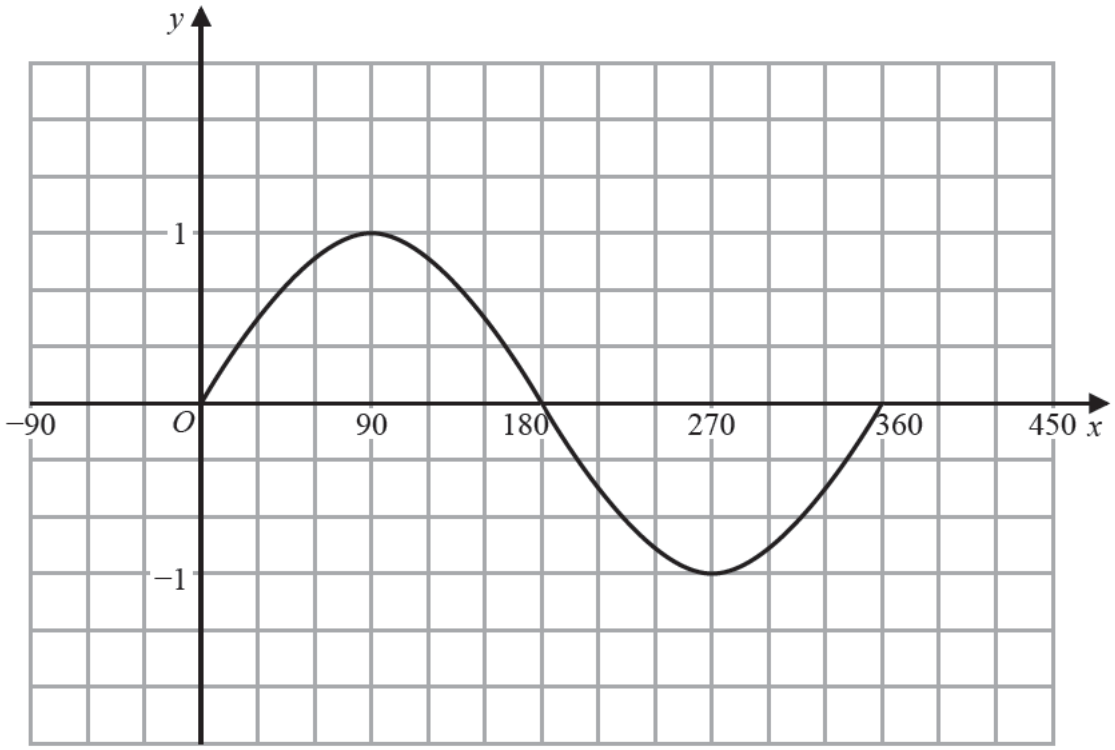
18 Here is the graph of $y = \sin x°$ for $0 \leqslant x \leqslant 360$



(a) On the grid above, sketch the graph of $y = \sin(x + 90)°$ for $0 \leqslant x \leqslant 360$

(2)

In $0 \leqslant x \leqslant 360$, the graph of $y = \sin\left(\frac{x}{2}\right)° + 3$ has a maximum at the point A.

(b) Write down the coordinates of A.

(,)

(2)

(Total for Question 18 is 4 marks)

19 *ABCD* is a quadrilateral.

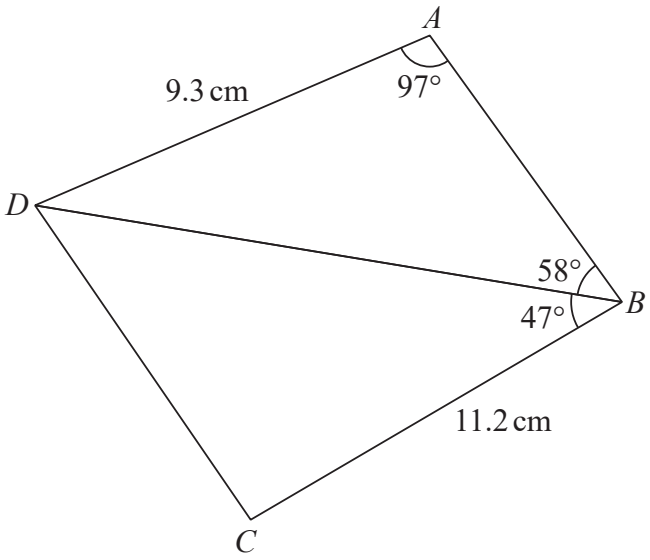


Diagram **NOT** accurately drawn

Find the area of quadrilateral *ABCD*.
Give your answer correct to 3 significant figures.

cm^2

(Total for Question 19 is 5 marks)

20 (a) Write $3x^2 - 12x + 7$ in the form $a(x + b)^2 + c$

(3)

The line **L** is the line of symmetry of the curve with equation $y = 3x^2 - 12x + 7$

(b) Using your answer to part (a) or otherwise, write down an equation of **L**.

(1)

(Total for Question 20 is 4 marks)

21 The curve with equation $y = (10x - 3)(x + 1)$ and the line with equation $y - 6x = 0$ intersect at the points A and B.

Find the coordinates of the midpoint of AB.
Show your working clearly.

(,)

(Total for Question 21 is 6 marks)

22

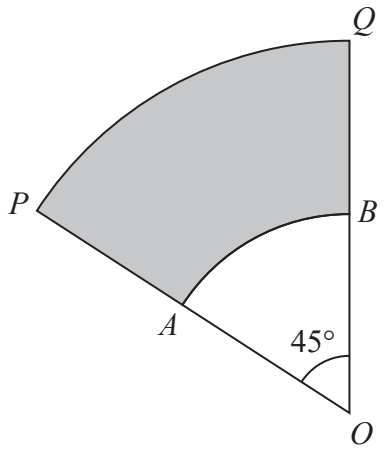


Diagram **NOT** accurately drawn

OPQ is a sector of a circle, centre *O*
OAB is a sector of a circle, centre *O*

A is the point on *OP* such that $OA : AP = 3 : 2$
B is the point on *OQ* such that $OB : BQ = 3 : 2$
Angle $POQ = 45°$

The area of the shaded region is $\frac{81}{2}\pi$ cm^2

Work out the perimeter of the shaded region.
Give your answer in terms of π.

cm

(Total for Question 22 is 6 marks)

Turn over for Question 23

23 The 10th term of an arithmetic series, S, is 66
The sum of the first 20 terms of S is 1290

Find the 5th term of S.
Show your working clearly.

(Total for Question 23 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS