

Answer on Question #47679 – Math – Calculus
Problem

Differentiate the following products and quotients using algebraic simplification:

1) $f(x) = x(1 - x + 3x^2)$

2) $f(x) = \frac{4x - 2x^2 + 6}{2x}$

Solution

1) $f(x) = x(1 - x + 3x^2) = x - x^2 + 3x^3$

$$df(x) = f'(x)dx = (x - x^2 + 3x^3)'dx = ((x)' - (x^2)' + (3x^3)')dx = \\ = (1 - 2x + 9x^2)dx$$

2) $f(x) = \frac{4x - 2x^2 + 6}{2x} = \frac{4x}{2x} - \frac{2x^2}{2x} + \frac{6}{2x} = 2 - x + \frac{3}{x}$

$$df(x) = \left(2 - x + \frac{3}{x}\right)'dx = \left((2)' - (x)' + \left(\frac{3}{x}\right)'\right)dx = \left(0 - 1 - \frac{3}{x^2}\right)dx = -\left(1 + \frac{3}{x^2}\right)dx$$

Answer

1) $df(x) = (1 - 2x + 9x^2)dx$

2) $df(x) = -\left(1 + \frac{3}{x^2}\right)dx$