Name Key

Review Trig Problems using Formula Sheet

1. Simplify: sin x sec x cot x

$$\cancel{\sin x}\cdot\frac{1}{\cancel{\cos x}}\cdot\frac{\cancel{\cos x}}{\cancel{\sin x}} = \boxed{1}$$

2. Simplify cos y(tan y - sec y)

$$\cos y\left(\frac{\sin y}{\cos y}-\frac{1}{\cos y}\right) = \cancel{\cos y}\left(\frac{\sin y - 1}{\cancel{\cos y}}\right)$$

$$= \boxed{\sin y - 1}$$

3. Simplify $(\sin^2 x)(\cos^2 x) + \cos^4 x$

$$\cos^2 x(\sin^2 x + \cos^2 x)$$

$$\cos^2 x\,(1) = \boxed{\cos^2 x}$$

Prove: $\frac{1}{1-\sec x}+\frac{1}{1+\sec x} = -2\cot^2 x$

$1(1+\sec x)$ $\quad 1(1-\sec x)$

$$\frac{1+\cancel{\sec x}+1-\cancel{\sec x}}{(1+\sec x)(1-\sec x)}$$

$$\frac{2}{1-\sec^2 x} = \frac{2}{-\tan^2 x} = \frac{2}{\frac{1}{-\cot^2 x}} = -2\cot^2 x \checkmark$$

5. Prove the following identity: $\tan^2 x - \sin^2 x = (\sin^2 x)(\tan^2 x)$

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

$$\sin^2 x\left(\frac{1}{\cos^2 x} - 1\right)$$

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

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

$$\sin^2 x \cdot \frac{\sin^2 x}{\cos^2 x} = \sin^2 x \cdot \tan^2 x \checkmark$$

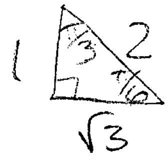
6. Prove $\sin(x+\pi) = -\sin x$

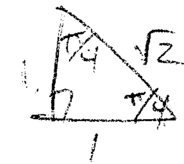
$$\sin x\cos\pi + \cos x\sin\pi$$

$$\sin x(-1) + \cancel{\cos x(0)}$$

$$= -\sin x \checkmark$$

7. Find the exact value of Cos $\frac{7\pi}{12}$ $= \frac{4\pi}{12} + \frac{3\pi}{12}$ $\quad (= \pi/3,\ = \pi/4)$





$\cos\left(\frac{\pi}{3} + \frac{\pi}{4}\right)$

$\cos\frac{\pi}{3}\cos\frac{\pi}{4} - \sin\frac{\pi}{3}\sin\frac{\pi}{4}$

$\left(\frac{1}{2}\right)\left(\frac{1}{\sqrt{2}}\right) - \left(\frac{\sqrt{3}}{2}\right)\left(\frac{1}{\sqrt{2}}\right) = \frac{1}{2\sqrt{2}} - \frac{\sqrt{3}}{2\sqrt{2}} = \boxed{\frac{1-\sqrt{3}}{2\sqrt{2}}}$

8. Find the exact value of Sin $\frac{\pi}{12}$ $= \frac{\pi}{2} - \frac{3\pi}{12}$

$\sin\left(\frac{4\pi}{12} - \frac{3\pi}{12}\right)$ $\quad (= \pi/3,\ = \pi/4)$

$\sin\frac{\pi}{3}\cos\frac{\pi}{4} - \cos\frac{\pi}{3}\sin\frac{\pi}{4}$

$\left(\frac{\sqrt{3}}{2}\right)\left(\frac{1}{\sqrt{2}}\right) - \left(\frac{1}{2}\right)\left(\frac{1}{\sqrt{2}}\right) = \frac{\sqrt{3}}{2\sqrt{2}} - \frac{1}{2\sqrt{2}} = \boxed{\frac{\sqrt{3}-1}{2\sqrt{2}}}$

9. Find the exact value of Tan $\frac{5\pi}{12}$ $= 30+45$ $= \frac{\pi}{6} + \frac{\pi}{4}$

$\tan\left(\frac{\pi}{6} + \frac{\pi}{4}\right) = \frac{\tan\frac{\pi}{6} + \tan\frac{\pi}{4}}{1 - \tan\frac{\pi}{6}\tan\frac{\pi}{4}} = \frac{\frac{1}{\sqrt{3}} + 1}{1 - \left(\frac{1}{\sqrt{3}}\right)(1)} = \frac{\frac{1+\sqrt{3}}{\sqrt{3}}}{\frac{\sqrt{3}}{\sqrt{3}} - \frac{1}{\sqrt{3}}}$

$= \frac{1+\sqrt{3}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}-1} = \boxed{\frac{1+\sqrt{3}}{\sqrt{3}-1}}$

*10. If the Sin θ = (3/8) and θ is in the first quadrant, what is sin(2θ), cos (2θ), and tan(2θ)?

$x^2 + 3^2 = 8^2$

$x^2 + 9 = 64$

$\sqrt{x^2} = \sqrt{55}$

$\sin 2\theta = 2\sin\theta\cos\theta$

$= 2\left(\frac{3}{8}\right)\left(\frac{\sqrt{55}}{8}\right)$

$= \boxed{\frac{6\sqrt{55}}{64}} = \boxed{\frac{3\sqrt{55}}{32}}$

$\cos 2\theta = 1 - 2\sin^2\theta$

$1 - 2\left(\frac{3}{8}\right)^2$

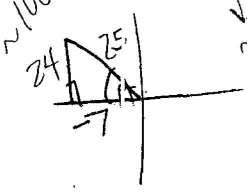
$1 - 2\left(\frac{9}{64}\right) = 1 - \frac{18}{64} = \frac{46}{64}$

$\boxed{\frac{23}{32}}$

$\tan 2\theta = \frac{2\tan\theta}{1 - \tan^2\theta} = \frac{2\left(\frac{3}{\sqrt{55}}\right)}{1 - \left(\frac{3}{\sqrt{55}}\right)^2} = \frac{\frac{6}{\sqrt{55}}}{\frac{55}{55} - \frac{9}{55}} = \frac{\frac{6}{\sqrt{55}}}{\frac{46}{55}} = \frac{330}{46\sqrt{55}}$

11. Find Cos 2A if tan A = -24/7 and A is in quadrant II.

≈ 106 $\quad \approx 212.5$



$2\cos^2 A - 1$

$2\left(\frac{-7}{25}\right)^2 - 1$

$2\left(\frac{49}{625}\right) - 1 = \frac{98}{625} - \frac{625}{625} = \boxed{\frac{-527}{625}}$ ✓