Week 5 Practice Worksheet

Some Additional Practice for the Midterm Exam

This isn't meant to be a "practice test" or "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 ClassNotes/Videos, the Online Lecture Notes, the Weekly Practice Worksheets, the Weekly Graded Worksheets, and the suggested practice problems from the online textbook.

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 $75°$ on a circle of radius 30 feet.

3. Evaluate the following expressions:

a. $\sin\left(\frac{\pi}{3}\right)$.

b. $\cos(45°)$.

c. $\sin(330°)$.

d. $\cos\left(\frac{\pi}{2}\right)$.

e. $\cos\left(\frac{2\pi}{3}\right)$.

f. $\sin\left(\frac{5\pi}{4}\right)$.

g. $\sin\left(\frac{7\pi}{6}\right)$.

h. $\cos\left(\frac{11\pi}{6}\right)$.

i. $\cos\left(\frac{17\pi}{6}\right)$.

k. $\sin\left(\frac{16\pi}{3}\right)$.

l. $\tan\left(\frac{3\pi}{4}\right)$.

m. $\cot\left(\frac{4\pi}{3}\right)$.

n. $\csc(\pi)$.

o. $\sec(360°)$.

4. a. Use the sine and cosine functions to find the coordinates of the point P in Figure 1a that is specified by $\frac{5\pi}{3}$ on the circumference of a circle of radius 10 units. **Clearly show your use of the sine and cosine functions**.
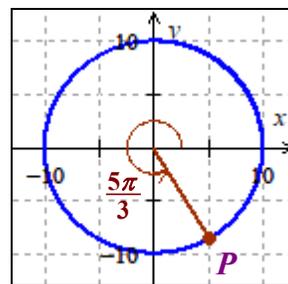

Figure 1a

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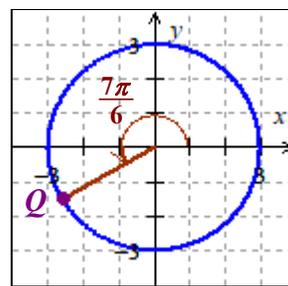

Figure 1b

5. If $\sin(\theta) = \frac{3}{4}$ and $\frac{\pi}{2} < \theta < \pi$, find the exact value of the following:

   a. $\cos(\theta)$

   b. $\sin(\theta + 2\pi)$

   c. $\tan(\theta)$

   d. $\sec(\theta)$

   e. $\csc(\theta)$

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

a. $3\sin(x) + 4 = 5$

b. $2\cos(\theta) = 1$

c. $2\sin(3\theta) + \sqrt{3} = 0$

d. $7 + 3\sqrt{2}\cos(4t) = 4$

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

    a. $6\cos(2x) + 5 = 2$

    b. $2 - 3\sin(4\theta) = 5$

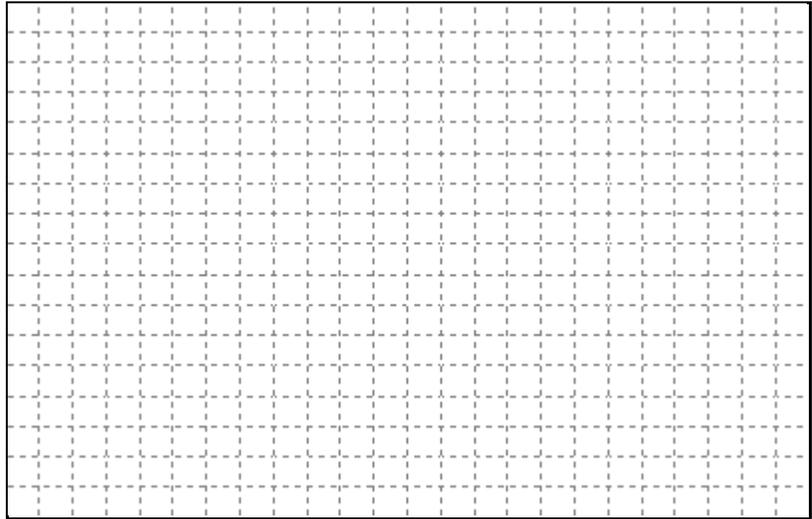**8.** Evaluate the following. Show your steps. (Do not use a calculator!)

