Honors Math 182 Homework 1 Version A

1. Find the following derivatives. Work the problems using pencil and paper. You may check your work with Maple.

   (i) $\dfrac{d}{dx}\left(x^{\pi} + \pi^{x}\right)$

   (ii) $\dfrac{d}{dx}\left(x^2 \ln(x^2+1)\right)$

   (iii) $\dfrac{d}{dx} \arctan(5 \sin x)$

   (iv) $\dfrac{d}{dx}|2+x|^{\sin x}$

   (v) $\dfrac{d}{dx}\dfrac{\tan(e^x)}{1+x^4}$

2. Find the following integrals. Work the problems using pencil and paper. You may check your work with Maple.

   (i) $\displaystyle\int_0^2 x^2(x-1)\,dx$

   (ii) $\displaystyle\int_0^2 \left|x^2(x-1)\right| dx$

   (iii) $\displaystyle\int_0^{\pi} \sin\left(\frac{x}{6}\right) dx$

   (iv) $\displaystyle\int_1^3 \frac{\arctan\sqrt{x}}{\sqrt{x}}\,dx$

   (v) $\displaystyle\int_0^1 x \arctan x\,dx$

3. Make up a differentiation problem you can solve which has both a sine and an arcsine function in it.

4. Make up a definite integral you can solve which has both a sine and cosine function in it.

5. Make up a definite integral you can solve which has both an exponential and logarithm function in it.

6. Make up a definite integral you can solve which has both an absolute value and a square root function in it.

7. Make up an integral problem that Maple can't solve.