

GRADIENTS OF CURVES

Task 1

- 1) The curve has C has equation

$$y = 3x^2 - 5x + 2$$

- Find $\frac{dy}{dx}$
- The gradient of the curve when $x = 2$.

- 2) The curve has C has equation

$$y = x^3 + 4x - 1$$

- Find $\frac{dy}{dx}$
- The gradient of the curve when $x = -1$.

- 3) The curve has C has equation

$$y = 10 - \frac{1}{2}x^2$$

- Find $\frac{dy}{dx}$
- The gradient of the curve when $x = 3$.

- 4) The curve has C has equation

$$y = \frac{1}{x} + 2x$$

- Find $\frac{dy}{dx}$
- The gradient of the curve when $x = 1$.

- 5) The curve has C has equation

$$y = \sqrt{x} + x^2$$

- Find $\frac{dy}{dx}$
- The gradient of the curve when $x = 4$.

- 6) The curve has C has equation

$$y = (x + 2)(x - 3)$$

- Find $\frac{dy}{dx}$
- The gradient of the curve when $x = 0$.

- 7) The curve has C has equation

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

- Find $\frac{dy}{dx}$
- The gradient of the curve when $x = 1$.

- 8) The curve has C has equation

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

- Find $\frac{dy}{dx}$
- The gradient of the curve when $x = 5$.

- 9) The curve has C has equation

$$y = 5x^2 - 7$$

- Find $\frac{dy}{dx}$
- The gradient of the curve when $x = -\frac{1}{2}$.

- 10) The curve has C has equation

$$y = x^2 - \frac{2}{x^2}$$

- Find $\frac{dy}{dx}$
- The gradient of the curve when $x = 1$.

Task 2

- 11) Find the coordinates of the point on the curve with equation

$$y = x^2 - 4x + 5$$

where the gradient is 2.

- 12) Find the coordinates of the point on the curve with equation

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

where the gradient is 0.

- 13) Find the coordinates of the points on the curve with equation

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

where the gradient is 5.

- 14) Find the coordinates of the points on the curve with equation

$$y = x^3 - 3x^2 + 1$$

where the gradient is 0.

- 15) Find the coordinates of the point on the curve with equation

$$y = 5x^2 - 8x$$

where the gradient is 12.

- 16) Find the coordinates of the point on the curve with equation

$$y = \sqrt{x}$$

where the gradient is $\frac{1}{4}$.

- 17) Find the coordinates of the point on the curve with equation

$$y = x^2 + x$$

where the gradient is 1.

- 18) Find the coordinates of the points on the curve with equation

$$y = 12x - x^3$$

where the gradient is 0.

- 19) Find the coordinates of the point on the curve with equation

$$y = \frac{4}{x}$$

where the gradient is -1.

- 20) Find the coordinates of the point on the curve with equation

$$y = (x - 1)^2$$

where the gradient is 4.

- 24) Find the range of values of x , for which the curve with equation

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

has a negative gradient.

- 25) Find the range of values of x , for which the curve with equation

$$y = \frac{1}{3}x^3 - x^2 - 8x + 2$$

has a positive gradient.

Challenge

- 26) The curve $y = ax^2 + bx$ has a gradient of 11 at the point (2, 10). Work out the values of a and b .

- 27) A curve has equation $y = \frac{k}{x} + x^2$. Given that the gradient when $x = 2$ is 0, find k and the coordinates of the turning point.

Task 3

- 21) Find the range of values of x , for which the curve with equation

$$y = x^2 - 6x + 8$$

has a positive gradient.

- 22) Find the range of values of x , for which the curve with equation

$$y = x^3 - 3x^2 - 9x + 5$$

has a negative gradient.

- 23) Find the range of values of x , for which the curve with equation

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

has a positive gradient.