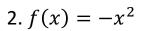


Increasing/ decreasing function

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

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

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





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

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

 $2. f(x) = e^{x^2}$ 



## **Turning points**

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

1. The function  $f(x) = 3x^2 - 6$  has a minimum point at A. Find the coordinates of A.

2.  $f(x) = x^3 + kx + p$  has a turning point at (- 2, 3). Find the values of k and p.

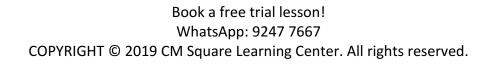
## Paper 1



1. Ocnsider  $f(x) = x^2 + \frac{p}{x}$ ,  $x \neq 0$ , where p is a constant.

(a) Find f'(x).

(b) There is a minimum value of f(x) when x = -2. Find the value of p.

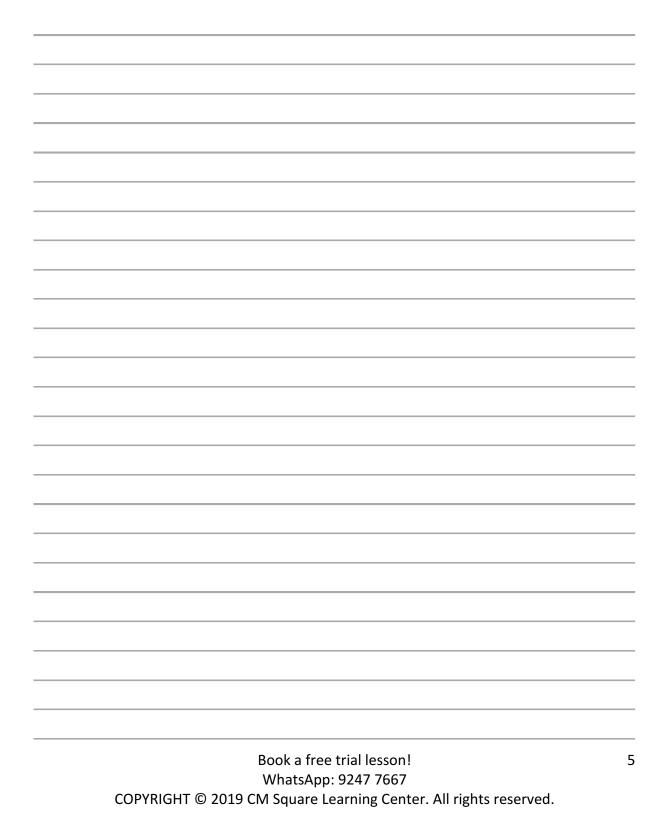




2. Use 
$$g(x) = \frac{\ln x}{x^2}$$
, for  $x > 0$ .

(a) Use the quotient rule to show that  $g'(x) = \frac{1-2lnx}{x^3}$ .

(b) The graph of g has a maximum point at A. Find the x-coordinate of A.



## Paper 2



1. Let  $f'(x) = -24x^3 + 9x^2 + 3x + 1$ .

(a) There are two points of inflexion on the graph of f. Write down the x-coordinates of these points.

(b) Let g(x) = f''(x). Explain why the graph of g has no points of inflexion.





2. Use 
$$f(x) = \frac{20x}{e^{0.3x}}$$
, for  $0 \le x \le 20$ .

(a) Sketch the graph of 
$$f$$
.

(b) (i) Write down the x-coordinate of the maximum point on the graph of f.

(ii) Write down the interval where f is increasing.

(c) Show that 
$$f'(x) = \frac{20-6x}{e^{0.3x}}$$
.

(d) Find the interval where the rate of change of f is increasing.

