

3.10 Trigonometric Equations and Inequalities

3.10 Practice

AP Precalculus

Solve each equation for $0 \leq x \leq 2\pi$. Find the exact value(s) using the unit circle.

1. $2 \sin x + 3 = 4$

$$2 \sin x + 3 = 4$$

$$2 \sin x = 1$$

$$\sin x = 1/2$$

$$x = \pi/6, 5\pi/6$$

2. $4 - 3 \cos x = 7$

$$4 - 3 \cos x = 7$$

$$-3 \cos x = 3$$

$$\cos x = -1$$

$$x = \pi$$

3. $\tan^2 x = 1$

$$\tan^2 x = 1$$

$$\tan x = \pm 1$$

$$x = \pi/4, 5\pi/4, 3\pi/4, 7\pi/4$$

4. $-1 = \cos^2 x + 2 \cos x$

$$\cos^2 x + 1 = 0$$

$$(\cos x + 1)^2 = 0$$

$$\cos x = -1$$

$$x = \pi$$

Solve each equation for $0 \leq \theta \leq 2\pi$. Find the approximate value(s) using a calculator.

5. $6 = 3 \cos \theta + 7$

$$6 = 3 \cos \theta + 7$$

$$3 \cos \theta = -1$$

$$\cos \theta = -1/3$$

$$1.911 \text{ rad}$$

and

$$4.372 \text{ rad}$$

6. $5 \sin^2 \theta + 3 = 6$

$$5 \sin^2 \theta + 3 = 6$$

$$5 \sin^2 \theta = 3$$

$$\sin^2 \theta = 3/5$$

$$\sin \theta = \pm \sqrt{3/5}$$

$$0.500 \text{ rad},$$

$$2.241 \text{ rad},$$

$$3.383 \text{ rad},$$

$$5.524 \text{ rad}$$

7. $6 \cos^2 \theta + 4 \cos \theta = 0$

$$2 \cos \theta (3 \cos \theta + 2) = 0$$

$$\cos \theta = 0$$

$$\cos \theta = -1/2$$

$$\cos \theta = -1/3$$

$$2.300 \text{ rad}$$

$$3.583 \text{ rad}$$

8. $\cos \theta = 3 \cos^2 \theta$

$$3 \cos^2 \theta - \cos \theta = 0$$

$$\cos \theta (3 \cos \theta - 1) = 0$$

$$\cos \theta = 0 \text{ or } \cos \theta = 1/3$$

$$\cos \theta = 1/3$$

$$1.231 \text{ rad}$$

$$5.051 \text{ rad}$$

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