

Standard 8 Review: Name: _____ Per: _____

1. Verify the following Trig IDs. Show your work

a. $\cos \theta \sec \theta = 1$

$$\cos \cdot \frac{1}{\cos} = 1$$

b. $\frac{\sin(90^\circ - \alpha)}{\cos(90^\circ - \alpha)} = \cot \alpha$

$$\frac{\cos \alpha}{\sin \alpha} = \cot \alpha$$

c. $\frac{1}{\csc^2 x} + \frac{1}{\sec^2 x} = 1$

$$\sin^2 + \cos^2 = 1$$

d. $\frac{\sec(-\sigma)}{\csc(-\sigma)} = -\tan \sigma$

$$\frac{\sec \sigma}{-\csc \sigma} = \frac{\frac{1}{\cos}}{\frac{1}{-\sin}} = \frac{-\sin}{\cos} = -\tan$$

2. Verify the following Trig IDs. Show your work

a. $\sin^2 \alpha - \sin^4 \alpha = \cos^2 \alpha - \cos^4 \alpha$

$$\begin{aligned} &\sin^2(1 - \sin^2) \\ &\frac{\sin^2(\cos^2)}{(1 - \cos^2)(\cos^2)} = \cos^2 - \cos^4 \end{aligned}$$

b. $\cos^2 \theta + 5 = 6 - \sin^2 \theta$

$$\begin{aligned} &1 - \sin^2 + 5 \\ &1 + 5 - \sin^2 = 6 - \sin^2 \end{aligned}$$

c. $\frac{1}{\sin x} - \sin x = \frac{\cos^2 x}{\sin x}$

$$\begin{aligned} &= \frac{1 - \sin^2}{\sin^2} \\ \frac{1}{\sin} - \sin &= \frac{1}{\sin} - \frac{\sin^2}{\sin} \end{aligned}$$

d. $\frac{\sec^2 x - 1}{\csc^2 x - 1} = \tan^4 x$

$$\frac{\tan^2}{\cot^2} = \frac{\tan^2}{\frac{1}{\tan^2}} = \tan^4$$

3. Find the solution(s) of the trig equations in the interval $[0, 2\pi)$.

a. $2\cos x - 1 = 0$

$$x = 60^\circ, 300^\circ$$

b. $3\tan^2 x - 1 = 0$

$$x = 30^\circ, 210^\circ$$

c. $\sin x(2\sin x + 1) = 0$

$$\sin x = 0 \quad 2\sin x + 1 = 0$$

$$x = 0^\circ, 180^\circ \quad x = 330^\circ, 210^\circ$$

d. $\sec^2 x - \sec x - 2 = 0$

$$(\sec x - 2)(\sec x + 1) = 0$$

$$x = 60^\circ, 300^\circ \quad x = 180^\circ$$

4. Find all the solutions of the equations.

a. $2 \cos x - \sqrt{3} = 0$

$30^\circ + n 360^\circ$
 $330^\circ + n 360^\circ$

b. $\tan^2 x = 3$

$60^\circ + n 180^\circ$

c. $\sin^2 x = 3 \cos^2 x$

$60^\circ + n 360^\circ$
 $300^\circ + n 360^\circ$

d. $2 \sec^2 x + \tan^2 x - 3 = 0$

$30^\circ + n 360^\circ$
 $330^\circ + n 360^\circ$

5. Use the Sum and Difference Formulas to find the exact values of the following trig functions. Show your work.

a. $\sin 75^\circ$

use $30^\circ + 45^\circ = 75^\circ$

$\frac{\sqrt{2} + \sqrt{6}}{4}$

b. $\cos 15^\circ$

use $45^\circ - 30^\circ = 15^\circ$

$\frac{\sqrt{6} + \sqrt{2}}{4}$

c. $\tan 195^\circ$

use $225^\circ - 30^\circ = 195^\circ$

$\sqrt{3} - 2$

6. Use the Sum and Difference Formulas to write the trig function of an angle.

a. $\cos 60^\circ \cos 45^\circ + \sin 60^\circ \sin 45^\circ =$

$\cos 15^\circ$

b. $\sin 330^\circ \cos 25^\circ + \cos 330^\circ \sin 25^\circ =$

$\sin 355^\circ$

c. $\frac{\tan 125^\circ + \tan 105^\circ}{1 - \tan 125^\circ \tan 105^\circ} =$

$\tan 230^\circ$

7. Find the exact value of the trig functions given that.

$$\sin u = \frac{15}{17} \quad 0 < u < \frac{\pi}{2} \quad \text{and} \quad \cos v = \frac{4}{5} \quad 0 < v < \frac{\pi}{2}$$

a. $\sin(u + v) = \frac{84}{85}$

b. $\cos(u + v) = \frac{-13}{85}$

c. $\sin(u - v) = \frac{36}{85}$

d. $\cos(u - v) = \frac{77}{85}$

Verify the identities.

8. $\tan\left(\frac{\pi}{4} + x\right) = \frac{1 + \tan x}{1 - \tan x}$

$$= \frac{\overset{=1}{\tan \frac{\pi}{4}} + \tan x}{1 - \tan \frac{\pi}{4} \cdot \tan x} = \frac{1 + \tan x}{1 - \tan x}$$

9. $\sin(2\pi - x) = -\sin x$

$$= \overset{=0}{\sin 2\pi} \overset{=1}{\cos x} - \overset{=1}{\cos 2\pi} \overset{=0}{\sin x}$$

$$0 - 1 \cdot \sin x = -\sin x$$

10. $\sin\left(\frac{3\pi}{2} + \theta\right) + \sin(\pi - \theta) = 0$

$$\overset{=-1}{\sin 270^\circ} \overset{=0}{\cos \theta} + \overset{=0}{\cos 270^\circ} \overset{=0}{\sin \theta} + \overset{=0}{\sin \pi} \overset{=1}{\cos \theta} - \overset{=-1}{\cos \pi} \overset{=0}{\sin \theta}$$

$$-\cos \theta + 0 + 0 + \sin \theta$$

$$\sin \theta - \cos \theta = 0$$