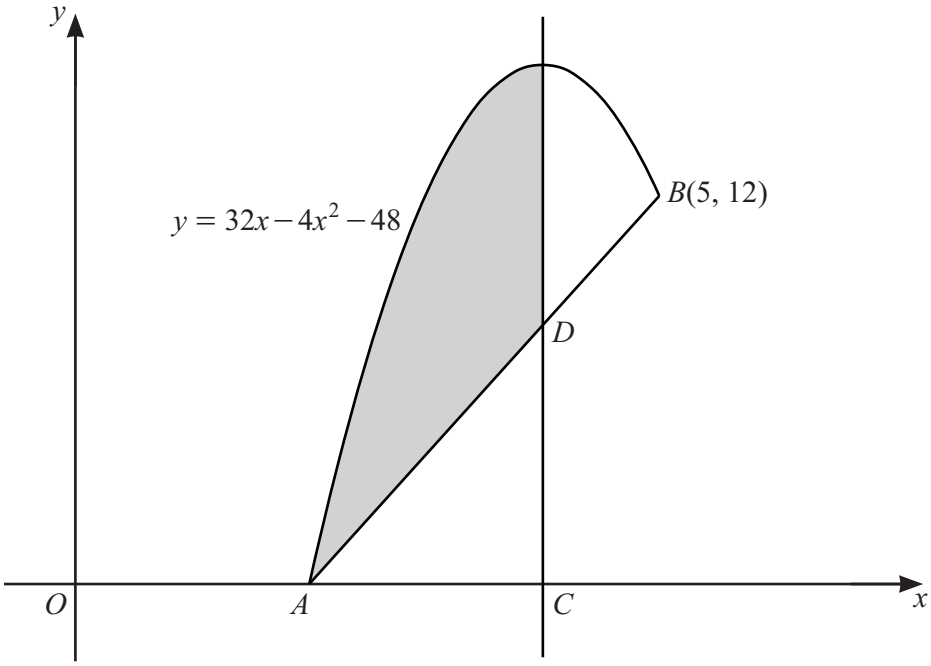
9



The diagram shows part of the curve $y = 32x - 4x^2 - 48$ and the line AB.
The curve and the line AB meet the x-axis at A and meet again at the point $B(5, 12)$.
The line CD extended is parallel to the y-axis and passes through the maximum point of the curve.
Find the area of the shaded region. [9]

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Continuation of working space for Question 9.

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10 The functions f and fg are defined by

$$\mathrm{f}(x) = \mathrm{e}^{x^2+3} \quad \text{for } x < 0$$

$$\mathrm{fg}(x) = \mathrm{e}^{2x} \quad \text{for } x > \frac{3}{2}.$$

(a) Explain why f^{-1} exists. [1]

(b) Find an expression for $\mathrm{f}^{-1}(x)$ and state the domain and range of f^{-1}. [5]

(c) Hence find and simplify an expression for $\mathrm{g}(x)$. [2]

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