Math 143
Fall, 2006 Name: **Solutions**
Quiz 1 - Review of derivatives and integrals

Complete the following problems. You do not need to simplify. Show all work to receive full credit.

1. Calculate the following derivatives. You do not need to simplify.

   (a) $\dfrac{d}{dx}\left(x^5 + \dfrac{1}{x} - \dfrac{1}{\pi}\right)$

   $$= 5x^4 - \frac{1}{x^2} - 0$$

   (b) $\dfrac{d}{dx}\left(x^2 \sec(2x+3)\right)$

   $$= 2x\sec(2x+3) + \sec(2x+3)\tan(2x+3)\cdot 2 \cdot x^2$$
   $$= 2x\sec(2x+3) + 2x^2\sec(2x+3)\tan(2x+3)$$

   (c) $\dfrac{d}{dx}\left(\dfrac{\tan x}{e^x + \pi^x}\right)$

   $$= \frac{\sec^2 x\,(e^x + \pi^x) - (e^x + \pi^x \ln \pi)\tan x}{(e^x + \pi^x)^2}$$

2. Calculate the following integrals:

   (a) $\displaystyle\int x^4 - \frac{7}{x} + \sin x\, dx$

   $$= \frac{1}{5}x^5 - 7\ln \mid x \mid - \cos x + C$$

   (b) $\displaystyle\int \frac{\tan^{-1} x}{1+x^2}\, dx$

   $$= \frac{1}{2}\left(\tan^{-1} x\right)^2 + C$$