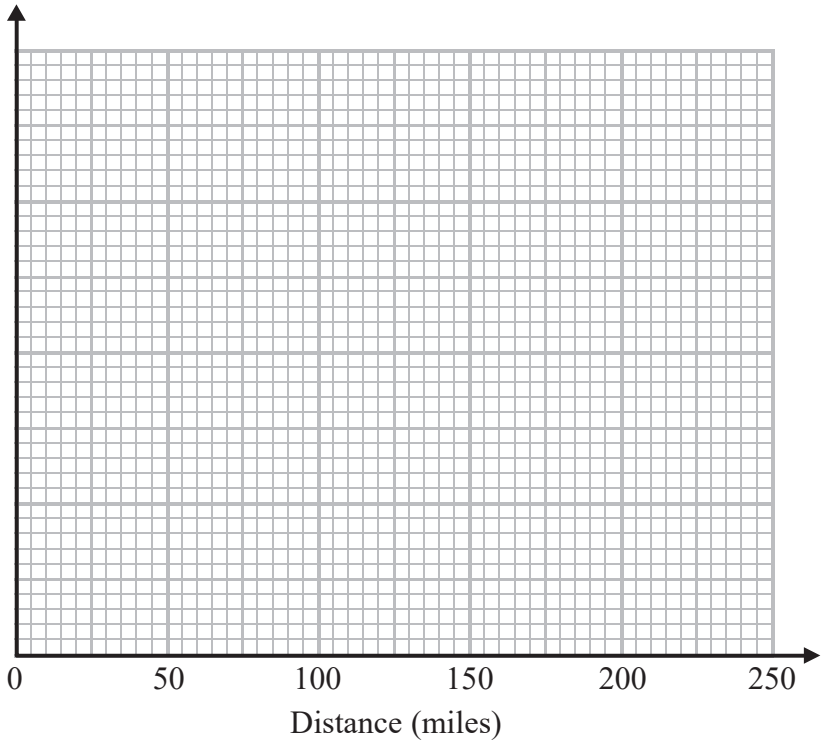
..... cm

(Total for Question 1 is 5 marks)

2 The table shows information about the distances 640 students travelled to a university open day.

Distance (d miles)	Frequency
$0 < d \leqslant 30$	120
$30 < d \leqslant 50$	80
$50 < d \leqslant 90$	160
$90 < d \leqslant 150$	180
$150 < d \leqslant 200$	100

(a) Draw a histogram for the information in the table.



(3)

(b) Estimate the median distance.

..... miles

(2)

(Total for Question 2 is 5 marks)

3 A group of people went to a restaurant.
Each person chose one starter and one main course.

starter	main course
soup	lasagne
prawns	curry

the number of people who chose soup : the number of people who chose prawns = 4 : 9

Of those who chose soup,
the number of people who chose lasagne : the number of people who chose curry = 3 : 2

Of those who chose prawns,
the number of people who chose lasagne : the number of people who chose curry = 2 : 5

What fraction of the people chose curry?
You must show how you get your answer.

.....

(Total for Question 3 is 4 marks)

4 Prove algebraically that the difference of the squares of any two consecutive even numbers is always 4 more than a multiple of 8.

(Total for Question 4 is 3 marks)

5 y is inversely proportional to the cube of x.

