

Increasing/ decreasing function

Increasing function: f'(x) > 0Decreasing function: f'(x) < 0

Find the intervals where the following functions are increasing or decreasing.

1. $f(x) = x^2 - 2x + 1$

2. $f(x) = -x^2$



Find the intervals where the following functions are increasing or decreasing **using GDC**.

1.
$$f(x) = x^2 - 4x + 4$$

$$2. f(x) = x^3 - 4x - 1$$



Turning points

Maximum / Minimum point f'(x) = 0Horizontal tangent line

1. The function $f(x) = x^2 - 4x + 10$ has a minimum point at A. Find the coordinates of A.

2. The function $f(x) = 3x^2 - 12x + 8$ has a maximum point at A. Find the coordinates of A.



Using **GDC**, Find he maximum and minimum points of the following functions.

1.
$$f(x) = 4x^3 + 3x^2 - 3x + 10$$

2.
$$f(x) = x^3 - 3x + 2$$



Exercise

1. Consider the function $f(x) = \frac{27}{x^2} - 16x$, $x \neq 0$. (a) Sketch the graph of y = f(x), for $-4 \le x \le 3$ and $-50 \le y \le 100$.

- (b) Use your graphic display calculator to find
- (i) the zero of f(x)

(ii) the coordinates of the local minimum point;

(iii) the equation of the tangent to the graph of y = f(x) at the point

(-2, 38.75). Give your answer in the form y = mx + c.

(c) Sketch the graph of the function g(x) = 10x + 40 on the same axes.

(d) Solve the equation f(x) = g(x).





2. Consider the function, $f(x) = \frac{48}{x} + kx^2 - 58$, where x > 0 and k is a constant.

The graph of the function passes through the point with coordinates (4, 2).

(a) Find the value of k.

(b) Using your value of k, find f'(x).

P is the minimum point of the graph of f(x).

(c) **Use your answer** to part (b) to show that the minimum value of f(x) is -22.

(d) Write down the **two** values of x which satisfy f(x) = 0.

(e) Sketch the graph of y = f(x) for $0 \le x \le 6$ and $-30 \le y \le 60$. Clearly indicate the minimum point P and the *x*-intercepts on your graph.