a. $\sin\left(\cos^{-1}\left(-\frac{1}{2}\right)\right)$

b. $\sin^{-1}\left(\sin\left(\frac{7\pi}{4}\right)\right)$

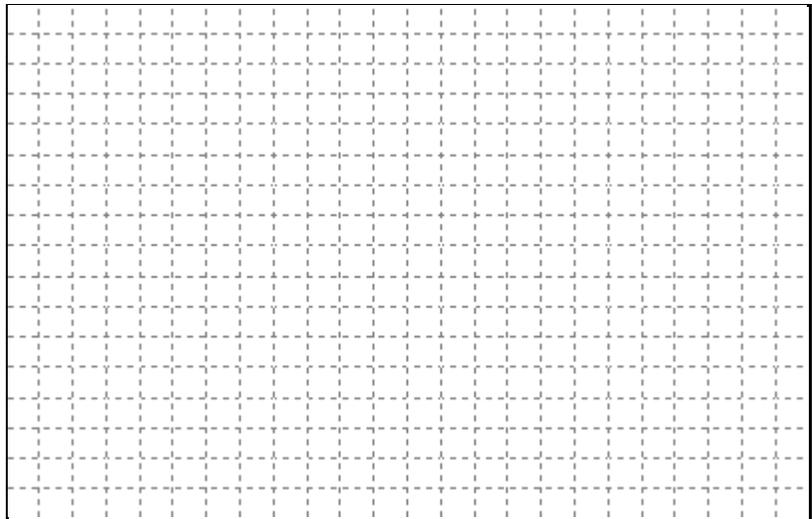**c.** $\cos^{-1}\left(\sin\left(\frac{4\pi}{3}\right)\right)$

d. $\cos^{-1}\left(\cos\left(\frac{8\pi}{7}\right)\right)$

9. 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.

Draw a graph of $y = g(t)$.

10. Sketch a graph of the function $q(x) = 2\cos\left(\frac{\pi}{2}x + \frac{\pi}{4}\right) - 3$. State the period, midline, and amplitude of q.

Draw a graph of $y = q(x)$.

11. Find four algebraic rules (one using "positive sine", one using "negative (reflected) sine", one using "positive cosine", and one using "negative (reflected) cosine") for the function $y = p(x)$ graphed in Figure 2.
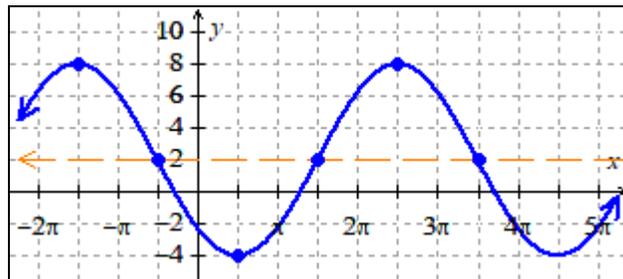

Figure 2: A graph of $y = p(x)$.

12. a. Find four algebraic rules (one using "positive sine", one using "negative (reflected) sine", one using "positive cosine", and one using "negative (reflected) cosine") for the function $y = f(t)$ graphed in Figure 3.
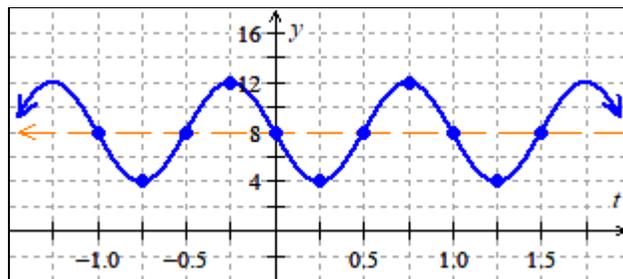

Figure 3: A graph of $y = f(t)$.

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