

# 14.6 EXERCISES

## HOMEWORK KEY

 = **WORKED-OUT SOLUTIONS**  
on p. WS1 for Exs. 9, 23, and 43

 = **TAKS PRACTICE AND REASONING**  
Exs. 11, 18, 32, 44, 46, and 47

### SKILL PRACTICE

- VOCABULARY** Give the sum and difference formulas for sine, cosine, and tangent.
- WRITING** Explain how you can evaluate  $\tan 75^\circ$  using either the sum or difference formula for tangent.

#### EXAMPLE 1

on p. 949  
for Exs. 3–10

#### FINDING VALUES Find the exact value of the expression.

- |                            |                            |   |   |
|----------------------------|----------------------------|---|---|
| 3. $\tan(-15^\circ)$       | 4. $\sin(-165^\circ)$      | 5. $\tan 195^\circ$                           | 6. $\cos 15^\circ$                      |
| 7. $\sin \frac{23\pi}{12}$ | 8. $\tan \frac{17\pi}{12}$ | <b>9.</b> $\cos\left(-\frac{5\pi}{12}\right)$ | 10. $\sin\left(-\frac{7\pi}{12}\right)$ |

- TAKS REASONING** Derive the cofunction identity  $\sin\left(\frac{\pi}{2} - \theta\right) = \cos \theta$  using the difference formula for sine.

#### EXAMPLE 2

on p. 950  
for Exs. 12–18

#### EVALUATING EXPRESSIONS Evaluate the expression given that $\cos a = \frac{4}{5}$ with $0 < a < \frac{\pi}{2}$ and $\sin b = -\frac{15}{17}$ with $\frac{3\pi}{2} < b < 2\pi$ .

- |                   |                   |                   |
|-------------------|-------------------|-------------------|
| 12. $\sin(a + b)$ | 13. $\cos(a + b)$ | 14. $\tan(a + b)$ |
| 15. $\sin(a - b)$ | 16. $\cos(a - b)$ | 17. $\tan(a - b)$ |
- TAKS REASONING** What is the value of  $\sin(a - b)$  given that  $\sin a = -\frac{3}{5}$  with  $\pi < a < \frac{3\pi}{2}$  and  $\cos b = \frac{12}{13}$  with  $0 < b < \frac{\pi}{2}$ ?

- |                      |                      |                     |                     |
|----------------------|----------------------|---------------------|---------------------|
| (A) $-\frac{18}{55}$ | (B) $-\frac{16}{65}$ | (C) $\frac{14}{45}$ | (D) $\frac{20}{43}$ |
|----------------------|----------------------|---------------------|---------------------|

#### EXAMPLE 3

on p. 950  
for Exs. 19–31

#### SIMPLIFYING EXPRESSIONS Simplify the expression.

- |  |  |   |   |
|--|--|---|---|
| 19. $\tan(x + \pi)$                              | 20. $\sin(x + \pi)$                      | 21. $\cos(x + 2\pi)$                      | 22. $\tan(x - 2\pi)$                      |
| <b>23.</b> $\sin\left(x - \frac{3\pi}{2}\right)$ | 24. $\tan\left(x + \frac{\pi}{2}\right)$ | 25. $\sin\left(x + \frac{3\pi}{2}\right)$ | 26. $\cos\left(x - \frac{3\pi}{2}\right)$ |
| 27. $\tan\left(x + \frac{3\pi}{2}\right)$        | 28. $\cos\left(x - \frac{\pi}{2}\right)$ | 29. $\tan\left(x + \frac{5\pi}{2}\right)$ | 30. $\cos\left(x + \frac{5\pi}{2}\right)$ |

- ERROR ANALYSIS** Describe and correct the error in simplifying the expression.

$$\tan\left(x + \frac{\pi}{4}\right) = \frac{\tan x + \tan \frac{\pi}{4}}{1 + \tan x \tan \frac{\pi}{4}} = \frac{\tan x + 1}{1 + \tan x} = 1$$

#### EXAMPLE 4

on p. 950  
for Exs. 32–38

- TAKS REASONING** What is a solution of the equation  $\sin(x - 2\pi) + \tan(x - 2\pi) = 0$  on the interval  $\pi < x < 3\pi$ ?

- |                     |                      |            |            |
|---------------------|----------------------|------------|------------|
| (A) $\frac{\pi}{2}$ | (B) $\frac{3\pi}{2}$ | (C) $2\pi$ | (D) $3\pi$ |
|---------------------|----------------------|------------|------------|