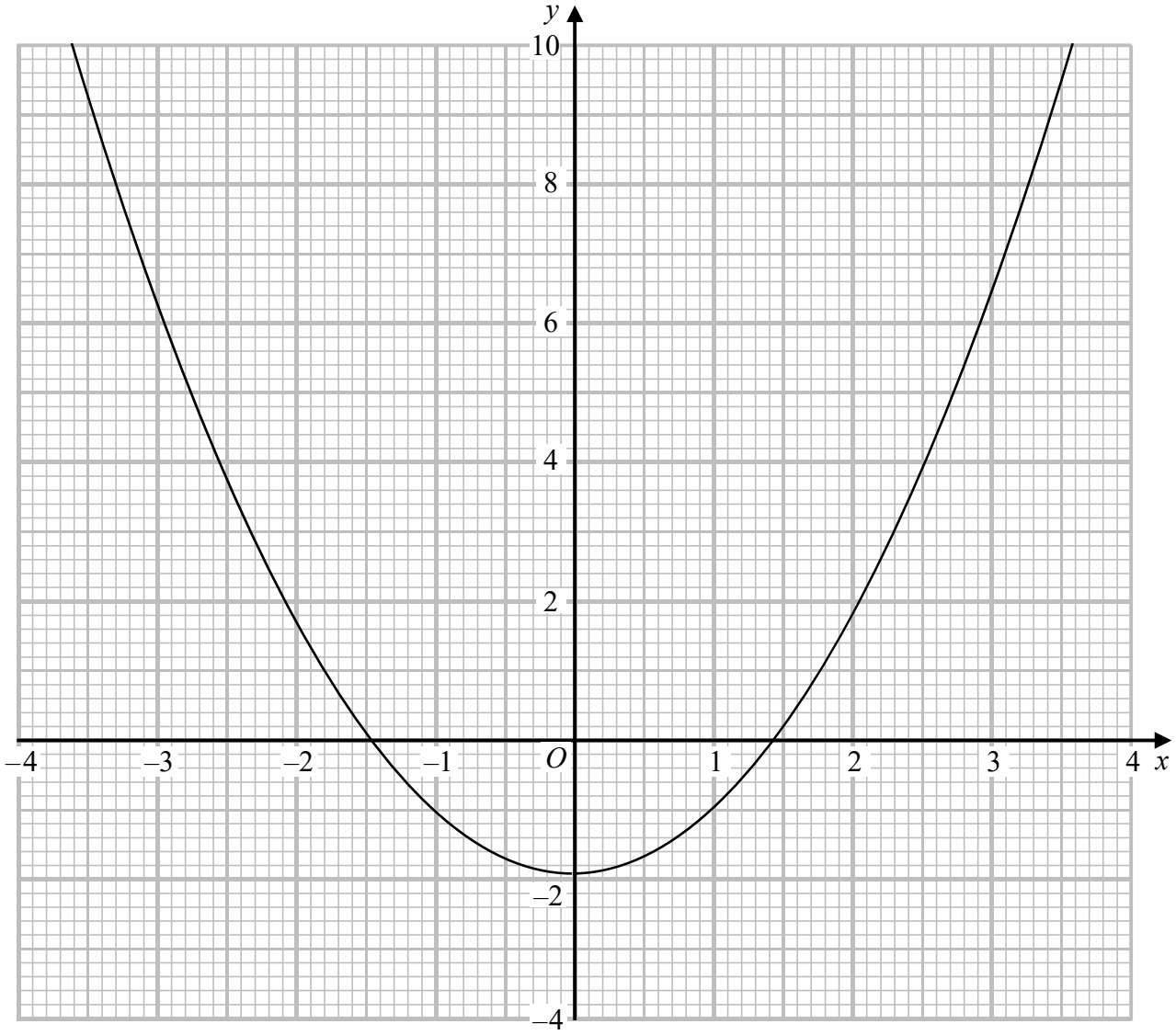
$y = 16$ when $x = 3.5$

Find the value of x when $y = \frac{27}{4}$

.....

(Total for Question 5 is 3 marks)

6 Here is the graph of $y = x^2 - 2$



Use the graph to find estimates for the solutions to the equation $x^2 - x - 1 = 0$
You must show how you get your solutions.

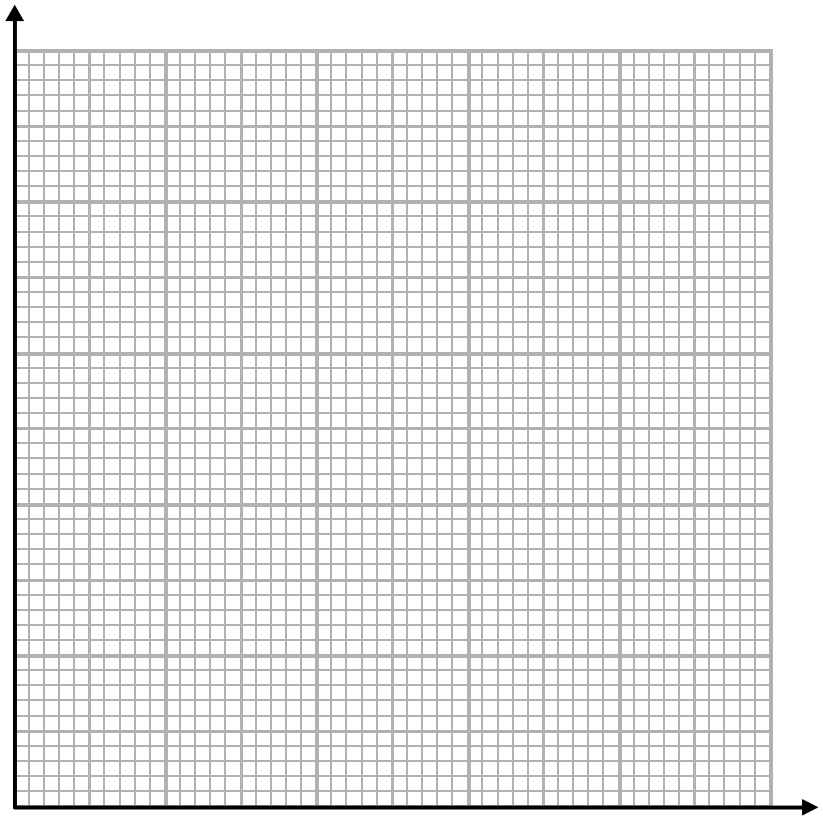
.....

(Total for Question 6 is 4 marks)

7 The table gives information about the speeds, in km/h, of 114 cars.

Speed (s km/h)	Frequency
$90 < s \leqslant 100$	16
$100 < s \leqslant 105$	12
$105 < s \leqslant 110$	22
$110 < s \leqslant 120$	33
$120 < s \leqslant 140$	28

(a) On the grid, draw a histogram for the information in the table.



(3)

(b) Find an estimate for the median.

.....km/h

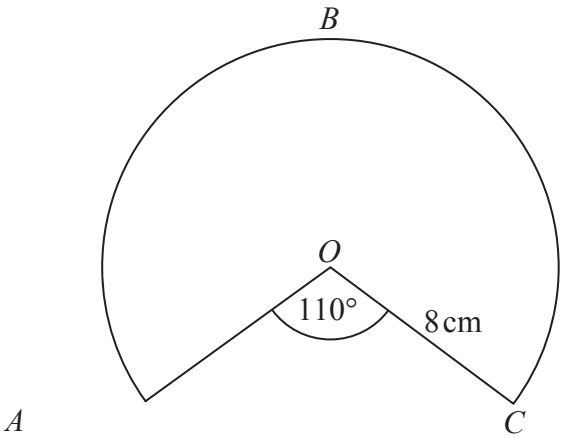
(2)

(Total for Question 7 is 5 marks)

8 Show that $\frac{2a}{b+2} - \frac{4a}{(b+2)^2}$ can be written as $\frac{2ab}{(b+2)^2}$

(Total for Question 8 is 2 marks)

9 The diagram shows a sector of a circle of radius 8 cm.



Work out the **area** of the sector ABC.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 9 is 2 marks)