Precalculus-04, Test 3 Review

Dr. Graham-Squire, Fall 2013

●The test will cover sections, 4.1-4.6 and 5.1-5.4.

●To study, you can look over your notes, rework HW problems on WebAssign, quizzes, and problems from the notes, as well as work out the practice problems given for each section. The Review Questions at the end of Chapters 4 and 5 are also good practice. You can also look at the following problems on my website:

(a) Quiz 2, questions 1, 3 and 4

(b) Test 2, question 4, 6, and 7

●Calculators <u>are</u> allowed on this test, but for certain questions you may not be allowed to use a calculator. For those without graphing calculators, there may be a section on the test where you can use either a calculator or a computer.

●You must know the unit circle! There will be questions on the test where you will not have a calculator and you will have to find certain trigonometric values.

●Some practice problems to work on:

1. Bob invests \$10,000 in a bank account at 4% interest, compounded continuously.

   (a) How much money will he have in the account after 5 years? Round to the nearest dollar.
   (b) How many years will it take until he has \$21,000 in the account? Round to the nearest 0.1 years.

2. Radioactive iodine is used as a tracer to diagnose certain thyroid gland disorders. It decays in such a way that the mass (in grams) remaining after t days is given by the exponential decay function, with $P = 6$ and $r = -0.087$. Answer the first two questions *without* using a calculator. You will need a calculator to answer the third question.

   (a) How much of the iodine is present initially?
   (b) How much iodine will be left in the body over the long run (that is, as t goes to infinity)?
   (c) How long does it take for the half of the iodine to leave the body?

3. Use the definition of logarithm to solve the equations. You should be able to do these without a calculator.

   (a) $\log_4 2 = x$
   (b) $\log_4 x = 2$
   (c) Evaluate $\log_5 100 - \log_5 10 + \log_5 5 - \log_5 2$

4. Use laws of logarithms to completely expand the expression $\ln\left(\dfrac{e^x}{x(x^2+1)(x^4+1)}\right)$.

5. Solve the equations. Round your answer to the nearest 0.01.

   (a) $7^{x/2} = 5^{1-x}$
   (b) $\log_{10} x + \log_{10}(x-3) = 1$

6. The bat population in a certain region was 350,000 in 2009, and the observed doubling time for the population is 25 years. When will the population reach 2 million?

7. The half-life of palladium is 4 days. After 20 days a sample has been reduced to a mass of 0.375 grams. After how many days was exactly one gram left?

8. (a) Find the reference number for $t = \frac{-35\pi}{4}$.

   (b) Find the terminal point for $t = \frac{41\pi}{6}$.

9. (a) Find $\cos t$ and $\csc t$ if $\tan t = \frac{1}{4}$ and t lies in Quadrant III.

   (b) Without a calculator, find the following. If an expression does not exist, write DNE and explain why it does not exist.

   (i) $\sin \frac{3\pi}{4}$ (ii) $\tan \frac{-7\pi}{3}$ $\sec \frac{7\pi}{2}$

10. Without a calculator, sketch a graph of $y = 3\cos\left(\pi\left(x + \frac{\pi}{4}\right)\right)$.

11. Without a calculator, sketch a graph of $y = \cot 3\left(x - \frac{\pi}{6}\right)$.