Worked Solutions

Pure Maths, Differential Calculus, sheet PM-DIFF-DF-01

The Power Rule (Derivative Formula) Q. 10

differentiate: $y = \frac{2x^3 - 5x}{3x^4}$

simplifying the division,

$$y = \frac{2x^3}{3x^4} - \frac{5x}{3x^4}$$

simplifying exponents,

$$y = \frac{2}{3}x^{-1} - \frac{5}{3}x^{-3}$$

applying the Power Rule:

$$\frac{d}{dx}\left[x^{n}\right] = nx^{n-1}$$

differentiating each term,

$$\frac{dy}{dx} = \frac{d}{dx}\left(\frac{2}{3}x^{-1}\right) - \frac{d}{dx}\left(\frac{5}{3}x^{-3}\right)$$

$$\frac{dy}{dx} = \frac{2}{3}(-1)x^{-2} - \frac{5}{3}(-3)x^{-4}$$

hence,

$$\frac{dy}{dx} = -\frac{2}{3}x^{-2} + 5x^{-4}$$