

**A2.A.68: Trigonometric Equations 5: Solve trigonometric equations for all values of the variable from  $0^\circ$  to  $360^\circ$**

- 1 In the interval  $90^\circ < x < 270^\circ$ , what is the solution of the equation  $\csc x = -2$ ?
  - 1)  $120^\circ$
  - 2)  $150^\circ$
  - 3)  $210^\circ$
  - 4)  $240^\circ$
- 2 What is the solution set of the equation  $-\sqrt{2} \sec x = 2$  when  $0^\circ \leq x < 360^\circ$ ?
  - 1)  $\{45^\circ, 135^\circ, 225^\circ, 315^\circ\}$
  - 2)  $\{45^\circ, 315^\circ\}$
  - 3)  $\{135^\circ, 225^\circ\}$
  - 4)  $\{225^\circ, 315^\circ\}$
- 3 Solve  $\sec x - \sqrt{2} = 0$  algebraically for all values of  $x$  in  $0^\circ \leq x < 360^\circ$ .
- 4 Find, algebraically, the measure of the obtuse angle, to the *nearest degree*, that satisfies the equation  $5 \csc \theta = 8$ .
- 5 What is one possible value of  $\theta$  in the equation  $\cot \theta = \cos \theta$ ?
  - 1)  $0^\circ$
  - 2)  $45^\circ$
  - 3)  $90^\circ$
  - 4)  $180^\circ$
- 6 Find all values of  $\theta$  in the interval  $0^\circ \leq \theta < 360^\circ$  which satisfy the equation  $2 \sin \theta - 1 = \csc \theta$ .
- 7 In the interval  $0^\circ \leq \theta < 360^\circ$ , find all values of  $\theta$  that satisfy the equation  $1 + 2 \sin \theta = \csc \theta$ .
- 8 Find all values of  $\theta$  in the interval  $0^\circ \leq \theta < 360^\circ$  which satisfy the equation  $2 \cos \theta + 1 = \sec \theta$ .
- 9 Find a positive acute angle  $\theta$  such that  $4 \cot \theta \sin \theta = 2$ .
- 10 Find, to the *nearest degree*, all values of  $\theta$  in the interval  $0^\circ \leq \theta < 360^\circ$  which satisfy the equation  $2 \sin \theta - 3 \csc \theta = -5$ .
- 11 Find, to the *nearest ten minutes* or *nearest tenth of a degree*, all values of  $x$  in the interval  $0^\circ \leq x < 360^\circ$  that satisfy the equation  $6 \sin x + 3 = 2 \csc x$ .
- 12 Find, to the nearest degree, all values of  $\theta$  in the interval  $0^\circ \leq \theta < 360^\circ$  which satisfy the equation  $7 \cos \theta + 1 = 6 \sec \theta$ .
- 13 In the interval  $0^\circ \leq x < 360^\circ$ , solve the equation  $5 \cos \theta = 2 \sec \theta - 3$  algebraically for all values of  $\theta$ , to the *nearest tenth of a degree*.
- 14 Find, to the *nearest degree*, all values of  $\theta$  in the interval  $0^\circ \leq \theta < 180^\circ$  that satisfy the equation  $3 \tan^2 \theta + \frac{1}{\cot \theta} = 2$ .

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## Answer Section

1 ANS: 3 REF: 080130siii

2 ANS: 3

$$-\sqrt{2} \sec x = 2$$

$$\sec x = -\frac{2}{\sqrt{2}}$$

$$\cos x = -\frac{\sqrt{2}}{2}$$

$$x = 135, 225$$

REF: 011322a2

3 ANS:

$$\sec x = \sqrt{2}$$

$$\cos x = \frac{1}{\sqrt{2}}$$

$$\cos x = \frac{\sqrt{2}}{2}$$

$$x = 45^\circ, 315^\circ$$

REF: 061434a2

4 ANS:

$$5 \csc \theta = 8$$

$$\csc \theta = \frac{8}{5}$$

$$\sin \theta = \frac{5}{8}$$

$$\theta \approx 141$$

REF: 061332a2

5 ANS: 3

REF: 010229siii

6 ANS:

$$90^\circ, 210^\circ, 330^\circ$$

REF: 068639siii

7 ANS:

$$30^\circ, 150^\circ, 270^\circ$$

REF: 080040siii

8 ANS:

60°, 180°, 300°

REF: 018442siii

9 ANS:

60° or  $\frac{\pi}{3}$ 

REF: 060311siii

10 ANS:

30, 150

REF: 018542siii

11 ANS:

22°20', 157°40', 241°30' and 298°30' or 22.3°, 157.7°, 241.5° and 298.5°

REF: 010236siii

12 ANS:

31, 180, 329

REF: 068036siii

13 ANS:

$$5 \cos \theta - 2 \sec \theta + 3 = 0$$

$$5 \cos \theta - \frac{2}{\cos \theta} + 3 = 0$$

$$5 \cos^2 \theta + 3 \cos \theta - 2 = 0$$

$$(5 \cos \theta - 2)(\cos \theta + 1) = 0$$

$$\cos \theta = \frac{2}{5}, -1$$

$$\theta \approx 66.4, 293.6, 180$$

REF: 061539a2

14 ANS:

34°, 135°

REF: 068737siii