



5 The equation of a curve is such that  $\frac{dy}{dx} = 4x - 3\sqrt{x} + 1$ .

(a) Find the  $x$ -coordinate of the point on the curve at which the gradient is  $\frac{11}{2}$ . [3]

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(b) Given that the curve passes through the point (4, 11), find the equation of the curve. [4]

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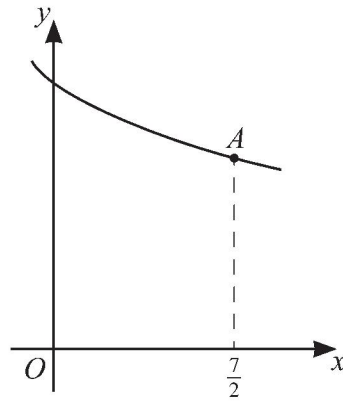
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The diagram shows part of the curve with equation  $y = \frac{12}{\sqrt[3]{2x+1}}$ . The point  $A$  on the curve has coordinates  $\left(\frac{7}{2}, 6\right)$ .

- (a) Find the equation of the tangent to the curve at  $A$ . Give your answer in the form  $y = mx + c$ . [4]

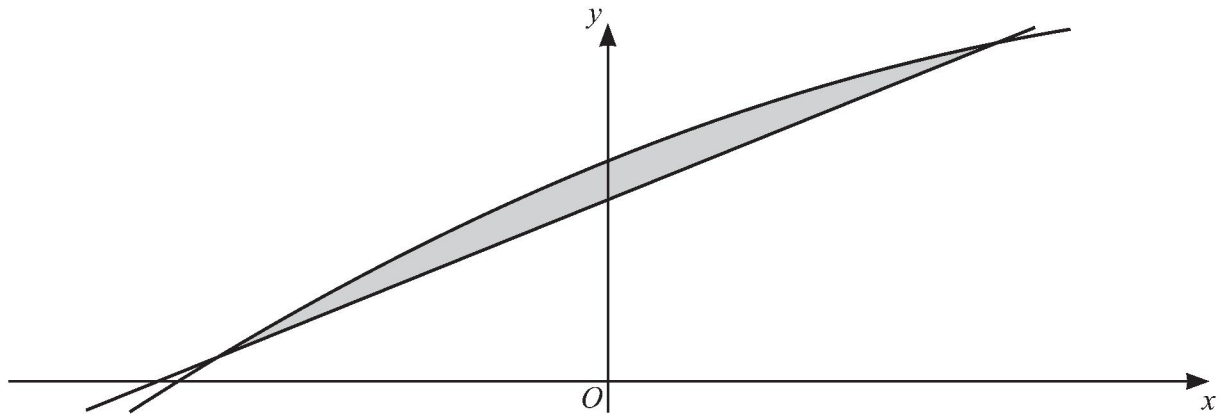
[illegible]

[illegible]

- 7 (a) By expressing  $-2x^2 + 8x + 11$  in the form  $-a(x-b)^2 + c$ , where  $a$ ,  $b$  and  $c$  are positive integers, find the coordinates of the vertex of the graph with equation  $y = -2x^2 + 8x + 11$ . [3]

[illegible]

(b)



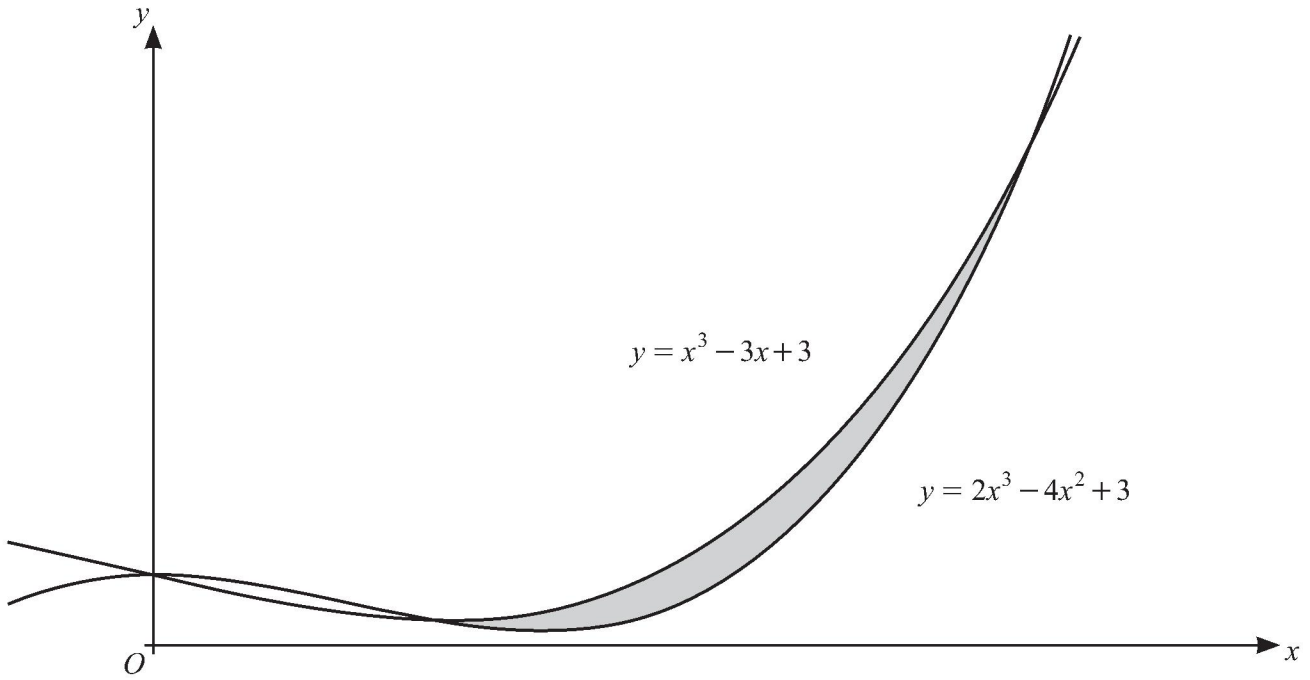
The diagram shows part of the curve with equation  $y = -2x^2 + 8x + 11$  and the line with equation  $y = 8x + 9$ .

Find the area of the shaded region.

This image shows a single sheet of white paper with ten evenly spaced horizontal dotted lines, typical of primary school writing paper. The lines are black and extend across the full width of the page. There is no handwriting or other markings on the paper.



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The diagram shows the curves with equations  $y = x^3 - 3x + 3$  and  $y = 2x^3 - 4x^2 + 3$ .

- (a) Find the  $x$ -coordinates of the points of intersection of the curves. [3]

[illegible]

[4]

This image shows a full page of white paper with horizontal dotted lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.