

**Review For Exam I** (February 12, 2007)

1. Find the following derivatives.
  - a)  $f(x) = \ln |\sin x|$
  - b)  $g(x) = 2^{\cos x}$
  - c)  $h(x) = \log_2(e^x)$
  
2. Find the following antiderivatives.
  - a)  $\int \frac{x^3+x^2+x+1}{x+2} dx$
  - b)  $\int \frac{e^x+e^{-x}}{e^x-e^{-x}} dx$
  - c)  $\int \frac{2x}{x^2+6x+9} dx$
  
3. Determine whether or not the function  $f(x) = x^2 + 2x + 2$  has an inverse. If it does, then find it. If it doesn't, restrict the domain until it does have an inverse and then find the inverse.
  
4. A chicken is removed from a freezer and placed in a room at  $20^\circ\text{C}$ . It's initial temperature is  $-10^\circ\text{C}$ . Half an hour after it is removed from the freezer, its temperature is  $-5^\circ\text{C}$ . Find the temperature of the chicken two hours after it is removed from the freezer. (Warning: Meat should never be thawed at room temperature.)
  
5. Derive the derivative of  $y = \text{arcsec } x$ .
  
6. Find the area enclosed between the curves  $y = x^3 - 3x$  and  $y = x$ .
  
7. Find the volume of the solid of revolution obtained by rotating the curve  $y = \sqrt{\sin x}$  around the  $x$  axis between  $x = 0$  and  $x = \frac{\pi}{2}$ .