

Find the derivatives of the following functions:

1. (5 points)  $s(t) = (t^4 + 6t + 1)(2t^3 + t^2 + t + 1)$

Apply the Product Rule – you don't have to simplify your solution:

**Solution:**

$$\frac{ds}{dt} = (4t^3 + 6)(2t^3 + t^2 + t + 1) + (t^4 + 6t + 1)(6t^2 + 2t + 1)$$

2. (5 points)  $y = \frac{x^2}{1 - x^2}$

Apply the Quotient Rule – please attempt to simplify the numerator in your solution:

**Solution:**

$$\frac{dy}{dx} = \frac{(2x)(1 - x^2) - (x^2)(-2x)}{(1 - x^2)^2} = \frac{(2x - 2x^3) - (-2x^3)}{(1 - x^2)^2} = \frac{2x}{(1 - x^2)^2}$$