Senior Analysis Name _____

Trigonometry Lecture 16

1. Convert from degrees to radians

a) $220°$ b) $-150°$ c) $3600°$

2. Convert from radians to degrees

a) $\frac{4\pi}{3}$ b) 8π c) $\frac{\pi}{9}$

3. Given x, find the six trigonometric functions associated with that x.

a) $\frac{4\pi}{3}$ b) 8π c) $\frac{\pi}{4}$

d) $\frac{5\pi}{6}$ e) $\frac{3\pi}{2}$

4. Given one trigonometric function, find the other five.

a) $\sin x = \frac{3}{5}$ (x in quadrant 1) b) $\cos x = \frac{1}{3}$ (x in quadrant 4)

c) $\tan x = 3$ (x in quadrant 3) d) $\sec x = 2$ (x in quadrant 1)

Senior Analysis Name _____

Identities Lecture 16.5

Prove that the following equations are true by transforming one side into the other

(1) $\dfrac{1}{1 - \sin(\theta)} + \dfrac{1}{1 + \sin(\theta)} = 2\sec^2(\theta)$

(2) $\dfrac{\sin(x)}{\sin(x) + \cos(x)} = \dfrac{\tan(x)}{1 + \tan(x)}$

(3) $\dfrac{\sin(x) + \cos(x)}{\sec(x) + \csc(x)} = \dfrac{\cos(x)}{\csc(x)}$

(4) $\dfrac{\tan(\theta) + 1}{\tan(\theta) - 1} = \dfrac{1 + 2\sin(\theta)\cos(\theta)}{\sin^2(\theta) - \cos^2(\theta)}$

(5) $\dfrac{\sin^2(\phi) + 2\cos(\phi) - 1}{\sin^2(\phi) + 3\cos(\phi) - 3} = \dfrac{1}{1 - \sec(\phi)}$

(6) $\dfrac{\cos^2(x) + 3\sin(x) - 1}{\cos^2(x) + 2\sin(x) + 2} = \dfrac{1}{1 + \csc(x)}$

(7) $\dfrac{\tan(x) + \tan(y)}{1 - \tan(x)\tan(y)} = \dfrac{\cot(x) + \cot(y)}{\cot(x)\cot(y) - 1}$

Senior Analysis Name _____

Addition Formulas Lecture 17

Evaluate the following:

1. $\sin 75°$
2. $\cos 75°$
3. $\tan 75°$, using the formula.
4. $\tan 75°$, using your answers from problem 1 and 2. Is this the same answer as you got in problem 3? How can you tell??
4. $\sin 345°$
5. $\cos 195°$
6. $\sin 32° \cos 238° + \cos 32° \sin 238°$
7. $\dfrac{\tan\frac{\pi}{16} + \tan\frac{3\pi}{16}}{1 - \tan\frac{\pi}{16}\tan\frac{3\pi}{16}}$

8. Using your calculator, confirm that $\sin^2 75° + \cos^2 75° = 1$. How could you prove to anyone that is true without a calculator?

Verify the following

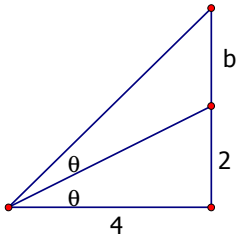
9. $\sin(270° - x) = -\cos x$
10. $\sin(x + y)\sin(x - y) = \sin^2 x \cos^2 y - \sin^2 y \cos^2 x$
11. $\sin\left(\theta + \frac{\pi}{3}\right) - \cos\left(\theta + \frac{\pi}{6}\right) = \sin\theta$

Senior Analysis Name _____

Double and Half Angle Lecture 18

1. Suppose x is in Quadrant 2 and $\sin x = \frac{3}{5}$. Find sin2x, cos2x and tan2x.

2. Given the picture as drawn, find b:



3. Suppose x is in quadrant 4 and $\cos x = \frac{2}{3}$. Find $\sin\frac{x}{2}, \cos\frac{x}{2}$ and $\tan\frac{x}{2}$.

4. Find $\sin 112.5°$ and $\cos 112.5°$.

Verify the following identities:

5. $(\sin x + \cos x)^2 = 1 + \sin 2x$

6. $\cos^2 2x + 4\sin^2 x \cos^2 x = 1$