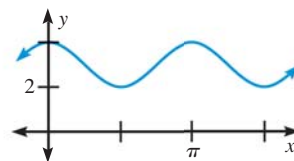


21.  **TAKS REASONING** The graph of which function is shown?

- (A)  $y = \cos \frac{1}{2}x + 3$       (B)  $y = \cos x + 3$   
 (C)  $y = \cos 2x + 3$       (D)  $y = \cos(x + \pi) + 3$



**EXAMPLE 4**

on p. 917  
for Exs. 22–33

**GRAPHING** Graph the sine or cosine function.

22.  $f(x) = -\sin x + 2$       **23.**  $y = -\sin \frac{1}{2}x + 3$       24.  $y = -\cos 2x - 2$   
 25.  $y = -\sin\left(x - \frac{\pi}{4}\right)$       26.  $f(x) = -\sin(x - \pi)$       27.  $y = -2 \cos \frac{1}{4}x$   
 28.  $y = -3 \cos(x - \pi) + 4$       29.  $y = -\cos(x + \pi) + 1$       30.  $f(x) = 1 - 3 \sin(x + \pi)$   
 31.  $y = -\sin\left(x - \frac{3\pi}{2}\right) + 2$       32.  $f(x) = -\cos\left(x + \frac{\pi}{2}\right) - 2$       33.  $y = -4 \cos 2\left(x - \frac{\pi}{4}\right)$

34. **ERROR ANALYSIS** Describe and correct the error in determining the maximum point of the function  $y = 2 \sin\left(x - \frac{\pi}{2}\right)$ .

Maximum:  $\left(\left(\frac{1}{4} \cdot 2\pi\right) - \frac{\pi}{2}, 2\right) = \left(\frac{\pi}{2} - \frac{\pi}{2}, 2\right) = (0, 2)$



35.  **TAKS REASONING** Which of the following is a maximum point of the graph of  $y = -4 \cos\left(x - \frac{\pi}{2}\right)$ ?

- (A)  $\left(-\frac{\pi}{2}, 4\right)$       (B)  $(0, 4)$       (C)  $\left(\frac{\pi}{2}, 4\right)$       (D)  $(\pi, 4)$

**EXAMPLE 5**

on p. 918  
for Exs. 36–41

**GRAPHING** Graph the tangent function.

36.  $y = -\frac{1}{2} \tan x$       37.  $y = \tan 2x - 3$       38.  $y = -\tan 4x + 2$   
 39.  $y = 2 \tan\left(x + \frac{\pi}{2}\right)$       40.  $y = -\tan 2\left(x - \frac{\pi}{2}\right)$       41.  $y = -\frac{1}{2} \tan\left(x - \frac{\pi}{4}\right)$

**WRITING EQUATIONS** In Exercises 42–46, write an equation of the graph described.

42. The graph of  $y = \cos 2\pi x$  translated down 4 units and left 3 units  
 43. The graph of  $y = 3 \sin x$  translated up 2 units and right  $\pi$  units  
 44. The graph of  $y = 5 \tan x$  translated right  $\frac{\pi}{4}$  unit and then reflected in the  $x$ -axis  
 45. The graph of  $y = \frac{1}{3} \cos \pi x$  translated down 1 unit and then reflected in the line  $y = -1$   
 46. The graph of  $y = \frac{1}{2} \sin 6x$  translated down  $\frac{3}{2}$  units and right 1 unit, and then reflected in the line  $y = -\frac{3}{2}$   
 47. **REASONING** Explain how you can obtain the graph of  $y = \cos x$  by translating the graph of  $y = \sin x$ .