Calculus Concepts **Name:**

Product/Quotient Rule Worksheet **Date:**

Product Rule: $\frac{d}{dx}\big(f(x)g(x)\big) = f(x)g'(x) + g(x)f'(x)$

Quotient Rule: $\frac{d}{dx}\left(\frac{f(x)}{g(x)}\right) = \frac{g(x)f'(x) - f(x)g'(x)}{(g(x))^2}$, where $g(x) \neq 0$

Directions: Find the derivative of each problem using either the product or the quotient rule. Show all calculus and algebra necessary to arrive at your answer. **NO CALCULATORS**.

PRACTICE PROBLEMS (IN CLASS)

A. Find $h'(x)$ if $h(x) = (3x - 2x^2)(5 + 4x)$

B. Find $g'(x)$ if $g(x) = x\sin x$

C. Find $\frac{d}{dx}(f(x))$ if $f(x) = \frac{1}{3}\left(2x^3 - 4\right)$

D. Find $f'(x)$ if $f(x) = \frac{5x - 2}{x^2 + 1}$

E. Find $g'(x)$ if $g(x)=\dfrac{3-\dfrac{1}{x}}{x+5}$

F. Find $h'(x)$ if $h(x)=\dfrac{1-\cos}{\sin x}$

HOMEWORK PROBLEMS: Find the derivative of each of the following functions using the product or quotient rule. Show all necessary calculus and algebra used to arrive at your answer.

1. $f(x)=(x^2-2x+1)(x^3-1)$
2. $f(x)=\dfrac{x+1}{x-1}$
3. $f(x)=x^2\cos x$
4. $f(x)=\sin x\cos x$
5. $f(x)=\dfrac{x+1}{\sqrt{x}}$
6. $f(x)=\dfrac{2x+3}{6}$
7. $f(x)=(x^3-3x)(2x^2+3x+5)$
8. $f(x)=\dfrac{\sin x}{\cos x}$