

## Assignment: Quadratic trigonometric equation

Date \_\_\_\_\_

Solve each equation for  $0 \leq \theta < 360$ .

1)  $2\cos \theta + 1 + 3\cos^2 \theta = 2\cos^2 \theta$

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

3)  $2\tan \theta + 1 - \tan^2 \theta = -2\tan^2 \theta$

4)  $1 - 3\tan^2 \theta = 2\tan \theta - 4\tan^2 \theta$

5)  $-2\tan \theta - 3 = -2 + \tan^2 \theta$

6)  $2\tan \theta - 1 + 3\tan^2 \theta = 4\tan^2 \theta$

7)  $2\sqrt{3}\sin \theta \cos \theta - \sin \theta = 2\sin \theta$

8)  $\tan \theta - 2\tan \theta \sin \theta = 0$

Verify each identity.

9)  $\frac{\csc^2 x + \sec^2 x}{\cot x} = \frac{\sec x}{\cos^2 x \sin x}$

10)  $\sin^2 x(1 - \csc^2 x) = -\cos^2 x$

## Answers to Assignment: Quadratic trigonometric equation

1)  $\{180\}$

2)  $\{90, 210, 330\}$

3)  $\{135, 315\}$

4)  $\{45, 225\}$

5)  $\{135, 315\}$

6)  $\{45, 225\}$

7)  $\{0, 30, 180, 330\}$

8)  $\{0, 30, 150, 180\}$

9)  $\frac{\csc^2 x + \sec^2 x}{\cot x}$

Decompose into sine and cosine

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

Simplify

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

Use  $\sin^2 x + \cos^2 x = 1$

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

Use  $\sec x = \frac{1}{\cos x}$

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

10)  $\sin^2 x(1 - \csc^2 x)$

Use  $\cot^2 x + 1 = \csc^2 x$

$$-\sin^2 x \cot^2 x$$

Decompose into sine and cosine

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

Simplify

$$-\cos^2 x$$

