

Exercise 16

Differentiate.

$$y = \frac{1}{t^3 + 2t^2 - 1}$$

SolutionUse the quotient rule to differentiate y .

$$\begin{aligned} y' &= \frac{d}{dt} \left(\frac{1}{t^3 + 2t^2 - 1} \right) \\ &= \frac{\left[\frac{d}{dt}(1) \right] (t^3 + 2t^2 - 1) - \left[\frac{d}{dt}(t^3 + 2t^2 - 1) \right] (1)}{(t^3 + 2t^2 - 1)^2} \\ &= \frac{(0)(t^3 + 2t^2 - 1) - (3t^2 + 4t)(1)}{(t^3 + 2t^2 - 1)^2} \\ &= -\frac{3t^2 + 4t}{(t^3 + 2t^2 - 1)^2} \end{aligned}$$