Math 220 – Trigonometry Homework #1

1. Convert from degrees to radians and simplify.
   (a) 120°
   (b) 225°
   (c) -30°
   (d) 300°
   (e) 540°
   (f) 2°

2. Convert from radians to degrees and simplify.
   (a) $\pi/3$
   (b) $\pi/12$
   (c) $7\pi/4$
   (d) 3.5π
   (e) $-3\pi/2$
   (f) 2

3. Evaluate the following quantities.
   (a) $\sin(3\pi/2)$
   (b) $\cos(7\pi/6)$
   (c) $\tan(5\pi/6)$
   (d) $\sin(-7\pi/2)$
   (e) $\cos(-3\pi/4)$
   (f) $\tan(18\pi)$
   (g) $\cot(2\pi/3)$
   (h) $\sec(2\pi/3)$
   (i) $\csc(2\pi/3)$

4. Determine real numbers a and b so that the expression $8\sin^2\theta + 2\cos^2\theta$ can be rewritten as $a\sin^2\theta + b$.

5. Determine real numbers a and b so that the expression $2\tan^2\theta + 3\sec^2\theta$ can be rewritten as $a\tan^2\theta + b$.

6. Simplify the expression $\cot^2\theta - \csc^2\theta$.

7. Determine if the following functions are even, odd or neither.

   (a) $f(\theta) = \cos\theta$
   (b) $g(t) = \sin t$
   (c) $h(\alpha) = \tan\alpha$
   (d) $F(x) = \cot x$
   (e) $v(x) = \sec x$
   (f) $f(x) = \csc x$
   (g) $g(\beta) = \beta^4 \sin\beta$
   (h) $h(x) = \sin^3 x \tan x$
   (i) $w(x) = (\sin x + \cos x)^2$

8. For all θ, the quantity $\sin(\pi + \theta)$ is equivalent to which one of the following?

   (a) 0
   (b) 1
   (c) $\sin\theta$
   (d) $-\sin\theta$
   (e) $\cos\theta$
   (f) $-\cos\theta$

9. For all θ, the quantity $\cos(\pi/2 + \theta)$ is equivalent to which one of the following?

   (a) 0
   (b) 1
   (c) $\sin\theta$
   (d) $-\sin\theta$
   (e) $\cos\theta$
   (f) $-\cos\theta$

10. Carefully sketch a graph of each of the following functions. Show more than one period for each function and include x-intercepts and y-intercepts.

    (a) $f(x) = \sin x$
    (b) $f(x) = \cos x$
    (c) $f(x) = \tan x$
    (d) $f(x) = \cot x$
    (e) $f(x) = \sec x$
    (f) $f(x) = \csc x$
    (g) $f(x) = 2\sin(x - \pi)$
    (h) $f(x) = 1 - \tan x$
    (i) $f(x) = 5 + 2\cos x$