MATH 222 (Lectures 1,2,4) Worksheet 1 Fall 2015

Name: ________________________________

Solve the following problems.

1. a Use the identity $\sin^2(\theta) + \cos^2(\theta) = 1$ to show that $\tan^2(\theta) + 1 = \sec^2(\theta)$.

   b For each of the following, circle the correct answer.

$2\sin(\theta)\cos(\theta) =$	$\cos(2\theta)$	$\sin(2\theta)$
$\cos^2(\theta) - \sin^2(\theta) =$	$\cos(2\theta)$	$\sin(2\theta)$
$\cos^2(\theta) =$	$\frac{1}{2}(1+\cos(2\theta))$	$\frac{1}{2}(1-\sin(2\theta))$
$\tan(\arctan(x)) =$	1	x

2. True or False:
   (a) $\frac{d}{dx}(\frac{1}{x}) = \ln x$
   (b) $\frac{d}{dt}\int_0^t \frac{dx}{1+x^2} = \frac{1}{1+t^2}$
   (c) $\sqrt{x^2+9} = x+3$
   (d) The function $f(x) = \frac{1}{x+4}$ is defined for all values of x except for $x = -4$
   (e) $\int e^{(x^3)}dx = e^{(x^3)} + C$
   (f) If $f(x) = x^2 \cdot g(x)$ then $f'(x) = 2x \cdot g'(x)$

3. For each of the following, state whether the object is a function or a number. If it is a function, state what variable it is a function of.
   (a) $\int_1^x e^{\cos(t)}dt$
   (b) $\int_1^3 \sin(s)ds$
   (c) $\int \ln(x)dx$
   (d) $\int_t^{t^3} \ln(\cos(x))dx$

4. Compute $\frac{d}{dx}\int_x^1 \ln z \, dz$. (Hint: remember the "Fundamental Theorem of Calculus".)

5. Compute $\int e^x \sin(2\pi e^x) dx$

6. Compute $\int_0^x \left(\int_0^t \cos(s) ds \right) dt$.

7. Define $f(x) = \ln(x)\sin(x) + \sqrt{x^4 + x^2}$. Compute $f'(x)$.