7-4 Worksheet- Graphing the "other" Trig Functions

This material will be on the test for honors. It is "enrichment" for the rest of you, much like the graphing rational function idea was back in chapter 4. Give the questions some thought and use your graphing calculator when instructed to do so. Write your answers onto a separate piece of paper. This assignment will count like any other homework assignment.

1. The key to understanding the graph of $y = \tan x$ is to remember that $\tan x = \dfrac{\sin x}{\cos x}$. Have $0 \le x < 2\pi$, in all of your answers unless told otherwise.
   a) Where is $\sin x = 0$? What is $\tan x$ at these x values?
   b) Where is $\cos x = 0$? What is $\tan x$ at these x values? (hint: you are dividing by zero)
   c) Where will $\tan x = 1$? Where is $\tan x = -1$?
   d) In what quadrants is $\tan x > 0$? In what quadrants is $\tan x < 0$? Explain why your answers are true, talking about sine and cosine.
   e) Graph $y = \tan x$ with your graphing calculator in a ZOOM TRIG (#7) window. Copy the graph onto your paper. Look to see if your answers to the above parts were correct.
   f) Are the vertical lines really part of the graph? Explain.
   g) What is the period of $\tan x$? Explain why it is not 2π.

2. a) How will the graph of $y = \tan(x/2)$ compare to the graph of $y = \tan x$?
   b) Graph $y = \tan(x/2)$ with $y = \tan(x)$ in the same window as before. Make this new graph with a thicker line (hit enter on the diagonal line in front of the Y_2 to do this) so you easily tell them apart. Copy the graph onto your paper.

3. a) What is the connection between $\tan x$ and $\cot x$?
   b) Graph $y = \cot x$ on the same graph with with $y = \tan x$. Make $\cot x$ with a thicker line. (How do you put $\cot x$ into your calculator?) Copy the graph onto your paper.

4. a) How does $\sec x$ relate to $\cos x$?
   b) Is $\sec x$ positive or negative when $\cos x$ is positive?
   c) What happens to $\sec x$ as $\cos x$ gets bigger?
   d) What happens to $\sec x$ as $\cos x$ goes to 0?
   e) Graph $y = \cos x$ and and $y = \sec x$ on the same graph (make $\sec x$ the thicker line and think about how to put it into your calculator.) Copy the graph onto your paper.