Name : ____________________

Block : __________

Pre-Calculus 12
Chapter 6 In Class Assignment

1. Prove the identity

a) $\sin^3 x + \sin x \cos^2 x = \sin x$

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

$\sin x\,(1) = \sin x$

$\sin x = \sin x$

b) $\frac{\sec x}{\cot x + \tan x} = \sin x$

$$\frac{\frac{1}{\cos x}}{\frac{\cos x}{\sin x} + \frac{\sin x}{\cos x}} = RS$$

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

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

$$\frac{\frac{1}{\cos x}}{\frac{1}{\sin x \cos x}} = RS$$

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

c) $\frac{\cot x}{\sec x} = \frac{1-\sin^2 x}{\sin x}$

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

$LS = \frac{\cos x}{\sin x} \cdot \cos x$

$LS = \cot x \cdot \frac{1}{\sec x}$

$LS = \frac{\cot x}{\sec x}$

$\frac{\cot x}{\sec x} = \frac{\cot x}{\sec x}$

d) $\frac{\cot x}{\csc x - 1} = \frac{\csc x + 1}{\cot x}$

$\frac{\cot x\,(\csc x + 1)}{(\csc x - 1)(\csc x + 1)} = RS$

$\frac{\cot x\,(\csc x + 1)}{\csc^2 x - 1} = RS$

$\frac{\cot x\,(\csc x + 1)}{\cot^2 x} = RS$

$\frac{\csc x + 1}{\cot x} = \frac{\csc x + 1}{\cot x}$

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e) $\frac{\sin 2x}{2-2\cos^2 x} = \cot x$

$\frac{\cancel{2}\sin x \cancel{\cos x}}{2(1-\cos^2 x)} = \cot x$

$\frac{\sin x \cancel{\cos x}}{\sin^2 x} = RS$

$\frac{\cos x}{\sin x} = RS$

$\cot x = \cot x$

f) $\frac{\sin 2x}{\cos x} + \frac{\cos 2x}{\sin x} = \csc x$

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

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

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

$\frac{1}{\sin x} = RS$

$\csc x = \csc x$

4

2. Prove the following

a) $\sin\left(\frac{\pi}{4}+\theta\right) - \sin\left(\frac{\pi}{4}-\theta\right) = \sqrt{2}\sin\theta$

$\sin\frac{\pi}{4}\cos\theta + \cos\frac{\pi}{4}\sin\theta - \left[\sin\frac{\pi}{4}\cos\theta - \cos\frac{\pi}{4}\sin\theta\right] = RS$

$\frac{1}{\sqrt{2}}\cos\theta + \frac{1}{\sqrt{2}}\sin\theta - \frac{1}{\sqrt{2}}\cos\theta + \frac{1}{\sqrt{2}}\sin\theta = RS$

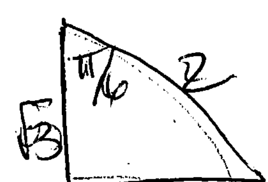
$\frac{2}{\sqrt{2}}\sin\theta = \sqrt{2}\sin\theta =$

b) $\sin\left(\frac{\pi}{6}+\theta\right) + \cos\left(\frac{\pi}{3}+\theta\right) = \cos\theta$

$\sin\frac{\pi}{6}\cos\theta + \cos\frac{\pi}{6}\sin\theta + \cos\frac{\pi}{3}\cos\theta - \sin\frac{\pi}{3}\sin\theta = RS$

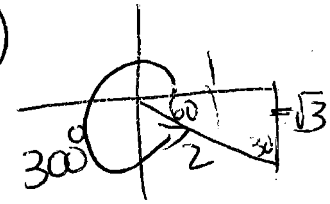
$\frac{1}{2}\cos\theta + \frac{\sqrt{3}}{2}\sin\theta + \frac{1}{2}\cos\theta - \frac{\sqrt{3}}{2}\sin\theta = RS$

$= \cos\theta$



8

$(300^\circ + 45^\circ)$



3. Determine an exact value for $\tan(345^\circ)$

$\tan(300^\circ + 45^\circ)$

$$\frac{\tan 300 + \tan 45}{1 - \tan 300 \tan 45}$$

2 ✓

$$\frac{-\sqrt{3} + 1}{1 - (-\sqrt{3})(1)}$$

$$\frac{-\sqrt{3}+1}{1+\sqrt{3}} \cdot \frac{1-\sqrt{3}}{1-\sqrt{3}} = \frac{-2\sqrt{3}+3+1}{1-3} = \frac{4-2\sqrt{3}}{-2} = -2+\sqrt{3}$$

4. Given that $\cos A = \frac{-3}{5}$ and $\sin B = \frac{-2}{3}$ where A and B are both in quadrant III, use identities to evaluate:

a) $\cos(A + B)$

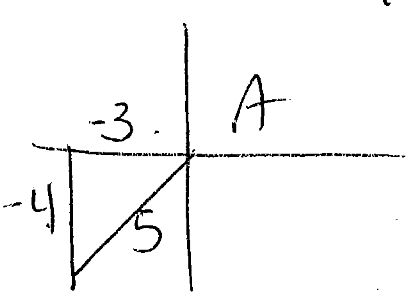
$\cos A \cos B - \sin A \sin B$

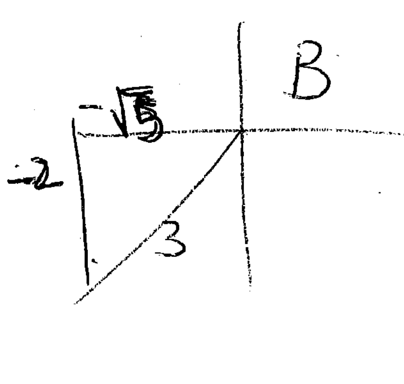
$$-\frac{3}{5} \cdot -\frac{\sqrt{5}}{3} - \left(-\frac{4}{5}\right)\left(-\frac{2}{3}\right)$$

$$\frac{3\sqrt{5}}{15} - \frac{8}{15}$$

2 ✓

$$\frac{3\sqrt{5}-8}{15}$$





b) $\sin(A - \pi)$

$\sin A \cos \pi - \cos A \sin \pi$

$$-\frac{4}{5}(-1) - \left(-\frac{3}{5}\right)(0)$$

$$\frac{4}{5}$$

2 ✓