Name:_____

Review Exercises

Graphs of the Sine and Cosine Functions

For the following exercises, graph the functions for two periods and determine the amplitude or stretching factor, period, midline equation, and asymptotes.

1. $f(x) = -3\cos\ x + 3$

2. $f(x) = \frac{1}{4}\sin\ x$

3. $f(x) = 3\cos\left(x + \frac{\pi}{6}\right)$

4. $f(x) = -2\sin\left(x - \frac{2\pi}{3}\right)$

5. $f(x) = 3\sin\left(x - \frac{\pi}{4}\right) - 4$

6. $f(x) = 2\left(\cos\left(x - \frac{4\pi}{3}\right) + 1\right)$

7. $f(x) = 6\sin\left(3x - \frac{\pi}{6}\right) - 1$

8. $f(x) = -100\sin(50x - 20)$

Graphs of the Other Trigonometric Functions

For the following exercises, graph the functions for two periods and determine the amplitude or stretching factor, period, midline equation, and asymptotes.

9. $f(x) = \tan\ x - 4$

10. $f(x) = 2\tan\left(x - \frac{\pi}{6}\right)$

11. $f(x) = -3\tan(4x) - 2$

12. $f(x) = 0.2\cos(0.1x) + 0.3$

For the following exercises, graph two full periods. Identify the period, the phase shift, the amplitude, and asymptotes.

13. $f(x) = \frac{1}{3}\sec\ x$

14. $f(x) = 3\cot\ x$

15. $f(x) = 4\csc(5x)$

16. $f(x) = 8\sec\left(\frac{1}{4}x\right)$

17. $f(x) = \frac{2}{3}\csc\left(\frac{1}{2}x\right)$

18. $f(x) = -\csc(2x + \pi)$

For the following exercises, use this scenario: The population of a city has risen and fallen over a 20-year interval. Its population may be modeled by the following function: $y = 12{,}000 + 8{,}000\sin(0.628x)$, where the domain is the years since 1980 and the range is the population of the city.

19. What is the largest and smallest population the city may have?

20. Graph the function on the domain of $[0, 40]$.

21. What are the amplitude, period, and phase shift for the function?

22. Over this domain, when does the population reach 18,000? 13,000?

23. What is the predicted population in 2007? 2010?

For the following exercises, suppose a weight is attached to a spring and bobs up and down, exhibiting symmetry.

24. Suppose the graph of the displacement function is shown in Figure 1, where the values on the *x*-axis represent the time in seconds and the *y*-axis represents the displacement in inches. Give the equation that models the vertical displacement of the weight on the spring.

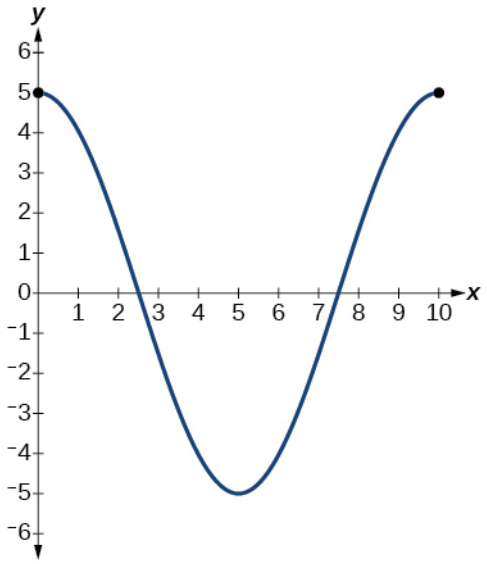

Figure 1

25. At time = 0, what is the displacement of the weight?

26. At what time does the displacement from the equilibrium point equal zero?

27. What is the time required for the weight to return to its initial height of 5 inches? In other words, what is the period for the displacement function?