Section 6-1:

1. What is the amplitude of the function $f(\theta) = 7\cos(\theta)$? Sketch a graph of this function.

$h(\theta) = -3\cos(\theta) + 4$

Midline
The center value of a sinusoidal function, the value that the function oscillates above and below, is called the **midline** of the function, corresponding to a vertical shift.

The function $f(\theta) = \cos(\theta) + k$ has midline at $y = k$.

Try it Now
2. What is the midline of the function $f(\theta) = 3\cos(\theta) - 4$? Sketch a graph of the function.

Example 5

What is the period of the function $f(t) = \sin\left(\dfrac{\pi}{6}t\right)$?

Example 7
Determine the midline, amplitude, and period of the function $f(t) = 3\sin(2t) + 1$.

3. If a sinusoidal function starts on the midline at point (0,3), has an amplitude of 2, and a period of 4, write a formula for the function.

Example 10

Sketch a graph of $f(t) = 3\sin\left(\dfrac{\pi}{4}t - \dfrac{\pi}{4}\right)$.

For each of the following equations, find the amplitude, period, horizontal shift, and midline.

11. $y = 3\sin(8(x+4)) + 5$

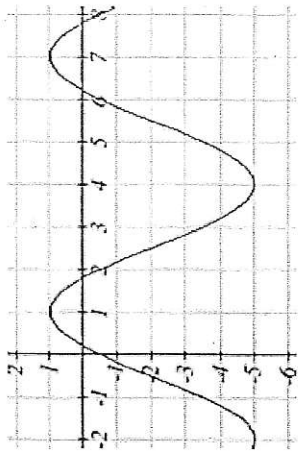12. $y = 4\sin\left(\dfrac{\pi}{2}(x-3)\right) + 7$

13. $y = 2\sin(3x - 21) + 4$

14. $y = 5\sin(5x + 20) - 2$
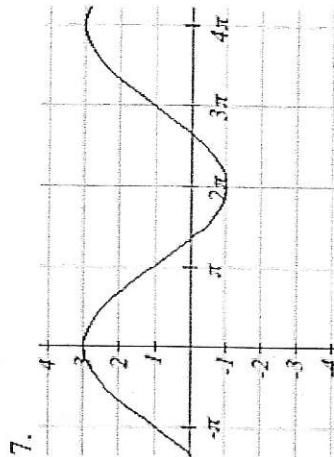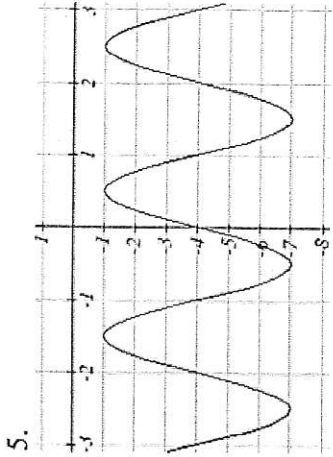
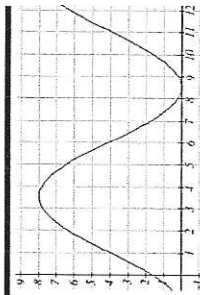15. $y = \sin\left(\dfrac{\pi}{6}x + \pi\right) - 3$

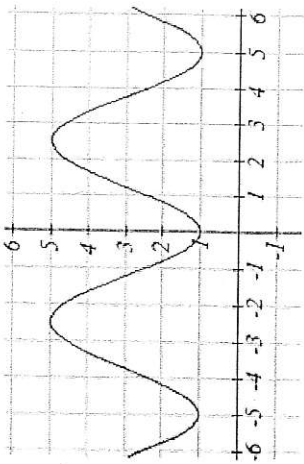16. $y = 8\sin\left(\dfrac{7\pi}{6}x + \dfrac{7\pi}{2}\right) + 6$

Second Video

Writing a function from the graph of a transformed sinusoidal function
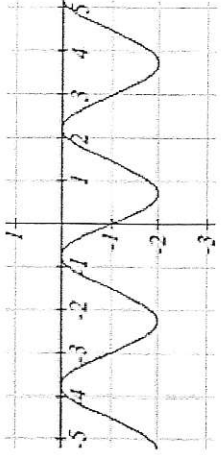
5.

7.

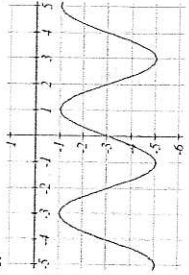Write a formula for the function graphed here.

10.

9.

Exercises

For the graphs below, determine the amplitude, midline, and period, then find a formula for the function.

6.

8.