SECTION 3.1 PRODUCT RULE AND QUOTIENT RULE

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

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

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

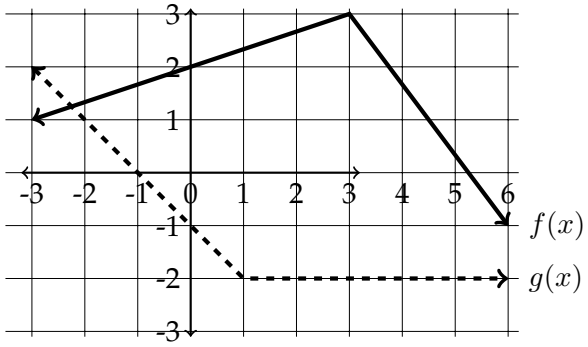
   (b) $g(x) = \dfrac{\sqrt{x}}{8}(1 - x\sqrt{x})$

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

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

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

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