Exam Review

Name: ________________________________
Math 165
Date: 12/5/2013
Section: ______

This is a worksheet that will help you review for the exam tomorrow.

1. Make up and solve a u-substitution problem that you think might be on the exam that involves $\ln(x)$.

2. Make up and solve a u-substitution problem that you think might be on the exam that involves $\sin(x)$. 
3. Make up and solve a u-substitution problem that you think might be on the exam that involves \( \cos(x) \).

4. The exam will have multiple u-substitution problems, write down the strategy you will use to solve them. Of course you can use the strategy we came up with before break.

5. Integrate \( \int_1^e \frac{1}{x} \, dx \).
6. Find the integral of the piecewise function. Ask me for a picture if you get stuck.

\[ f(x) = \begin{cases} 
\sqrt{4-x^2} & -2 \leq x \leq 2 \\
-2x + 4 & 2 < x < 3 \\
2 & 3 \leq x \leq 5 
\end{cases} \]

7. Write the following right end point Riemann sums in integral form. Notice that they are very similar.

\[ \lim_{n \to \infty} \sum_{k=1}^{n} \left[ \left( k \frac{4}{n} \right)^3 + 2 \left( k \frac{4}{n} \right) \right] \frac{4}{n} \]

\[ \lim_{n \to \infty} \sum_{k=1}^{n} \left[ \left( 1 + k \frac{4}{n} \right)^3 + 2 \left( 1 + k \frac{4}{n} \right) \right] \frac{4}{n} \]
8. Set up, but do not evaluate, the Riemann sum for the integral \( \int_{2}^{3} \sin(2x) \, dx \).

9. Write down as many trig and inverse trig integrals as you can remember.
10. What is the derivative of $\int_{x}^{\pi} \ln(t) + \sin^2(t) - \frac{t + 1}{\cos(t)} \, dt$?

11. What is the derivative of $\int_{x^2-x}^{x} \ln(t) + \sin^2(t) - \frac{t + 1}{\cos(t)} \, dt$?