

(65) Differentiating x^n (Basic Powers of x)

WORKING AT D/E

(1) Find an expression for $\frac{dy}{dx}$ for each of the following:

(a) $y = x^4$ (b) $y = x^7$ (c) $y = 2x^3$
(d) $y = 5x^4$ (e) $y = x^{\frac{3}{2}}$ (f) $y = x^{-1}$
(g) $y = -4x^7$ (h) $y = 8x^{\frac{1}{4}}$ (i) $y = \sqrt{x}$

(2) Find an expression for $f'(x)$ for each of the following:

(a) $f(x) = x^{\frac{4}{5}}$ (b) $f(x) = 3x^{\frac{1}{3}}$ (c) $f(x) = \frac{6}{x}$
(d) $f(x) = -x^{-\frac{2}{5}}$ (e) $f(x) = \frac{1}{2x^2}$

(3) Find an expression for $\frac{dx}{dt}$ given $x = 8^{\sqrt{t}}$

WORKING AT B/C

(1) Find a simplified expression for $\frac{dy}{dx}$ for each of the following:

(a) $y = x\sqrt{x}$ (b) $y = \frac{x^7}{2x}$ (c) $y = \frac{4}{3\sqrt[5]{x}}$

(2) Find a simplified expression for $f'(x)$ for each of the following:

(a) $f(x) = \left(2x^{\frac{7}{2}}\right)^4$ (b) $f(x) = \frac{8x}{\sqrt[4]{x^3}}$

(3) Find an expression for $\frac{dP}{dt}$ given $P = 0.5t\sqrt{t}$

WORKING AT A*/A

(1) Find a simplified expression for $h'(t)$ given that $h(t) = \sqrt[4]{16t^8} \times \frac{3}{t^{0.25}}$

(2) Find the gradient of the curve with equation $y = 2\sqrt[4]{t}$ when $t = 16$.

(3) $f(x) = 2x^2$

Find the value of x for which $f'(x) = 64$