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**Math 112**  
July 19, 2006  
Derivative Skills Practice

**Derivative Rules:**

$$(f(x) + g(x))' = f'(x) + g'(x) \qquad (c \cdot f(x))' = c \cdot f'(x)$$

$$(e^{f(x)})' = e^{f(x)} \cdot f'(x)$$

$$(f(x) \cdot g(x))' = f(x)g'(x) + g(x)f'(x)$$

$$(f(x)^n)' = n f(x)^{n-1} \cdot f'(x)$$

$$(\ln(f(x)))' = \frac{1}{f(x)} \cdot f'(x) = \frac{f'(x)}{f(x)}$$

$$\left(\frac{f(x)}{g(x)}\right)' = \frac{g(x)f'(x) - f(x)g'(x)}{(g(x))^2}$$

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