Practice with the Product Rule **Name:**
Introduction to Calculus

For each function below, find the derivative two ways:

- Use the product rule to find the derivative of each function
- Then check your answer by first simplifying f(x) and then taking the derivative using the power rule method.

1 $f(x) = (x^2 + 1)(x)$

a) Use product rule and then simplify	b) Simplify and then use power rule

2 $f(x) = (x^3 + 5x)(x - 1)$

a) Use product rule and then simplify	b) Simplify and then use power rule

For each function below, find the derivative using the product rule. **DO NOT SIMPLIFY**.

3 $f(x) = 3^x(2x-5)$

4 $f(x) = (\sin x)(x^3 - x + 1)$

5 $f(x) = (5e^x - \sqrt{x})(x^2 + \sqrt{x})$

6 $f(x) = (\cos x - 1)(x + 5 + \frac{1}{x})$

7 $f(x) = (\sin x)(x^2 + 2x)(2^x)$

8 Let $f(x)$ be the product of two functions, $u(x)$ and $v(x)$: $f(x) = u(x) \cdot v(x)$
Find $f'(2)$ if $u(2) = 3$, $u'(2) = 3$, $v(2) = 1$, and $v'(2) = 2$.