Sec. 6.3 - Sinusoidal Functions

Learning Goal:

By the end of today, I will be able to identify the graph of a sinusoidal (Sine and Cosine) function and state the key characteristics (amplitude, period, domain and range).

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Using your calculator or trig tables to complete the table of values for the following, up to 360 degrees; use the table of values to plot the graph (we will only do this once this way, then we will use a faster method).

$f(x)=\sin(x)$

f(x)	
X	Y f(x)
0	
15	
30	
45	
60	
75	
90	
105	
120	
135	
150	
180	

f(x)	
X	Y
195	
210	
225	
240	
255	
270	
285	
300	
315	
330	
345	
360	

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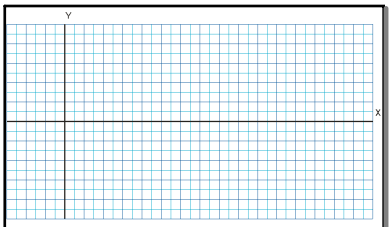

For a faster method, choose key points such as 90, 180 and 270 to plot, and then fill in the blanks with a smooth curve.

Period

Amplitude

Axis

Domain (1 cycle)

Range (1 cycle)

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Using your calculator or trig tables to complete the table of values for the following, up to 360 degrees; use the table of values to plot the graph (we will only do this once this way, then we will use a faster method).

$f(x)=\cos(x)$

f(x)	
X	Y f(x)
0	
15	
30	
45	
60	
75	
90	
105	
120	
135	
150	
180	

f(x)	
X	Y
195	
210	
225	
240	
255	
270	
285	
300	
315	
330	
345	
360	

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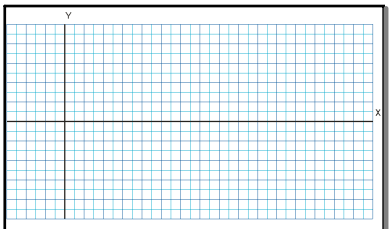

For a faster method, choose key points such as 90, 180 and 270 to plot, and then fill in the blanks with a smooth curve.

Period

Amplitude

Axis

Domain (1 cycle)

Range (1 cycle)

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Sine Generator with respect to the Primary Trigonometric Relationships.

Circle Generator

Controlling Period, Amplitude, Axis in the Sine Curve

Attribute Controls - demo

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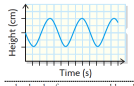
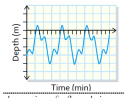
Identify if the following functions are (i) periodic and (ii) sinusoidal.

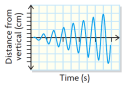
the height above the ground of a person on a Ferris wheel



the depth of a programmable radio-controlled toy submarine



the motion of a flagpole in a gust of wind



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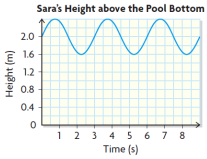
Sarah is sitting in an inner tube in a wave pool. The depth of the water below her in terms of time can be represented by the graph shown. Discuss and interpret the graph.



When is Sarah 2.0m above the bottom of the pool?

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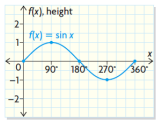
Need to Know

- The sine function has the following properties:
  - It has an amplitude of 1.
  - It has a period of 360°.
  - Its axis is defined by $y = 0$.
  - The domain is $\{x \in \mathbf{R}\}$, and the range is $\{y \in \mathbf{R} \mid -1 \leq y \leq 1\}$.
- The sine function passes through five key points: (0°, 0), (90°, 1), (180°, 0), (270°, −1), and (360°, 0).



- Graphs that are periodic and have the same shape and characteristics as the sine function are called sinusoidal functions.

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Homework Questions

Page 363-4 #3, 7, 5 and 8 (Desmos)

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Attachments

RelationshipOfSineAndCosineToTheUnitCircle.cdf

SineAndCosineGraphGenerator.cdf