

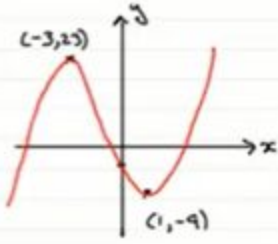


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Differentiation: How to Find Stationary Points

Find the coordinates of the stationary points on the curve $y = x^3 + 3x^2 - 9x - 4$

$\therefore \frac{dy}{dx} = 3x^2 + 6x - 9$	when $x = -3$
\therefore At stationary points $\frac{dy}{dx} = 0$	$y = (-3)^3 + 3(-3)^2 - 9(-3) - 4$
$\therefore 3x^2 + 6x - 9 = 0$	$= 23$
$\therefore x^2 + 2x - 3 = 0$	when $x = 1, y = -9$
$\therefore (x + 3)(x - 1) = 0$	\therefore stationary points at
$\therefore x + 3 = 0$ or $x - 1 = 0$	$(-3, 23)$ and $(1, -9)$
$\therefore x = -3$ or $x = 1$	

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