




14.4 EXERCISES

HOMEWORK KEY

-  = **WORKED-OUT SOLUTIONS**
on p. WS1 for Exs. 5, 13, and 43
-  = **TAKS PRACTICE AND REASONING**
Exs. 15, 36, 42, 44, 46, and 47
-  = **MULTIPLE REPRESENTATIONS**
Ex. 43

SKILL PRACTICE

1. **VOCABULARY** What is the difference between a trigonometric equation and a trigonometric identity?

2. **WRITING** Describe several techniques for solving trigonometric equations.

CHECKING SOLUTIONS Verify that the given x -value is a solution of the equation.

3. $2 + 3 \cos x - 5 = 0, x = 4\pi$

4. $\pi \sec x + \pi = 0, x = \pi$

5. $12 \sin^2 x - 3 = 0, x = \frac{\pi}{6}$

6. $5 \tan^3 x - 5 = 0, x = \frac{\pi}{4}$

7. $2 \cos^4 x - \cos^2 x = 0, x = \frac{\pi}{2}$

8. $3 \cot^4 x - \cot^2 x - 24 = 0, x = \frac{7\pi}{6}$

GENERAL SOLUTIONS Find the general solution of the equation.

9. $2 \sin x - 1 = 0$

10. $\sqrt{3} \csc x + 2 = 0$

11. $3 \tan x - \sqrt{3} = 0$

12. $\sin x + \sqrt{2} = -\sin x$

13. $4 \cos^2 x - 3 = 0$

14. $3 \tan^2 x - 9 = 0$

15. **TAKS REASONING** What is the general solution of the equation $4 \sin x = 2 \sin x + 1$?

(A) $x = \frac{\pi}{6} + 2n\pi$ or $x = \frac{7\pi}{6} + 2n\pi$

(B) $x = \frac{\pi}{6} + n\pi$ or $x = \frac{5\pi}{6} + n\pi$

(C) $x = \frac{\pi}{6} + 2n\pi$ or $x = \frac{5\pi}{6} + 2n\pi$

(D) $x = \frac{\pi}{6} + n\pi$ or $x = \frac{7\pi}{6} + n\pi$

SOLVING EQUATIONS Solve the equation in the interval $0 \leq x < 2\pi$.

16. $5 + 2 \sin x - 7 = 0$

17. $3 \tan x - \sqrt{3} = 0$

18. $3 \cos x = \cos x - 1$

19. $2 \sin^2 x - 1 = 0$

20. $5 \tan^2 x - 15 = 0$

21. $4 \cos^2 x - 1 = 0$

ERROR ANALYSIS Describe and correct the error in solving the equation in the interval $0 \leq x \leq \frac{\pi}{2}$.

22.

$$\sin^2 x = \frac{1}{2} \sin x$$

$$\sin x = \frac{1}{2}$$

$$x = \frac{\pi}{6}$$



23.

$$-2 \cos x = -1$$

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

$$x = \frac{2\pi}{3}$$



GENERAL SOLUTIONS Find the general solution of the equation.

24. $\sin x \cos x - 3 \cos x = 0$

25. $\sqrt{3} \cos x \tan x - \cos x = 0$

26. $2 \sin^3 x = \sin x$

27. $2 \tan^4 x - \tan^2 x - 15 = 0$

28. $\sqrt{\cos x} = 2 \cos x - 1$

29. $1 + \cos x = \sqrt{3} \sin x$

EXAMPLE 1

on p. 931
for Exs. 3–15

EXAMPLE 2

on p. 932
for Exs. 16–23

EXAMPLE 4

on p. 933
for Exs. 24–29