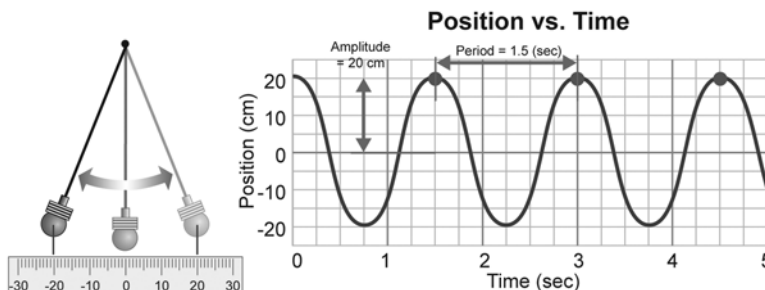


Harmonic Motion Graphs



A graph can be used to show the amplitude and period of an object in harmonic motion. An example of a graph of a pendulum's motion is shown below.

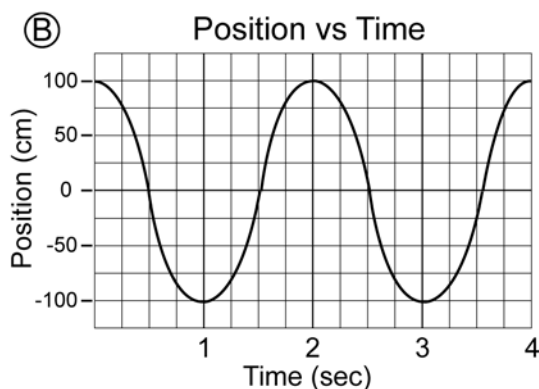
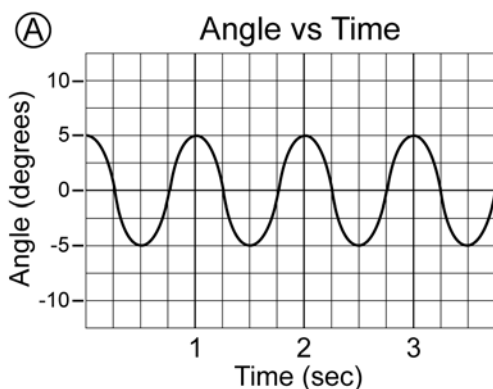


The distance to which the pendulum moves away from this center point is called the **amplitude**. The amplitude of a pendulum can be measured in units of length (centimeters or meters) or in degrees. On a graph, the amplitude is the distance from the x-axis to the highest point of the graph. The pendulum shown above moves 20 cm to each side of its center position, so its amplitude is 20 cm.

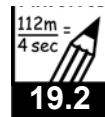
The **period** is the time for the pendulum to make one complete cycle. It is the time from one peak to the next on the graph. On the graph above, one peak occurs at 1.5 seconds, and the next peak occurs at 3.0 seconds. The period is $3.0 - 1.5 = 1.5$ seconds.

PRACTICE

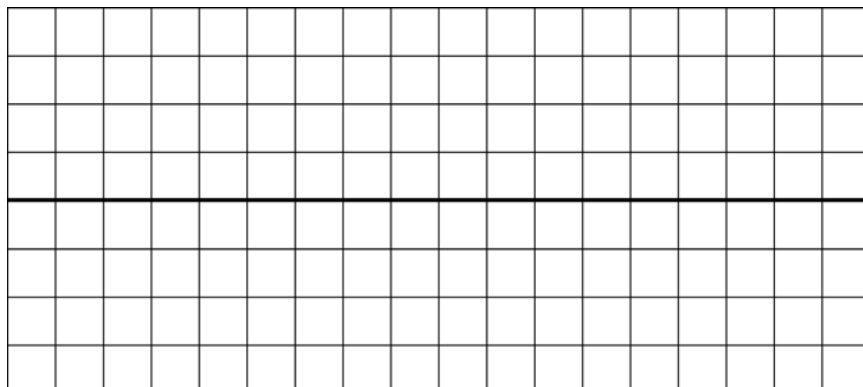
1. Use the graphs to answer the following questions



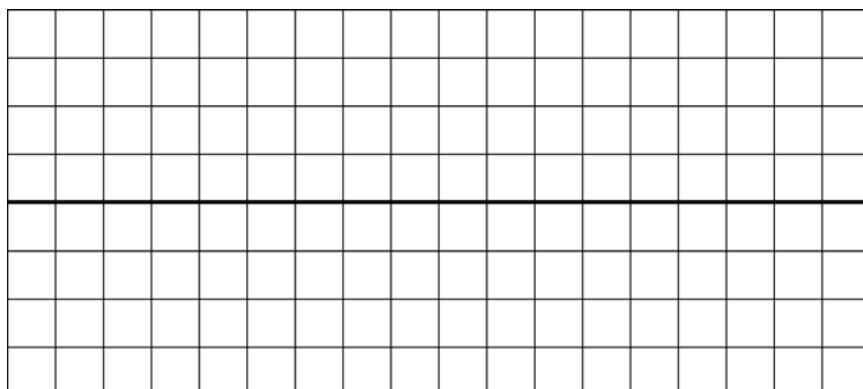
- What is the amplitude of each vibration?
- What is the period of each vibration?



2. Use the grids below to draw the following harmonic motion graphs. Be sure to label the y-axis to indicate the measurement scale.
- a. A pendulum with an amplitude of 2 cm and a period of 1 second.



- b. A pendulum with an amplitude of 5 degrees and a period of 4 seconds.



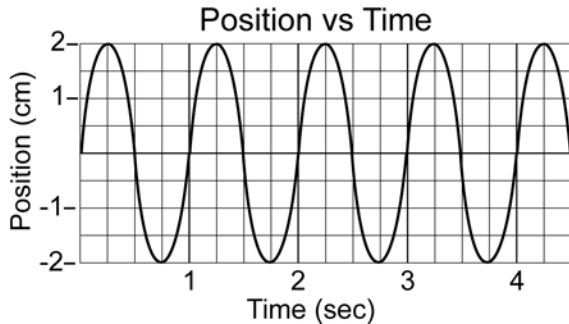
19.2 Harmonic Motion Graphs

1. Answers are:

- a. $A = 5$ degrees; $B = 100$ cm
- b. $A = 1$ second; $B = 2$ seconds

2. Answers are:

- a. Diagram:



b. Diagram:

