

SECTION 3.1 PRODUCT RULE AND QUOTIENT RULE

1. Complete **The Product Rule**: If f and g are differentiable, then

$$\frac{d}{dx} [f(x)g(x)] =$$

2. Complete **The Quotient Rule**: If f and g are differentiable, then

$$\frac{d}{dx} \left[\frac{f(x)}{g(x)} \right] =$$

3. Find the derivatives for each function below. *Do not use the Product Rule or the Quotient Rule if you don't have to!*

(a) $f(x) = (1 - x^2)(e^x + x)$

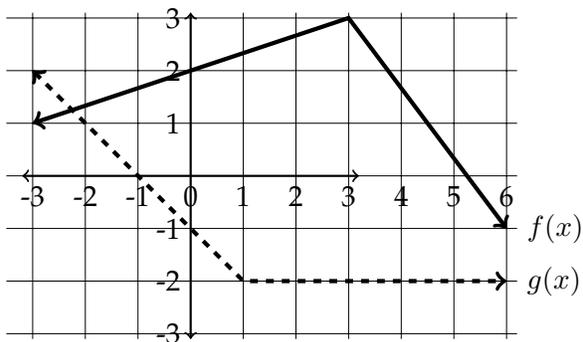
(b) $g(x) = \frac{\sqrt{x}}{8}(1 - x\sqrt{x})$

(c) $h(x) = \frac{10x - x^{3/2}}{4x^2}$

(d) $y = \frac{\sqrt[3]{x}}{2x + 1}$

(e) $v(t) = \frac{2te^t}{t^2 + 1}$

4. The graphs of $f(x)$ (shown thick) and the graphs of $g(x)$ (shown dashed) are shown below. If $h(x) = f(x)g(x)$, find $h'(0)$.



5. Suppose that $f(5) = 1$, $f'(5) = 6$, $g(5) = -3$ and $g'(5) = 2$. Find the following values.

(a) $(f - g)'(5)$

(b) $(fg)'(5)$

(c) $(g/f)'(5)$