Pre-Calculus
Chapter 8-9
Review WS 8.4-8.5

Name ____________
Period ____________
A# ____________

Solve each equation for $0^\circ \le \theta < 360^\circ$. Give answer to the nearest tenth of a degree.

1. $2\cos^2\theta + 3\sin\theta - 3 = 0$

$2(1-\sin^2\theta) + 3\sin\theta - 3 = 0$

$2 - 2\sin^2\theta + 3\sin\theta - 3 = 0$

$-2\sin^2\theta + 3\sin\theta - 1 = 0$

$2\sin^2\theta - 3\sin\theta + 1 = 0$

$(2\sin\theta - 1)(\sin\theta - 1) = 0$

$2\sin\theta - 1 = 0 \quad \sin\theta - 1 = 0$

$\sin\theta = \frac{1}{2} \quad \sin\theta = 1$

$\boxed{\theta = 30^\circ, 90^\circ, 150^\circ}$

2. $\cos\theta\cot\theta = 2\cos\theta$

$\cos\theta\cot\theta - 2\cos\theta = 0$

$\cos\theta(\cot\theta - 2) = 0$

$\cos\theta = 0 \quad \cot\theta - 2 = 0$

$\theta = 90^\circ, 270^\circ \quad \cot\theta = 2$

$\tan\theta = \frac{1}{2}$

$\theta = \tan^{-1}\left(\frac{1}{2}\right)$

$\theta = 26.6^\circ, 206.6^\circ$

$\boxed{\theta = 26.6^\circ, 90^\circ, 206.6^\circ, 270^\circ}$

Simplify each expression.

3. $\cot A(\sec A - cosA)$

$\frac{\cos A}{\sin A}\left(\frac{1}{\cos A} - \cos A\right)$

$= \frac{1}{\sin A} - \frac{\cos^2 A}{\sin A}$

$= \frac{1-\cos^2 A}{\sin A}$

$= \frac{\sin^2 A}{\sin A}$

$\boxed{= \sin A}$

4. $\dfrac{\cot\theta}{\sin(90^\circ - \theta)}$

$\frac{\cot\theta}{\cos\theta}$

$\cot\theta \cdot \frac{1}{\cos\theta}$

$\frac{1}{\cos\theta} \cdot \frac{\cos\theta}{\sin\theta}$

$= \frac{1}{\sin\theta} = \boxed{\csc\theta}$

5. $(\sec x + \tan x)(1 - \sin x)$ (FOIL!)

$\sec x - \frac{\sin x}{\cos x} + \tan x - \frac{\sin^2 x}{\cos x}$

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

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

$= \frac{\cos^2 x}{\cos x}$

$\boxed{= \cos x}$

6. $\dfrac{\cot x + \tan x}{\csc^2 x}$

$\frac{1}{\csc^2 x}\left[\cot x + \tan x\right]$

$\sin^2 x\left[\frac{\cos x}{\sin x} + \frac{\sin x}{\cos x}\right]$

$\frac{\sin x\cos x}{1} + \frac{\sin^3 x}{\cos x}$

$\frac{\sin x\cos^2 x}{\cos x} + \frac{\sin^3 x}{\cos x}$

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

Prove the given identity.

7. $\dfrac{\cot A(1+\tan^2 A)}{\tan A} = \csc^2 A$

$\dfrac{\cot A(\sec^2 A)}{\tan A}$

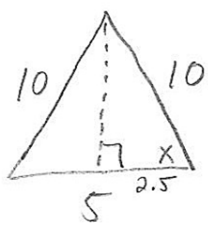
$\dfrac{1}{\tan A}\cdot \cot A(\sec^2 A) = \csc^2 A$

$\cot^2 A(\sec^2 A) = \csc^2 A$

$\dfrac{\cos^2 A}{\sin^2 A}\cdot\dfrac{1}{\cos^2 A} = \csc^2 A$

$\boxed{\dfrac{1}{\sin^2 A} = \csc^2 A}$

8. The sides of an isosceles triangle have lengths 5, 10, and 10. What are the measures of the angles?



$\cos x^\circ = \dfrac{2.5}{10}$

$\cos x = \dfrac{1}{4}$

$x = \cos^{-1}\left(\dfrac{1}{4}\right)$

$x = 75.5^\circ$

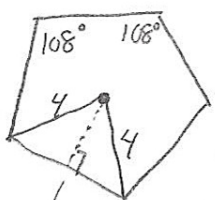
$\boxed{75.5^\circ,\ 75.5^\circ,\ \text{and } 29^\circ}$

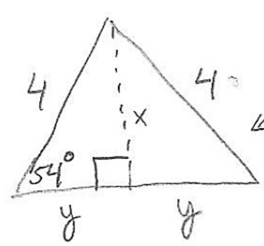
9. A regular pentagon is inscribed in a circle with a radius of 4 inches. Find the area of the pentagon.

There are 5 ≅ △s so

$A = 5(7.59\text{ in}^2)$

$A = 37.953\text{ in}^3$





$A = \frac{1}{2}(4.7)(3.23)$

$A = 7.59\text{ in}^2$

$\sin 54^\circ = \dfrac{x}{4}$ $\qquad \cos 54^\circ = \dfrac{y}{4}$

$x = 3.23$ $\qquad y = 2.35$