5-3 Solving Trigonometric Equations

Solve each equation for all values of x.

2. $5 = \sec^2 x + 3$

ANSWER:

$\frac{\pi}{4} + 2n\pi, \frac{3\pi}{4} + 2n\pi, \frac{5\pi}{4} + 2n\pi, \frac{7\pi}{4} + 2n\pi, \; n \in \mathbb{Z}$

4. $4 \tan x - 7 = 3 \tan x - 6$

ANSWER:

$\frac{\pi}{4} + n\pi, \; n \in \mathbb{Z}$

6. $2 - 10 \sec x = 4 - 9 \sec x$

ANSWER:

$\frac{2\pi}{3} + 2n\pi, \frac{4\pi}{3} + 2n\pi, \; n \in \mathbb{Z}$

8. $11 = 3 \csc^2 x + 7$

ANSWER:

$\frac{\pi}{3} + 2n\pi, \frac{2\pi}{3} + 2n\pi, \frac{4\pi}{3} + 2n\pi, \frac{5\pi}{3} + 2n\pi, \; n \in \mathbb{Z}$

10. $9 + \sin^2 x = 10$

ANSWER:

$\frac{\pi}{2} + 2n\pi, \frac{3\pi}{2} + 2n\pi, \; n \in \mathbb{Z}$

12. $7 \cos x = 5 \cos x + \sqrt{3}$

ANSWER:

$\frac{\pi}{6} + 2n\pi, \frac{11\pi}{6} + 2n\pi, \; n \in \mathbb{Z}$

Find all solutions of each equation on $[0, 2\pi)$.

14. $-2 \sin x = -\sin x \cos x$

ANSWER:

$0, \pi$

16. $\csc^2 x - \csc x + 9 = 11$

ANSWER:

$\frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}$

18. $2\sin^2 x = \sin x + 1$

ANSWER:

$\frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$

Find all solutions of each equation on the interval $[0, 2\pi)$.

22. $\sec x = \tan x + 1$

ANSWER:

0

24. $\csc x + \cot x = 1$

ANSWER:

$\frac{\pi}{2}$

26. $\cos x - 4 = \sin x - 4$

ANSWER:

$\frac{\pi}{4}, \frac{5\pi}{4}$

28. $\cot^2 x \csc^2 x - \cot^2 x = 9$

ANSWER:

$\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

30. $\sec^2 x \tan^2 x + 3\sec^2 x - 2\tan^2 x = 3$

ANSWER:

$0, \pi$