Name Key

Math 143

Quiz – Section 7.2 & 7.3

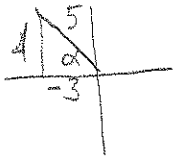
Show your work for full credit. (2 pts/problem unless indicated otherwise)

1. Write $\csc \frac{\pi}{3}$ as the cofunction of a complementary angle. (1 pt)

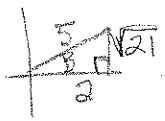
$\sec\left(\frac{\pi}{2} - \frac{\pi}{3}\right) = \sec\left(\frac{3\pi}{6} - \frac{2\pi}{6}\right)$

1. $\sec\left(\frac{\pi}{6}\right)$

2. Use the given information to find the exact value of the expression, rationalize all fractions.



$\sin\alpha = \frac{4}{5}$, α lies in quadrant II, and $\cos\beta = \frac{2}{5}$, β lies in quadrant I.



Find $\cos(\alpha - \beta)$. $= \cos\alpha\cos\beta + \sin\alpha\sin\beta$

$= \frac{-3}{5}\cdot\frac{2}{5} + \frac{4}{5}\cdot\frac{\sqrt{21}}{5}$

$= \frac{-6}{25} + \frac{4\sqrt{21}}{25}$

2. $\frac{-6+4\sqrt{21}}{25}$

3. Find one angle that satisfies the following (1 pt)

$\sin(3\theta - 5^\circ) = \cos(\theta + 25^\circ)$

$\cos(90 - (3\theta - 5)) = \cos(\theta + 25)$

$\cos(95 - 3\theta) = \cos(\theta + 25)$

$95 - 3\theta = \theta + 25$

$-25 + 3\theta \quad +3\theta - 25$

$\frac{70}{4} = \frac{4\theta}{4}$

$4\overline{)70}$ R 2

3. 17.5°

4. Choose **two** of the following and **verify the identities.** (3 pts/problem)

i) $1 + \sec^2 x \sin^2 x = \sec^2 x$

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

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

$$1 + \tan^2 x = \sec^2 x$$

$$\sec^2 x = \sec^2 x \quad \checkmark$$

ii) $\sec x - \frac{1}{\sec x} = \sin x \tan x$

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

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

$$\frac{\tan^2 x}{\sec x} = \sin x \tan x$$

$$\frac{\left(\frac{\cos x}{1}\right)\left(\frac{\sin^2 x}{\cos^2 x}\right)}{\left(\frac{\cos x}{1}\right)\cdot\frac{1}{\cos^2 x}} = \sin x \cdot \tan x$$

$$\frac{\sin^2 x}{\cos^2 x} = \frac{\sin x}{\cos x} \cdot \frac{\sin x}{1} = \tan x \cdot \sin x \quad \checkmark$$

iii) $\dfrac{\cot^2 \theta - 1}{1 + \cot^2 \theta} = 1 - 2\sin^2 \theta$

$$\frac{\cot^2 \theta - 1}{\csc^2 \theta} = 1 - 2\sin^2 \theta$$

$$\frac{\cot^2 \theta}{\csc^2 \theta} - \frac{1}{\csc^2 \theta} = 1 - 2\sin^2 \theta$$

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

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

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

$$1 - 2\sin^2 \theta = 1 - 2\sin^2 \theta \quad \checkmark$$