

## Topic 7: Product Rule

Find the derivative of each function.

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

$$2. f(x) = (\sqrt{x} + 3x)\left(5x^2 - \frac{3}{x}\right)$$

$$3. f(x) = (x^{3/2} - 4x)\left(x^4 - \frac{3}{x^2} + 2\right)$$

Answers

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

$$2) f'(x) = \left(\frac{1}{2}x^{-1/2} + 3\right)\left(5x^2 - \frac{3}{x}\right) + (\sqrt{x} + 3x)(10x + 3x^{-2})$$

$$3) f'(x) = \left(\frac{3}{2}x^{1/2} - 4\right)\left(x^4 - \frac{3}{x^2} + 2\right) + (x^{3/2} - 4x)(4x^3 + 6x^{-3})$$