Some Additional Practice for the Midterm Exam

This isn't meant to be a "practice test", nor is it meant to be "the only thing you need to study to be prepared for the exam." It's just some additional practice problems. If you're comfortable with all of these problems, then you should be prepared for the exam but, in addition to the problems below, you should also study the Online Lecture Notes, the extra practice problems associated with the Online Lecture Notes, the suggested practice problems from the textbook, and the Worksheets.

You should NOT use a calculator for ANY of the problems below since you won't be allowed to use a calculator on the Midterm.

1. **a.** Convert 24° into radians.

b. Convert $\frac{3}{2}$ radians into degrees.

2. Find the arc-length spanned by an angle measuring 24° on a circle of radius 30 feet.

3. Evaluate the following expressions:

a. $\sin(225^\circ)$ **b.** $\sin\left(\frac{5\pi}{3}\right)$ **c.** $\cos(300^\circ)$

d. $\cos\left(\frac{17\pi}{6}\right)$ **e.** $\tan\left(\frac{3\pi}{4}\right)$ **f.** $\sec(3600^\circ)$

4. If $\sin(\theta) = \frac{3}{4}$ and θ is in the second quadrant, find the exact value of the following:

a. $\cos(\theta)$ **b.** $\sin(\theta + 2\pi)$ **c.** $\sin(-\theta)$

d. $\tan(\theta)$ **e.** $\csc(\theta)$ **f.** $\sec(\theta)$

5. Find all of the solutions to the following equations on the interval $[0, 2\pi)$.

a. $2\cos(\theta) = 1$ **b.** $\sin(2\theta) + 3 = 4$

6. Find *all* of the solutions to the following equations:

a. $3\sin(x) + 4 = 5$ **b.** $7 + 3\sqrt{2}\cos(4t) = 4$

7. Use the sine and cosine functions to find the coordinates of the point P in Figure 1 that is specified by $\frac{7\pi}{6}$ on the circumference of a circle of radius 3 units.

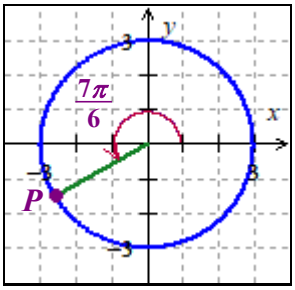

Figure 1

8. Sketch a graph of the function $g(t) = 3\sin\left(2t + \frac{\pi}{4}\right) - 2$. State the period, midline, and amplitude of g.

9. **a.** Find four algebraic rules (one using positive sine, one using negative sine, one using positive cosine, and one using negative cosine) for the function $y = f(t)$ graphed in Figure 2.

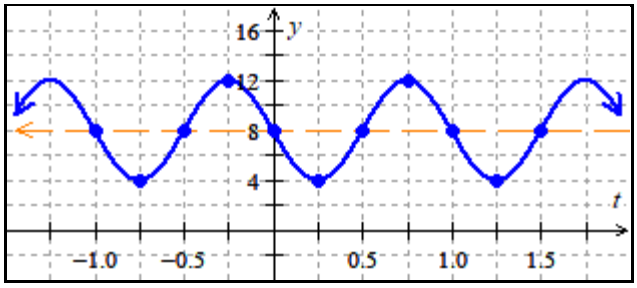

Figure 2: A graph of $y = f(t)$.

b. Use one of your answer to part **a** to find exact solutions to $f(t) = 10$.

10. Evaluate the following. Show your steps. (Do not use a calculator!)

a. $\sin\left(\cos^{-1}\left(-\frac{1}{2}\right)\right)$ **b.** $\sin^{-1}\left(\sin\left(\frac{7\pi}{4}\right)\right)$ **c.** $\cos^{-1}\left(\sin\left(\frac{4\pi}{3}\right)\right)$