Unit Circle and Identities Practice

Name Key

This worksheet will be turned in before leaving class. Worksheets with no work shown/attached will be given **zeros**.

1. For each restriction given, circle which quadrant or quadrants apply.

a. $0 < \theta < \pi$	(Q1)	(Q2)	Q3	Q4
b. $\frac{\pi}{2} < \theta < \frac{3\pi}{2}$	Q1	(Q2)	(Q3)	Q4
c. $\sin x > 0$	(Q1)	(Q2)	Q3	Q4
d. $\tan x < 0$	Q1	(Q2)	Q3	(Q4)
e. $\cos x < 0$ & $\sin x > 0$	Q1	(Q2)	Q3	Q4
f. $\csc x < 0$ & $\sec x < 0$	Q1	(Q2)	(Q3)	Q4

2. Without a calculator, evaluate the following:

a. $tan^2\left(\frac{2\pi}{3}\right) = 3$

b. $\cos\left(\frac{3\pi}{4}\right) - \sin\left(\frac{3\pi}{4}\right) = -\sqrt{2}$

c. $tan^2(60°) - sin^2(45°) = \frac{5}{2}$

d. $cos^2\left(\frac{\pi}{4}\right) + \sin\left(\frac{\pi}{2}\right) = \frac{3}{2}$

e. $\cos\left(\frac{5\pi}{3}\right) - \tan\left(\frac{5\pi}{4}\right) = \frac{-1}{2}$

3. If $\cos\theta = -\frac{3}{4}, \frac{\pi}{2} < \theta < \pi$ find the exact value of:

a. $\sin\theta = \frac{\sqrt{7}}{4}$

b. $\tan\theta = \frac{\sqrt{7}}{3}$

c. $\sin 2\theta = -\frac{3\sqrt{7}}{8}$

4. If $\sin\theta = \frac{5}{13}, 0 < \theta < \frac{\pi}{2}$ find the exact value of:

a. $\cos\theta = \frac{12}{13}$

b. $\tan\theta = \frac{5}{12}$

c. $\sin 2\theta = \frac{120}{169}$

d. $\cos 2\theta = \frac{119}{169}$

5. Show that $\frac{\sin 2x - \sin x}{\cos 2x - \cos x + 1} = \tan x$

$$\frac{2\sin x\cos x - \sin x}{2\cos^2 x - 1 - \cos x + 1} = \frac{\sin x(2\cos x - 1)}{\cos x(2\cos x - 1)} = \tan x$$

6. For $0 < \theta < \pi$, find all values of θ such that:

a. $\sin x = \frac{1}{2}$ $x = \frac{\pi}{6}, \frac{5\pi}{6}$

b. $\cos x = -\frac{1}{2}$ $x = \frac{2\pi}{3}, \frac{4\pi}{3}$

c. $\tan x = \sqrt{3}$ $x = \frac{\pi}{3}, \frac{4\pi}{3}$

7. For $0 < \theta < 2\pi$, find all values of θ such that:

a. $\tan x = -1$ $x = \frac{3\pi}{4}, \frac{7\pi}{4}$

b. $\sec x = 2$ $\cos x = \frac{1}{2}$ $x = \frac{\pi}{3}, \frac{5\pi}{3}$

c. $\csc x = -\sqrt{2}$ $\sin x = \frac{-1}{\sqrt{2}} = \frac{-\sqrt{2}}{2}$ $x = \frac{5\pi}{4}, \frac{7\pi}{4}$

8. Find all 6 trig values for:

a. $\theta = \frac{5\pi}{6}$ $\sin\theta = 1/2$ $\csc\theta = 2$ $\cos\theta = -\sqrt{3}/2$ $\sec\theta = \frac{-2}{\sqrt{3}}$ $\tan\theta = -\frac{1}{\sqrt{3}}$ $\cot\theta = -\sqrt{3}$

b. $\theta = \frac{4\pi}{3}$ $\sin\theta = -\frac{\sqrt{3}}{2}$ $\csc\theta = \frac{-2}{\sqrt{3}}$ $\cos\theta = -1/2$ $\sec\theta = -2$ $\tan\theta = \sqrt{3}$ $\cot\theta = \frac{1}{\sqrt{3}}$

c. $\theta = \frac{7\pi}{4}$ $\sin\theta = \frac{-\sqrt{2}}{2}$ $\csc\theta = \frac{-2}{\sqrt{2}}$ $\cos\theta = \frac{\sqrt{2}}{2}$ $\sec\theta = \frac{2}{\sqrt{2}}$ $\tan\theta = -1$ $\cot\theta = -1$

d. $\theta = \pi$ $\sin\theta = 0$ $\csc\theta =$ undefined $\cos\theta = -1$ $\sec\theta = -1$ $\tan\theta = 0$ $\cot\theta =$ undefined

9. Show that:

a. $5 - 5\sin^2 x = 5\cos^2 x$ Hint: GCF

b. $(\cos x - \sin x)^2 = 1 - \sin 2x$ Hint: expand left side

c. $\frac{\cos^2 x - 1}{\sin x} = -\sin x$ Hint: replace numerator