Exercise 15

Differentiate.

$$y = \frac{t^3 + 3t}{t^2 - 4t + 3}$$

Solution

Use the quotient rule to differentiate y.

$$y' = \frac{d}{dt}\left(\frac{t^3 + 3t}{t^2 - 4t + 3}\right)$$

$$= \frac{\left[\frac{d}{dt}(t^3 + 3t)\right](t^2 - 4t + 3) - \left[\frac{d}{dt}(t^2 - 4t + 3)\right](t^3 + 3t)}{(t^2 - 4t + 3)^2}$$

$$= \frac{(3t^2 + 3)(t^2 - 4t + 3) - (2t - 4)(t^3 + 3t)}{(t^2 - 4t + 3)^2}$$

$$= \frac{t^4 - 8t^3 + 6t^2 + 9}{(t^2 - 4t + 3)^2}$$