

Think About a Plan

The Cosine Function

Tides The table at the right shows the times for high tide and low tide of one day. The markings on the side of a local pier showed a high tide of 7 ft and a low tide of 4 ft on the previous day.

Tide Table	
High Tide	4:03 A.M.
Low Tide	10:14 A.M.
High Tide	4:25 P.M.
Low Tide	10:36 P.M.

- What is the average depth of water at the pier? What is the amplitude of the variation from the average depth?
- How long is one cycle of the tide?
- Write a cosine function that models the relationship between the depth of water and the time of day. Use $y = 0$ to represent the average depth of water. Use $t = 0$ to represent the time 4:03 A.M.
- Reasoning** Suppose your boat needs at least 5 ft of water to approach or leave the pier. Between what times could you come and go?

- What is the average depth of water at the pier?

- How can you find the amplitude of the variation from the average depth? What is the amplitude?

- How can you find the length of one cycle of the tide? What is the cycle length in minutes?

- How can you find a cosine function that models the relationship between the depth of water and the time of day? Write the cosine function.

- How can you use a graph to find the times of day when the water depth is at least 5 ft?

- Over what domain should you graph the cosine function to represent the entire day? _____
- Between what times could you come and go? _____