

## Exercise 182

The function  $H(t) = 8 \sin\left(\frac{\pi}{6}t\right)$  models the height  $H$  (in feet) of the tide  $t$  hours after midnight. Assume that  $t = 0$  is midnight.

- Find the amplitude and period.
- Graph the function over one period.
- What is the height of the tide at 4:30 a.m.?

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### Solution

#### Part (a)

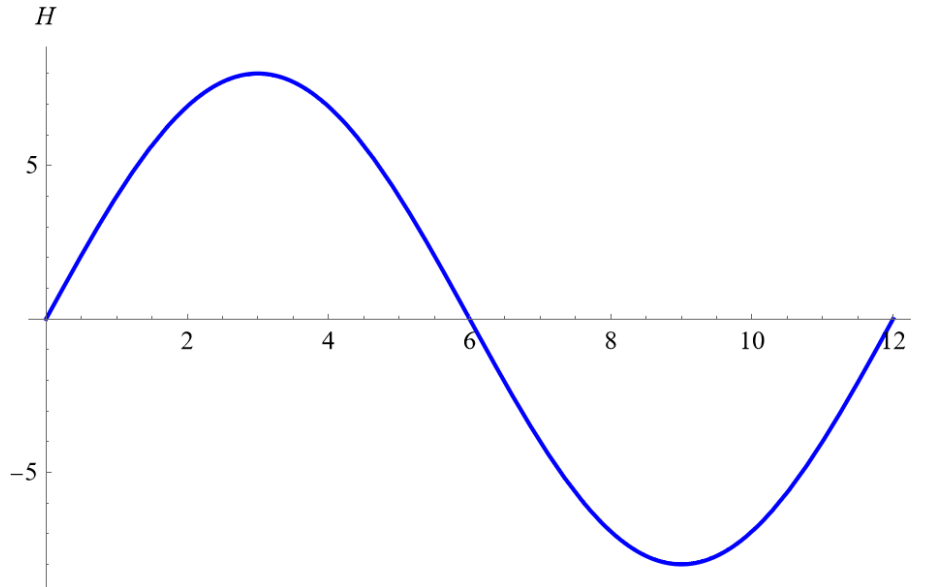
The amplitude is 8, the (positive) coefficient of the sine function. The period is

$$\frac{2\pi}{\frac{\pi}{6}} = 12,$$

half the number of hours in a day.

#### Part (b)

Below is a graph of  $H(t)$  versus  $t$ .



#### Part (c)

4:30 a.m. is 4.5 hours after midnight. Plug  $t = 4.5$  into the formula to get the height of the tide at this time.

$$H(4.5) = 8 \sin\left(\frac{\pi}{6} \cdot 4.5\right) \approx 5.66 \text{ ft}$$