

Math 1316 - Practice Exam 3 - Non-Calculator Part

Free Response. Show all work to justify your answer.

Verify that each equation is an identity.

$$1) \sec \beta + \tan \beta = \frac{\cos \beta}{1 - \sin \beta}$$

1) _____

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

2) _____

Verify that the equation is an identity.

$$3) \frac{\cos(x - y)}{\cos(x + y)} = \frac{1 + \tan x \tan y}{1 - \tan x \tan y}$$

3) _____

Use a sum or difference identity to find the exact value.

4) $\tan 105^\circ$

4) _____

Use identities to find the indicated value for each angle measure.

5) $\sin \theta = \frac{2\sqrt{6}}{5}$, $\tan \theta < 0$ Find $\sin(2\theta)$.

5) _____

Express the function as a trigonometric function of x .

6) $\sin 4x$

6) _____

Determine all solutions of the equation in radians.

7) Find $\cos \frac{x}{2}$, given that $\sec x = 4$ and x terminates in $0 < x < \frac{\pi}{2}$.

7) _____

Give the exact value of the expression.

8) $\cos \left(\arcsin \frac{3}{5} + \arccos \frac{\sqrt{3}}{2} \right)$

8) _____

Answer Key

Testname: 1316-PRACTICETEST3-F17-NONCALCULATOR

$$1) \sec \beta + \tan \beta = \frac{1}{\cos \beta} + \frac{\sin \beta}{\cos \beta} = \frac{1 + \sin \beta}{\cos \beta} = \frac{1 + \sin \beta}{\cos \beta} \cdot \frac{1 - \sin \beta}{1 - \sin \beta} = \frac{1 - \sin^2 \beta}{\cos \beta(1 - \sin \beta)} = \frac{\cos^2 \beta}{\cos \beta(1 - \sin \beta)} = \frac{\cos \beta}{1 - \sin \beta}$$

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

$$3) \frac{\cos(x - y)}{\cos(x + y)} = \frac{\cos x \cos y + \sin x \sin y}{\cos x \cos y - \sin x \sin y} = \frac{1/(\cos x \cos y)}{1/(\cos x \cos y)} \cdot \frac{\cos x \cos y + \sin x \sin y}{\cos x \cos y - \sin x \sin y} = \frac{1 + \tan x \tan y}{1 - \tan x \tan y}$$

$$4) -2 - \sqrt{3}$$

$$5) \frac{-4\sqrt{6}}{25}$$

$$6) 4 \sin x \cos^3 x - 4 \sin^3 x \cos x$$

$$7) \frac{\sqrt{10}}{4}$$

$$8) \frac{4\sqrt{3}-3}{10}$$