

## Increasing/ decreasing function

**Increasing function:  $f'(x) > 0$**

**Decreasing function:  $f'(x) < 0$**

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

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

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

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## Turning points

### Maximum / Minimum point

$$f'(x) = 0$$

### Horizontal tangent line

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

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

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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  $0 \leq x \leq 6$  and  $-30 \leq y \leq 60$ . Clearly indicate the minimum point P and the x-intercepts on your graph.

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