

**Math 112**  
Winter 2005  
Activity 4  
Derivative Skills Practice

**Derivative Rules:**

$$\begin{aligned}(f(x) + g(x))' &= f'(x) + g'(x) & (c \cdot f(x))' &= c \cdot f'(x) \\ (e^{f(x)})' &= e^{f(x)} \cdot f'(x) \\ (f(x) \cdot g(x))' &= f(x)g'(x) + g(x)f'(x)\end{aligned}$$

$$\begin{aligned}(f(x)^n)' &= n f(x)^{n-1} \cdot f'(x) \\ (\ln(f(x)))' &= \frac{1}{f(x)} \cdot f'(x) = \frac{f'(x)}{f(x)} \\ \left(\frac{f(x)}{g(x)}\right)' &= \frac{g(x)f'(x) - f(x)g'(x)}{(g(x))^2}\end{aligned}$$

Compute the derivative. Do not simplify.

1.  $y = \frac{4x}{e^{x^2}}$

2.  $y = x \cdot \sqrt[4]{1 + x^2}$

3.  $y = e^{\sqrt{x}} \cdot \ln 2x$

4.  $y = \frac{x^3}{e^{x+\ln x}}$

5.  $y = \left(x + \frac{1}{x}\right)^7$

6.  $y = \sqrt{\ln \sqrt{x}}$

7.  $y = (x^2 + 6)^2(3x - 7)^8$

8.  $y = \left(\frac{x^3 - 2x}{5x^4 + 7}\right)^{10}$

9.  $y = (7x^6 - 9x^4) \cdot \ln(1 + (4x)^3)$

10.  $y = \sqrt{x} - \frac{1}{\sqrt{x}}$