In Exercises 13–18, find the values of the other five trigonometric functions.

13. $\sin x = \frac{5}{13}, \frac{\pi}{2} < x < \pi$

14. $\cos x = \frac{24}{25}, -\frac{\pi}{2} < x < 0$

15. $\tan x = \frac{3}{4}, \pi < x < 2\pi$

16. $\cot x = -\frac{12}{5}, 0 < x < \pi$

17. $\sec x = -3, 0 < x < \pi$

18. $\csc x = -5, \frac{\pi}{2} < x < \frac{3\pi}{2}$

19. Explain why the cotangent graph has vertical asymptotes at multiples of π.

20. ***Reading*** Prepare a summary table for the six trigonometric functions introduced in this section and the preceding one. The table should give the definition, the domain, the range, the fundamental period, and a sketch of the graph of each function.

21. **a.** Verify that $1 + \tan^2 \frac{\pi}{3} = \sec^2 \frac{\pi}{3}$. $\left[\textit{Note}: \tan^2 \frac{\pi}{3} \text{ means } \left(\tan \frac{\pi}{3}\right)^2.\right]$

    b. Can you find any other values of x for which $1 + \tan^2 x = \sec^2 x$?

22. **a.** Evaluate $1 + \cot^2 x$ and $\csc^2 x$ for $x = \frac{\pi}{2}$, $x = \frac{3\pi}{4}$, and $x = \frac{7\pi}{6}$.

    b. Make a conjecture about the relationship between $1 + \cot^2 x$ and $\csc^2 x$. Prove your conjecture using Exercise 7 on page 271 and the definitions of cotangent and cosecant.

Find the exact value of each expression or state that the value is undefined.

23.	**a.** $\cos 120°$	**b.** $\sec 120°$	**c.** $\sin 120°$	**d.** $\tan 120°$
24.	**a.** $\sin 225°$	**b.** $\csc 225°$	**c.** $\tan 225°$	**d.** $\sec 225°$
25.	**a.** $\csc 90°$	**b.** $\sec 180°$	**c.** $\tan 240°$	**d.** $\cot 0°$
26.	**a.** $\csc 150°$	**b.** $\csc 0°$	**c.** $\tan 315°$	**d.** $\sec 315°$
27.	**a.** $\csc \pi$	**b.** $\tan \frac{2\pi}{3}$	**c.** $\cot \frac{\pi}{2}$	**d.** $\sec \frac{5\pi}{6}$
28.	**a.** $\tan \frac{\pi}{2}$	**b.** $\cot \frac{7\pi}{4}$	**c.** $\sec(-3\pi)$	**d.** $\csc \frac{7\pi}{6}$

7-6 The Inverse Trigonometric Functions

Objective *To find values of the inverse trigonometric functions.*

From the graph of $f(x) = \tan x$ shown on the left at the top of the next page, we can see that the tangent function is not one-to-one and thus has no inverse. However, if we restrict x to the interval $-\frac{\pi}{2} < x < \frac{\pi}{2}$, the restricted function, which we denote $F(x) = \text{Tan}\, x$, is one-to-one. Its inverse is denoted $\text{Tan}^{-1} x$ and is read "the inverse tangent of x." Notice that $\text{Tan}^{-1} x = y$ means that $\tan y = x$ and $-\frac{\pi}{2} < y < \frac{\pi}{2}$.