

**Differentiation**  
**Products and Quotients**

1.  $y = (2x - 1)(3x + 2)$ . Calculate  $\frac{dy}{dx}$  when  $x = 2$ .

2.  $f(x) = \frac{x^3 - 2x^2}{x}$ . Calculate  $f'(-3)$ .

3.  $f(x) = \left(2x - \frac{4}{x}\right)^2$ . Calculate the value of  $f'(-2)$ .

4.  $y = \left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)^2$ . Calculate  $\frac{dy}{dx}$  when  $x = 3$ .

5.  $f(x) = \frac{x^3 - 1}{\sqrt{x}}$ . Calculate the value of  $f'(4)$ .

6.  $y = \frac{2x - x^2}{\sqrt[3]{x}}$ . Calculate  $\frac{dy}{dx}$  when  $x = 8$ .

7.  $f(x) = \frac{4}{x^2} + x\sqrt{x}$ . Find the value of  $f'(4)$ .

8.  $f(x) = x^4 - \frac{16}{\sqrt{x}}$ . Calculate  $f'(1)$ .

9.  $y = \frac{\sqrt{x} - x}{x^2}$ . Calculate the value of  $\frac{dy}{dx}$  when  $x = 4$ .

10.  $f(x) = \frac{(x^2 + 1)^2}{\sqrt{x}}$ . Find  $f'(1)$ .

11.  $f(x) = \frac{x^3 - 4x}{x^2\sqrt{x}}$ . Find the value of  $f'(4)$ .

12.  $y = \frac{x^2 - x}{\sqrt[4]{x^3}}$ . Find  $\frac{dy}{dx}$  when  $x = 16$ .