Basic Differentiation

1. Find $f'(x)$ given that $f(x)$ equals:

   a. x^5 b. $2x^4$ c. $8x$

Multiply the coefficient by the index, then reduce the index by 1

2. Find $\frac{dy}{dx}$ given that y equals:

   a. $7x^3$ b. $\frac{1}{x^3}$ c. 9

Laws of indices:
$\frac{1}{x^a} = x^{-a}$
$\sqrt{x} = x^{\frac{1}{2}}$

3. Find $f'(x)$ given that $f(x)$ equals:

   a. $x^2 + 5x$ b. $2x^3 + x - 3$

   c. $4x^3 + \frac{1}{x^2}$ d. $5 - 3x^2 + x^4$

4. Find $\frac{dy}{dx}$ given that y equals:

   a. $3x^2 + \sqrt{x}$ b. $\frac{2}{x^3} + 6x^2$

   c. $x(x^2 + 7)$ d. $\frac{3x^2 - 6}{x}$

Expand the brackets first!

Basic Differentiation ANSWERS

Multiply the coefficient by the index, then reduce the index by 1

1. Find $f'(x)$ given that $f(x)$ equals:

a. x^5 $f'(x) = 5x^4$

b. $2x^4$ $f'(x) = 8x^3$

c. $8x$ $f'(x) = 8$

Laws of indices:
$\frac{1}{x^a} = x^{-a}$
$\sqrt{x} = x^{\frac{1}{2}}$

2. Find $\frac{dy}{dx}$ given that y equals:

a. $7x^3$ $\frac{dy}{dx} = 21x^2$

b. $\frac{1}{x^3} = x^{-3}$ $\frac{dy}{dx} = -3x^{-4}$

c. 9 $\frac{dy}{dx} = 0$

3. Find $f'(x)$ given that $f(x)$ equals:

a. $x^2 + 5x$ $f'(x) = 2x + 5$

b. $2x^3 + x - 3$ $f'(x) = 6x^2 + 1$

c. $4x^3 + \frac{1}{x^2} = 4x^3 + x^{-2}$ $f'(x) = 12x^2 - 2x^{-3}$

d. $5 - 3x^2 + x^4$ $f'(x) = -6x + 4x^3$

4. Find $\frac{dy}{dx}$ given that y equals:

a. $3x^2 + \sqrt{x} = 3x^2 + x^{\frac{1}{2}}$ $\frac{dy}{dx} = 6x + \frac{1}{2}x^{-\frac{1}{2}}$

b. $\frac{2}{x^3} + 6x^2 = 2x^{-3} + 6x^2$ $\frac{dy}{dx} = -6x^{-4} + 12x$

Expand the brackets first!

c. $x(x^2 + 7) = x^3 + 7x$ $\frac{dy}{dx} = 3x^2 + 7$

d. $\frac{3x^2 - 6}{x} = 3x - 6x^{-1}$ $\frac{dy}{dx} = 3 + 6x^{-2}$