Worksheet 1

Review

TRIG IDENTITIES

1. Using the identity $\sin^2(\theta)+\cos^2(\theta)=1$, show that $\tan^2(\theta)+1=\sec^2(\theta)$.

2. For each of the following, circle the correct answer:

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

CALCULUS

3. True or False:

a. $\dfrac{d}{dx}\left(\dfrac{1}{x}\right)=\ln x$

b. $\dfrac{d}{dt}\displaystyle\int_0^t \frac{1}{1+x^2}\,dx=\frac{1}{1+t^2}$

c. $\sqrt{x^2+9}=x+3$

d. The function $f(x)=\dfrac{1}{x+4}$ is defined for all values x except for $x=-4$.

e. $\displaystyle\int e^{x^2}\,dx=e^{x^2}+C$

f. If $f(x)=x^2\cdot g(x)$ then $f'(x)=2x\cdot g'(x)$.

4. 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. $\displaystyle\int_1^x e^{\cos(t)}\,dt$

b. $\displaystyle\int_t^{t^2} \ln(\cos(x))\,dx$

c. $\displaystyle\int_1^3 \sin(s)\,ds$

d. $\displaystyle\int \ln(x)\,dx$

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

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

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

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