6.

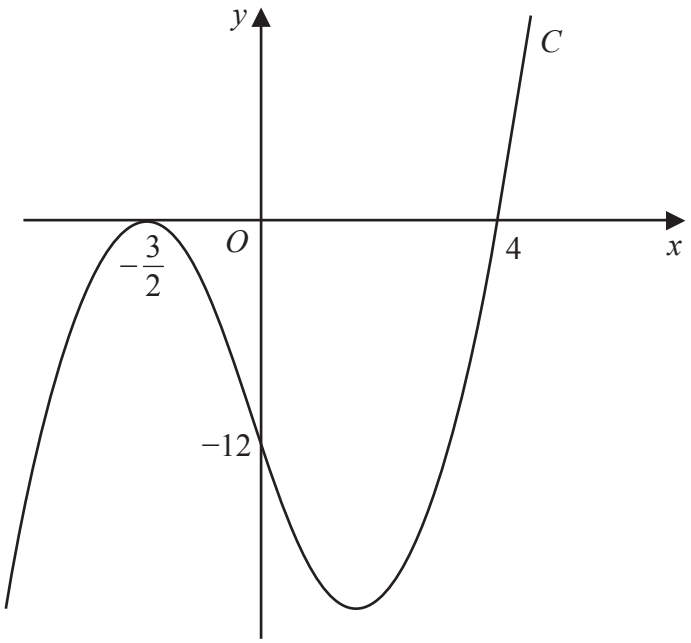


Figure 2

Figure 2 shows a sketch of the curve C with equation $y = \mathrm{f}(x)$.

The curve C

- touches the x-axis at $-\frac{3}{2}$
- cuts the x-axis at 4
- cuts the y-axis at -12

Given that $\mathrm{f}(x)$ is a cubic function,

(a) find $\mathrm{f}(x)$. You may leave the answer in a factorised form.

(3)

The line with equation $y = 2x - 12$ cuts C at $(0, -12)$ and at two further points, P and Q.

(b) Use algebra to find the exact x coordinates of P and Q.
Give each answer in simplest form.

(*Solutions relying entirely on calculator technology are not acceptable.*)

(4)

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Question 6 continued

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Question 6 continued

(Total for Question 6 is 7 marks)

7.

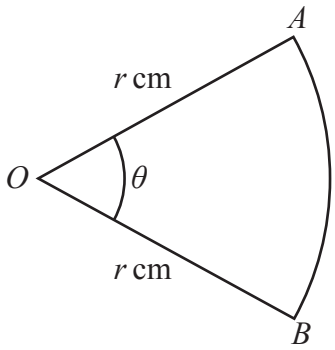


Diagram **NOT** accurately drawn

Figure 3

Figure 3 shows a sector AOB of a circle, centre O.

The radius OA of the sector is r cm and angle AOB is θ radians.

Given that

- the **area** of sector AOB is $1\,\text{cm}^2$
- the **perimeter** of sector AOB is $8\,\text{cm}$

(a) write down two different equations involving r and θ.

(2)

Given that $r > 2$

(b) solve the two simultaneous equations in part (a) to find the exact value of r and the exact value of θ.
Write each answer in the form $a + b\sqrt{c}$ where a, b and c are integers.

(*Solutions relying on calculator technology are not acceptable.*)

(5)

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