1. Solve for $x$ in each of the following. Give the exact answer and then a calculator answer.
   a) $2^{4-x} = 28$
      exact: 
      calculator: 
   b) $3^{1+x} = 7^x$.
      exact: 
      calculator: 
   c) $4 \cdot 3^{1+x} = 10^x$
      exact: 
      calculator: 
   d) $\log_{10}(1 + 2x) = 2$
      exact: 
      calculator: 

2. Use the rules for logarithms to express $\log\left(\frac{a^2b}{c^3}\right)$ in terms of $\log a$, $\log b$, and $\log c$.
   answer: 

Name ____________________________

MATH 118 Spring 2011: Exam 4

Show all your work in each of the following problems.
3. A bank offers depositors an annual rate of 7% on savings accounts with interest being compounded monthly. Suppose that $10,000 is invested initially.

a) How much will be present after 5 years? Round to two decimal places.

answer:____________________

b) How long will it take for the money to double? Round to two decimal places.

answer:____________________

4. Suppose that $x$ is in the third quadrant and that $\tan x = \frac{3}{4}$. Find the exact values of $\sin x$ and $\cos x$.

$\sin x$:____________________

$\cos x$:____________________

5. Find the polar coordinates $r$ and $\theta$ (in radians) of the point with Cartesian coordinates $(x, y) = (4, -2)$.

$r$=____________________

$\theta$=____________________

6. Use the law of cosines to solve the indicated triangle for side $a$ and angle $\beta$. Express your answer for $\beta$ in degrees. Round your answers to two decimal places.

side $a$:____________________

angle $\beta$:____________________
7. Suppose that $x$ is in the second quadrant and that $\sin x = \frac{3}{5}$. Find the exact values of each of the following using the double or half angle formula.
   a) $\sin 2x$
   answer:_____________________

   b) $\cos 2x$
   answer:_____________________

   c) $\sin \frac{x}{2}$
   answer:_____________________

   d) $\cos \frac{x}{2}$
   answer:_____________________

8. A certain population is decreasing continuously in size at the rate of 4.5% per month? What is the half-life of the population?
   answer:_____________________

9. Find all solutions in the interval $[0, 360^\circ]$ to the equation $5 \cos x = 2$. Round your answer to two decimal places.
   answer:_____________________
10. Find all solutions in the interval \([0, 2\pi]\) for each of the following. Give exact answers.
   
a) \csc x = -1

   answer: ____________________

   b) \(2\sin^2 x - 1 = 0\)

   answer: ____________________

11. Use the law of sines to solve the indicated triangle for side \(a\) and angle \(\beta\). Express your answer for \(\beta\) in degrees. Round your answers to two decimal places.

   side \(a\):____________________

   angle \(\beta\):__________________