Math 229: Review for Test 3

Bring your scientific calculator to the exam. (Graphing calculators are not allowed on the test.)

Read through the review at the end of Chapter 9, beginning on page 753.

STRONGLY Suggested review problems: Page 759: 1, 5, 7, 9, 13, 15, 16, 24 (for #24, use the Double Angle Identities…this will be required on the test. Try sketching the triangle for $\cot(\theta) = \frac{-3}{4}$ in QII first, then use the values for $\sin(\theta)$ and $\cos(\theta)$ in the Double Angle Identities!), 25 (for #25, use the Half-Angle Identities…this will be required on the test)

For Proving/Verifying Identities, one of the problems from the homework will be on the test, so practice those!

Even Answers: #16: $x = \frac{\pi}{6} + 2\pi k, \quad x = \frac{5\pi}{6} + 2\pi k, \quad x = \pi k$

#24: $\sin(2\theta) = -\frac{24}{25}, \quad \cos(2\theta) = -\frac{7}{25}, \quad \tan(2\theta) = \frac{24}{7}$

What you should have memorized:

- All previous trig facts, including Cosine and Sine values for multiples of pi and odd multiples of pi/2, and the sides of 30-60-90 and 45-45-90 triangles.

- Identities to have memorized:
  - Reciprocal
  - Ratio
  - Even/Odd
  - Pythagorean for sine and cosine (be able to derive the other two)
  - Double Angle Formulas for sine and cosine (know all three forms for cos(2x)!)

Concepts to study:

Supplement on Composition of Inverse Trig Functions

- Evaluate the composition of trig and inverse trig functions
  Example: $\sin(\cos^{-1}(x)) = what?$ Sketch the triangle $\cos\theta = \frac{x}{1}$, find the missing side using the Pythag. Theorem, then find the sine using the triangle. Answer: $\sin(\cos^{-1}(x)) = \sqrt{1-x^2}$

All other identities will either be provided, or you will be asked to derive them.

Section 9.5: Solving Equations

- For a given trig equation, be able to find the General Solution as well as Particular Solutions from 0 to 2pi. Look at the suggested review problems for Chapter 9 and see if you can identify these types of equations:
  - Basic Equations
  - Factor to solve
  - Clear fractions to solve
  - Recognize "mismatches" in the argument and/or the type of trig function. Use identities to eliminate the mismatch.
  - Solve equations with multiple angles such as cos(2x) or sin(5x), etc.

Sections 9.1 – 9.3: Identities

- Derive one identity from another (example: Use the Sum of Angles Identity to derive the Double Angle Identity for either sine or cosine)
- Use the Sum of Angles Identities to find the exact value of, say, $\sin\left(\frac{7\pi}{12}\right)$
- Solve "puzzles" involving Double Angles and Half-Angles (see #24 and #25 in the Review Problems) This includes determining which quadrant the Half Angle is in!
- Prove/verify an identity: Starting on one side, use identities and substitution to "massage" the one side into the form of the other side.
- Verify an identity by graphing (graphs will be provided)

  Examine the graph of the left and right side of an equation.

  - y = Left Hand Side
  - y = Right Hand Side

  If the graphs don't match, then the equation is <u>not</u> an identity.

  If the graphs DO match, then we haven't <u>proven</u> the equation is an identity but have strong evidence that it is!