9. ✦ **TAKS REASONING** If $\csc \theta = \dfrac{3}{2}$ and $\dfrac{\pi}{2} < \theta < \pi$, what is the value of $\tan \theta$?

(A) $-\dfrac{2\sqrt{5}}{5}$ (B) $-\dfrac{2\sqrt{13}}{13}$ (C) $\dfrac{2\sqrt{13}}{13}$ (D) $\dfrac{2\sqrt{5}}{5}$

EXAMPLES
2 and 3
on p. 925
for Exs. 10–24

SIMPLIFYING EXPRESSIONS Simplify the expression.

10. $\sin x \cot x$ **11.** $\dfrac{\sin(-\theta)}{\cos(-\theta)}$ **12.** $\csc \theta \sin \theta + \cot^2 \theta$

13. $\cos \theta \,(1 + \tan^2 \theta)$ **14.** $1 + \tan^2 \left(\dfrac{\pi}{2} - x\right)$ **15.** $\dfrac{\cos\left(\dfrac{\pi}{2} - x\right)}{\csc x}$

16. $\dfrac{\cos\left(\dfrac{\pi}{2} - \theta\right)}{\csc \theta} + \cos^2 \theta$ **17.** $\sin\left(\dfrac{\pi}{2} - \theta\right) \sec \theta$ **18.** $\dfrac{\cos^2 x}{\cot^2 x}$

19. $\dfrac{\sec x \sin x + \cos\left(\dfrac{\pi}{2} - x\right)}{1 + \sec x}$ **20.** $\dfrac{\csc^2 x - \cot^2 x}{\sin(-x)\cot x}$ **21.** $\dfrac{\cos^2 x \tan^2(-x) - 1}{\cos^2 x}$

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

22.

$1 - \sin^2 \theta = 1 - (1 - \cos^2 \theta)$

$\qquad\qquad = 1 - 1 - \cos^2 \theta$

$\qquad\qquad = -\cos^2 \theta$ ✗

23.

$\tan(-x)\csc x = \dfrac{\sin x}{\cos x} \cdot \dfrac{1}{\sin x}$

$\qquad\qquad = \dfrac{1}{\cos x}$

$\qquad\qquad = \sec x$ ✗

24. ✦ **TAKS REASONING** Which of the following is the simplified form of the expression $\cos \theta \sec \theta$?

(A) $\tan \theta$ (B) 1 (C) 2 (D) $1 - \sin^2 \theta$

EXAMPLES
4 and 5
on p. 926
for Exs. 25–34

VERIFYING IDENTITIES Verify the identity.

25. $\sin x \csc x = 1$ **26.** $\tan \theta \csc \theta \cos \theta = 1$

27. $\dfrac{\cos\left(\dfrac{\pi}{2} - \theta\right) + 1}{1 - \sin(-\theta)} = 1$ **28.** $\sin\left(\dfrac{\pi}{2} - x\right)\tan x = \sin x$

29. $\dfrac{\csc^2 \theta - \cot^2 \theta}{1 - \sin^2 \theta} = \sec^2 \theta$ **30.** $2 - \cos^2 \theta = 1 + \sin^2 \theta$

31. $\sin x + \cos x \cot x = \csc x$ **32.** $\dfrac{\sin^2(-x)}{\tan^2 x} = \cos^2 x$

33. $\dfrac{1 + \cos x}{\sin x} + \dfrac{\sin x}{1 + \cos x} = 2\csc x$ **34.** $\dfrac{\sin x}{1 - \cos(-x)} = \csc x + \cot x$

35. **ODD AND EVEN FUNCTIONS** A function f is *odd* if $f(-x) = -f(x)$. A function f is *even* if $f(-x) = f(x)$. Which of the six trigonometric functions are odd? Which are even?

VERIFYING IDENTITIES Verify the identity.

36. $\ln|\sec \theta| = -\ln|\cos \theta|$ **37.** $\ln|\tan \theta| = \ln|\sin \theta| - \ln|\cos \theta|$

38. **CHALLENGE** Use the Pythagorean identity $\sin^2 \theta + \cos^2 \theta = 1$ to derive the other Pythagorean identities, $1 + \tan^2 \theta = \sec^2 \theta$ and $1 + \cot^2 \theta = \csc^2 \theta$.

○ = **WORKED-OUT SOLUTIONS**
on p. WS1

✦ = **TAKS PRACTICE
AND REASONING**

◆ = **MULTIPLE
REPRESENTATIONS**