

Stationary Points

1. Find the stationary points on the curve $y = 8x^3 - 3x^2$ and determine their nature.
2. Find the stationary points of $f(x) = 3x^4 + 4x^3 - 12x^2 + 12$ and determine their nature.
3. A curve has equation $f(x) = x^3 + 2x^2 - 4x - 8$.
 - (a) Show that $(x - 2)$ is a factor of $f(x)$ and hence find where this curve crosses the x and y axes.
 - (b) Find the turning points on the curve and determine their nature.
 - (c) Hence sketch the curve.
4. A curve has equation $f(x) = 2x^4 + 2x^3$.
 - (a) Find where this curve crosses the x and y axes.
 - (b) Find the turning points on the curve and determine their nature.
 - (c) Hence sketch the curve.
5. A curve has equation $f(x) = 4x^3 - 15x^2 + 12x + 4$.
 - (a) Find where this curve crosses the x and y axes.
 - (b) Find the turning points on the curve and determine their nature.
 - (c) Hence sketch $f(x) = 4x^3 - 15x^2 + 12x + 4$.
6. A curve has equation $f(x) = x^3 + 2x^2 - 4x - 8$.
 - (a) Show that $x + 2$ is a factor of $f(x)$ and hence factorise completely.
 - (b) Find the stationary points of $f(x)$ and determine their nature.
 - (c) Sketch the graph of $f(x)$.
 - (d) Calculate the area enclosed by the curve and the x -axis.
7. $y = \frac{1}{3}x^3 - 2x^2 + 3x$.
 - (a) Find the stationary points of this curve and determine their nature.
 - (b) Find where the graph meets the x -axis.
 - (c) Calculate the area enclosed by the curve and the x -axis.
8. A function f is defined as $f(x) = x^3 - 3x + 2$.
 - (a) Find the coordinates of the stationary points of $f(x)$ and determine their nature.
 - (b) Show that $(x - 1)$ is a factor of $f(x)$ and hence factorise $f(x)$ fully.
 - (c) Hence sketch the curve $f(x) = x^3 - 3x + 2$.

