

Stationary points

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Worked example

Find the least value of

$$f(x) = x^2 + 6x - 9$$

Your turn

Find the least value of

$$f(x) = x^2 - 4x + 9$$

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Worked example

Find the turning point of

$$y = \sqrt[4]{x} - 2x$$

Your turn

Find the turning point of

$$y = \sqrt{x} - x$$

$$\left(\frac{1}{4}, \frac{1}{4}\right)$$

Worked example

Find the coordinates of the turning/stationary point(s) of the curves by differentiation:

$$y = x^2 + 6x - 2$$

$$y = 2x^3 + 6x^2 - 4$$

Your turn

Find the coordinates of the turning/stationary point(s) of the curves by differentiation:

$$y = x^3 + 3x^2 - 4$$

$(-2, 0)$ and $(0, -4)$

Worked example

$$y = 4ax^3 + \frac{3}{x}$$

y has a minimum when $x = \frac{1}{3}$

Work out the value of a

Your turn

$$y = 8ax^3 + \frac{6}{x}$$

y has a minimum when $x = \frac{1}{2}$

Work out the value of a

$$a = 4$$

Worked example

Find the stationary points on the curve $y = \frac{5}{3}x^3 - 80x$

Your turn

Find the stationary points on the curve $y = x^3 - 12x$

$(-2, 16)$ and $(2, -16)$

Worked example

Find the coordinates of the turning points of $y = x^3 - 6x^2 - 15x$

Your turn

Find the coordinates of the turning points of $y = x^3 + 6x^2 - 135x$

$(5, -400)$ and $(-9, 972)$

Worked example

Find the coordinates of the turning/stationary point(s) of the curves by differentiation:

$$y = \frac{2}{3}x^3 - 3.5x^2 + 3x + 5$$

Your turn

Find the coordinates of the turning/stationary point(s) of the curves by differentiation:

$$y = x^3 + \frac{1}{2}x^2 - 2x + 4$$

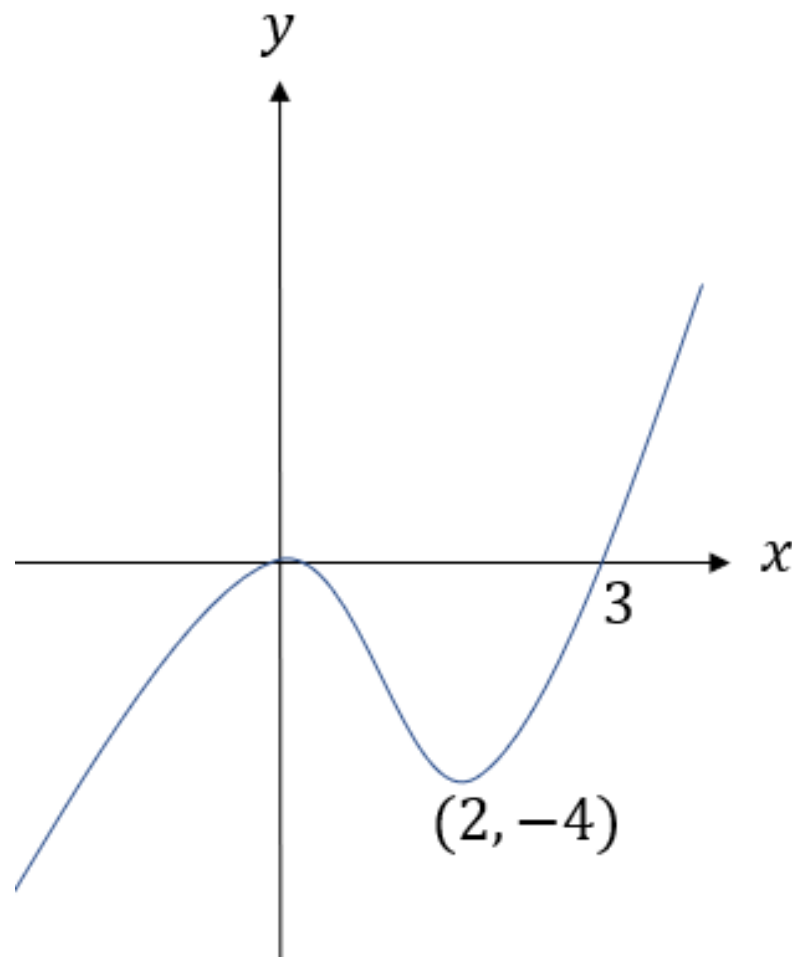
$$\left(-1, \frac{11}{2}\right) \text{ and } \left(\frac{2}{3}, \frac{86}{27}\right)$$

Worked example

By first finding the stationary points, sketch the graph of $y = x^3 - 6x^2$

Your turn

By first finding the stationary points, sketch the graph of $y = x^3 - 3x^2$

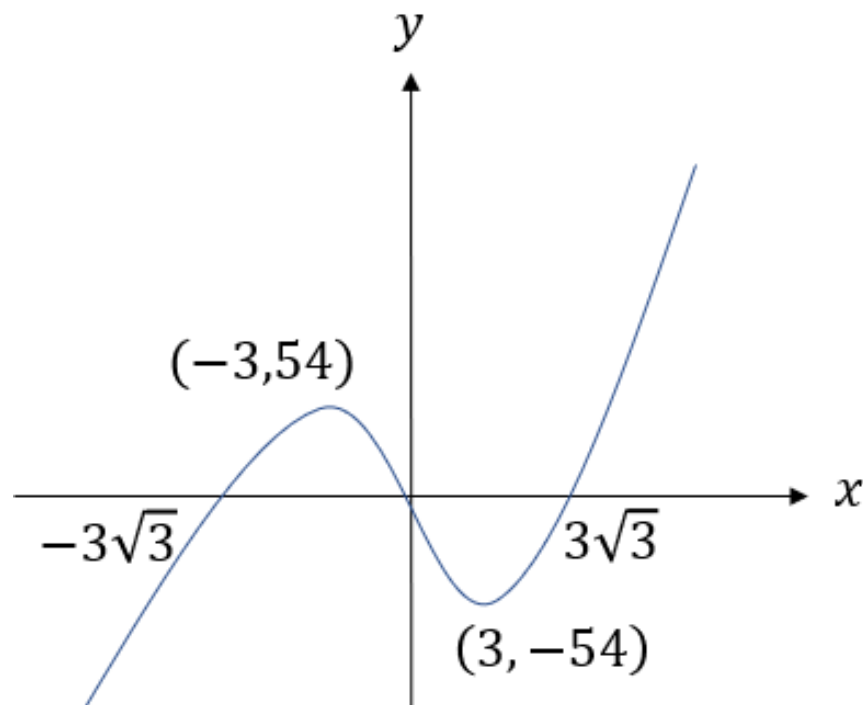


Worked example

By finding the turning points, sketch the graph of $y = x^3 - 48x$

Your turn

By finding the turning points, sketch the graph of $y = x^3 - 27x$



Worked example

By finding the turning points, sketch the graph of $y = x^3 - 48x$

Your turn

By finding the turning points, sketch the graph of $y = x^3 - 27x$

