

Week 4: Differentiation

Solutions

1. $y = 2x^3$

$$y' = 3 \cdot 2x^2 = 6x^2$$

(a) Find y'

Solution: $y' = 6x^2$

(b) Find $\frac{dy}{dx}$

Solution: $\frac{dy}{dx} = 6x^2$

3. $y = x^3 - 4x^2 - 3x + 9$

(a) Find y'

Solution: $y' = 3x^2 - 8x - 3$

(b) Find the range values of x for which y is increasing

Solution: y is increasing when the gradient is positive, i.e. when $x < -\frac{1}{3}$ and $x > 3$

4. Let $y = 5x^2 + 4\sin(3x)$ Find $\frac{dy}{dx}$

Solution: $\frac{dy}{dx} = 10x + 12\cos(3x)$