Exam I Review Sheet
MATH 122, Winter 2004

This exam will cover sections 6.1-6.9 in your text. You should know general terms and definitions from each of these sections, review the homework and quizzes given for these sections, and pay particular attention to the subjects and practice problems mentioned below.

1. Drawing the initial and terminal sides, in standard position, of angles given in radians or degrees.
2. Converting angles between radians and degrees, or between DMS and DD.
3. Using trigonometric definitions for acute angles based on right triangles.
4. Evaluating trigonometric and inverse trigonometric functions using a calculator (i.e. solving triangles).
5. Evaluating trigonometric functions of general angles using reference triangles and angles.
6. Finding exact values of trigonometric functions of special angles on the unit circle.
7. Domains, ranges, and periods of the basic trigonometric functions.
8. Basic Trigonometric identities.
9. Graphing basic trigonometric functions.
10. Graphing general trigonometric functions.

Below is a sampling of problems representative of the types you will see on the exam.

1. Draw each of the following angles in standard position, and then convert as indicated.
   (a) \(120^\circ\) to radians
   (b) \(-70^\circ\ 20'\ 5''\) to DD
   (c) \(820.245^\circ\), to DMS
   (d) \(\frac{3\pi}{2}\) to degrees
   (e) \(\frac{7\pi}{3}\) to degrees
   (f) \(-\frac{12\pi}{5}\) to degrees

2. Use the triangles show below to find the value of the six trigonometric functions at \(\theta\) and \(\alpha\).

3. Solve the following triangles.

4. Find the value of all six trigonometric functions in the situations described below. Also, sketch a picture, including the angle, reference triangle, and reference angle, depicting each situation.
   (a) Terminal side passes through the point \((-3, 4)\).
   (b) Terminal side forms a reference angle of \(\frac{\pi}{6}\) and lies in quadrant III.
   (c) Terminal side forms a reference angle of \(45^\circ\) and lies in quadrant IV.
5. Use reference triangles and your knowledge of special angles in quadrant I to find the exact values of the following.

   (a) \( \sin \left( \frac{2\pi}{3} \right) \)  
   (b) \( \tan \left( \frac{7\pi}{6} \right) \)  
   (c) \( \cos \left( \frac{7\pi}{4} \right) \)  
   (d) \( \sec \left( \frac{\pi}{4} \right) \)  
   (e) \( \cot \left( \frac{3\pi}{4} \right) \)  
   (f) \( \csc \left( \frac{4\pi}{3} \right) \)

6. State the domain, range, and period for each function.

   (a) \( \sin(x) \)  
   (b) \( \cot(x) \)  
   (c) \( \sec(x) \)  
   (d) \( \tan(x) \)  
   (e) \( \csc(x) \)  
   (f) \( \cos(x) \)

7. Simplify each of the following using appropriate basic identities.

   (a) \( \sin(-x) \cos(-x) \)  
   (b) \( \frac{\sin^2(x)}{1-\sin^2(x)} \)

8. Graph the functions given below.

   (a) \( \sin(x) \)  
   (b) \( \cot(x) \)  
   (c) \( \sec(x) \)  
   (d) \( \cos(x) \)

9. State the amplitude (if it exists), period, and phase shift for each function below. Then, graph that function.

   (a) \( \frac{1}{3} \cos \left( \frac{x}{2} \right) \)  
   (b) \( 3 \cot \left( 2x + \frac{\pi}{2} \right) \)  
   (c) \( \cos \left( 3x - \frac{\pi}{2} \right) \)  
   (d) \( 2 \tan \left( x + \frac{\pi}{4} \right) \)

10. Evaluate the following inverse trigonometric functions without using a calculator.

    (a) \( \arcsin(-\sqrt{3}) \)  
    (b) \( \tan^{-1}(-\sqrt{22}) \)  
    (c) \( \arcsin \left( -\frac{1}{2} \right) \)  
    (d) \( \sin \left[ \arcsin(-0.6) \right] \)

11. Find exact solutions to each of the following equations.

    (a) \( \sin^{-1}(x) = \tan^{-1}(x) \)  
    (b) \( \arcsin(x) = \arcsin \left( \frac{1}{2} \right) \)