Standard 8 Review: Name: ____________________ Per: _____

1. Verify the following Trig IDs. Show your work

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

b. $\dfrac{\sin(90° - \alpha)}{\cos(90° - \alpha)} = \cot\alpha$

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

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

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

$\dfrac{\sec\sigma}{-\csc\sigma} = \sec\sigma \cdot \dfrac{1}{-\csc\sigma}$

$\dfrac{1}{\cos\sigma} \cdot -\sin\sigma = \dfrac{-\sin\sigma}{\cos\sigma}$

$-\tan\sigma$

$''$

2. Verify the following Trig IDs. Show your work

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

$\cos^2\alpha(1-\cos^2\alpha)$

$\cos^2\alpha \sin^2\alpha$

$\sin^2\alpha - \sin^4\alpha = (1-\sin^2\alpha)\sin^2\alpha$

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

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

$= \dfrac{1-\sin^2 x}{\sin x}$

$\dfrac{1}{\sin x} - \sin x = \dfrac{1}{\sin x} - \dfrac{\sin^2 x}{\cancel{\sin x}}$

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

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

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

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

$\dfrac{3\tan^2 x}{3} = \dfrac{1}{3}$

$\sqrt{\tan^2 x} = \pm\sqrt{\dfrac{1}{3}}$

$\tan x = \pm\sqrt{\dfrac{1}{3}} = \dfrac{\pm\sqrt{3}}{3}$

$x = 30°, 150°, 210°, 330°$

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

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

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

$x^2 - x - 2 = 0$

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

$\sec x - 2 = 0 \quad \sec x + 1 = 0$

$\sec x = 2 \quad \sec x = -1$

$x = 60°, 300°, 180°$

4. Find all the solutions of the equations.

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

$\cos x = \frac{\sqrt{3}}{2}$

$x = 30^\circ + n360^\circ$

$x = 330^\circ + n360^\circ$

b. $\tan^2 x = 3$

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

$1 - \cos^2 x = 3\cos^2 x$

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

$2\sec^2 x + (\sec^2 x - 1) - 3 = 0$

$3\sec^2 x - 4 = 0$

$\sqrt{\sec^2 x} = \sqrt{\frac{4}{3}} = \frac{\sqrt{4}}{\sqrt{3}}$

$\sec x = \pm\frac{2}{\sqrt{3}} = \pm\frac{2\sqrt{3}}{3}$

$x = 30^\circ + n180^\circ$

$x = 150^\circ + n180^\circ$

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

b. $\cos 15^\circ$ *use* $45^\circ - 30^\circ = 15^\circ$

c. $\tan 195^\circ = \frac{\tan 225^\circ - \tan 30^\circ}{1 + \tan 225^\circ \tan 30^\circ}$ *use* $225^\circ - 30^\circ = 195^\circ$

$\frac{1 - \frac{\sqrt{3}}{3}}{1 + \frac{\sqrt{3}}{3}} \cdot \frac{3}{3} = \frac{(3-\sqrt{3})}{(3+\sqrt{3})} \cdot \frac{(3-\sqrt{3})}{(3-\sqrt{3})} = \frac{9 - 3\sqrt{3} - 3\sqrt{3} + 3}{9 - 3} = \frac{12 - 6\sqrt{3}}{6} = \frac{\cancel{6}(2-\sqrt{3})}{\cancel{6}}$

$2 - \sqrt{3}$

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

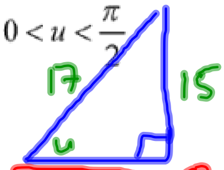
a. $\cos 60^\circ \cos 45^\circ + \sin 60^\circ \sin 45^\circ =$ $\cos(60^\circ - 45^\circ) = \cos 15^\circ$

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

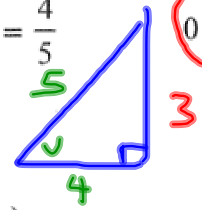
c. $\frac{\tan 125^\circ + \tan 105^\circ}{1 - \tan 125^\circ \tan 105^\circ} =$

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

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



$\sqrt{17^2 - 15^2} = 8$



a. $\sin(u + v) =$

$\sin u \cos v + \cos u \sin v$

$\frac{15}{17} \cdot \frac{4}{5} + \frac{8}{17} \cdot \frac{3}{5}$

$\frac{60}{85} + \frac{24}{85} = \frac{84}{85}$

b. $\cos(u + v)$

c. $\sin(u - v)$

d. $\cos(u - v)$

Verify the identities.

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

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

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

10. $\sin(\frac{3\pi}{2} + \theta) + \sin(\pi - \theta) = \sin x - \cos x$

$\sin\frac{3\pi}{2}\cos\theta + \cos\frac{3\pi}{2}\sin\theta + \sin\pi\cos\theta - \cos\pi\sin\theta$

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

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