

## Math Xb—Spring 2004

### Problems on the Derivatives of Logarithmic and Exponential Functions

Note that  $\log x = \log_{10} x$  and  $\exp(x) = e^x$ .

1. Find the derivative of  $f(x) = \frac{2}{x} + 2 \ln x$ .
2. Find the derivative of  $f(x) = 7^x + x^7$ .
3. Find the derivative of  $y = 8 \ln x^{1/2} - 12$ .
4. Find the derivative of  $y = e^{2x} + 2x^e + e^\pi$ .
5. Find the derivative of  $y = \log_7 x + \ln x^2$ .
6. Find the derivative of  $g(x) = \exp(2x^2 - 2x + 5)$ .
7. Find the derivative of  $y = \ln(x^2 + 1)$ .
8. Find the derivative of  $h(t) = 10^t + \log t$ .

### Answers

1.  $f'(x) = -\frac{2}{x^2} + \frac{2}{x}$
2.  $f'(x) = 7^x(\ln 7) + 7x^6$
3.  $y' = \frac{4}{x}$
4.  $y' = 2e^{2x} + 2ex^{e-1}$
5.  $y' = \frac{1}{x \ln 7} + \frac{2}{x}$
6.  $g'(x) = (4x - 2) \exp(2x^2 - 2x + 5)$
7.  $y' = \frac{2x}{x^2 + 1}$
8.  $h'(t) = 10^t(\ln 10) + \frac{1}{t \ln 10}$