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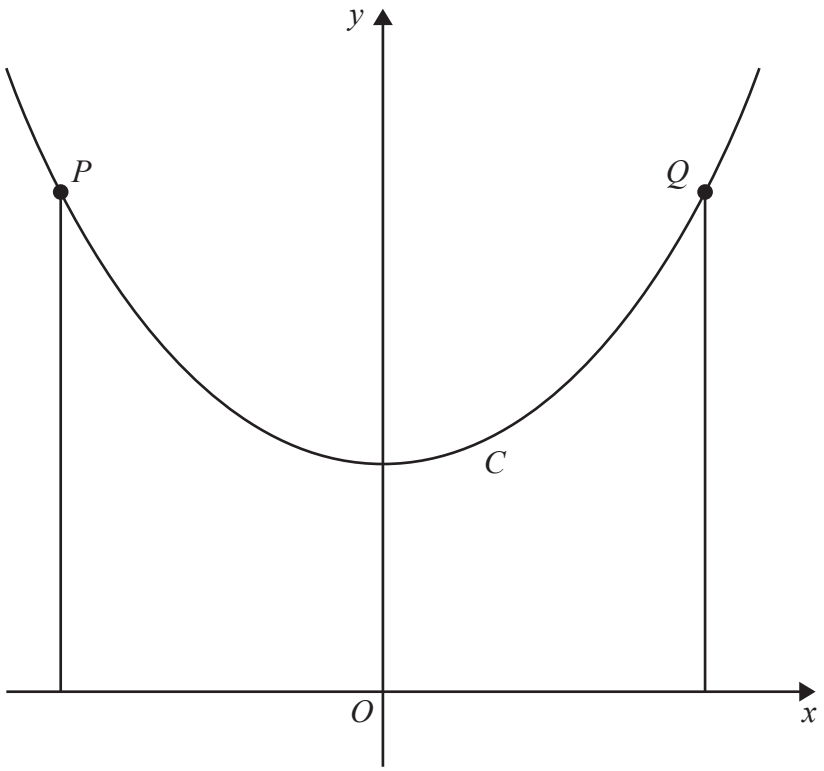


Figure 1

Figure 1 shows part of the curve C with equation

$$y = 3\cosh\left(\frac{x}{3}\right)$$

The point P and the point Q lie on the curve. The point P has x coordinate $-3a$ and the point Q has x coordinate $3a$.

(a) Find the length of the arc PQ, giving your answer as a multiple of $\sinh a$.

(5)

Given that the length of the arc PQ is 12

(b) show that the x coordinate of Q is $3\ln\left(p + \sqrt{q}\right)$, where p and q are integers to be found,

(2)

(c) show that the y coordinate of Q is $r\sqrt{s}$ where r and s are integers to be found.

(2)

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Question 4 continued

Q4

(Total 9 marks)