

## Trigonometric Equations

Patrons are reminded that drawing the relevant graph is a good idea and that  $\tan \theta \equiv \frac{\sin \theta}{\cos \theta}$ .  
All answers to 1 decimal place.

1. Solve  $\sin \theta = \frac{1}{2}$  for  $0^\circ < \theta < 720^\circ$ .

$$\theta = 30^\circ \text{ or } \theta = 150^\circ \text{ or } \theta = 390^\circ \text{ or } \theta = 510^\circ$$

2. Solve  $\cos \theta = \frac{\sqrt{3}}{2}$  for  $-360^\circ < \theta < 360^\circ$ .

$$\theta = \pm 30^\circ \text{ or } \theta = \pm 330^\circ$$

3. Solve  $\sin \theta = \frac{1}{\sqrt{2}}$  for  $-360^\circ < \theta < 360^\circ$ .

$$\theta = -315^\circ \text{ or } \theta = -225^\circ \text{ or } \theta = 45^\circ \text{ or } \theta = 135^\circ$$

4. Solve  $\tan \theta = \frac{1}{\sqrt{3}}$  for  $0^\circ < \theta < 360^\circ$ .

$$\theta = 30^\circ \text{ or } \theta = 210^\circ$$

5. Solve  $2 \sin \theta + 1 = 0$  for  $0^\circ < \theta < 720^\circ$ .

$$\theta = 210^\circ \text{ or } \theta = 330^\circ \text{ or } \theta = 570^\circ \text{ or } \theta = 690^\circ$$

6. Solve  $(\cos \theta)^2 = 1$  for  $0^\circ < \theta < 720^\circ$ .

$$\theta = 180^\circ \text{ or } \theta = 360^\circ \text{ or } \theta = 540^\circ$$

7. Solve  $(\sin \theta)^2 - 3 = 1$  for  $-360^\circ < \theta < 360^\circ$ .

$$\text{no solutions}$$

8. Solve  $\sin \theta = \frac{2}{3}$  for  $0^\circ < \theta < 360^\circ$ .

$$\theta = 41.8^\circ \text{ or } \theta = 138.2^\circ$$

9. Solve  $2 \tan \theta + 1 = 6$  for  $-360^\circ < \theta < 360^\circ$ .

$$\theta = -291.8^\circ \text{ or } \theta = -111.8^\circ \text{ or } \theta = 68.2^\circ \text{ or } \theta = 248.2^\circ$$

10. Solve  $3 \sin \theta + 1 = 0$  for  $0^\circ < \theta < 360^\circ$ .

$$\theta = 119.5^\circ \text{ or } \theta = 340.5^\circ$$

11. Solve  $3 \sin \theta = 5 \cos \theta$  for  $0^\circ < \theta < 720^\circ$ .

$$\theta = 59.0^\circ \text{ or } \theta = 239.0^\circ \text{ or } \theta = 419.0^\circ \text{ or } \theta = 519.0^\circ$$

12. Solve  $5(\cos \theta)^2 = 1$  for  $-360^\circ < \theta < 0^\circ$ .

$$\theta = -296.6^\circ \text{ or } \theta = -243.4^\circ \text{ or } \theta = -116.6^\circ \text{ or } \theta = -63.4^\circ$$