Differentiate.[1]

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

This function is a quotient, so we'll use quotient rule.

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

then

$$\begin{aligned}\frac{\mathrm{d}y}{\mathrm{d}t} &= \frac{\left(t^3 + 2t^2 - 1\right) \cdot 0 - 1 \cdot \left(3t^2 + 4t\right)}{\left(t^3 + 2t^2 - 1\right)^2} \\ &= \frac{-3t^2 - 4t}{\left(t^3 + 2t^2 - 1\right)^2}\end{aligned}$$

or

$$= -\frac{3t^2 + 4t}{\left(t^3 + 2t^2 - 1\right)^2}$$

[1]Stewart, *Calculus, Early Transcendentals*, p. 188, #16.