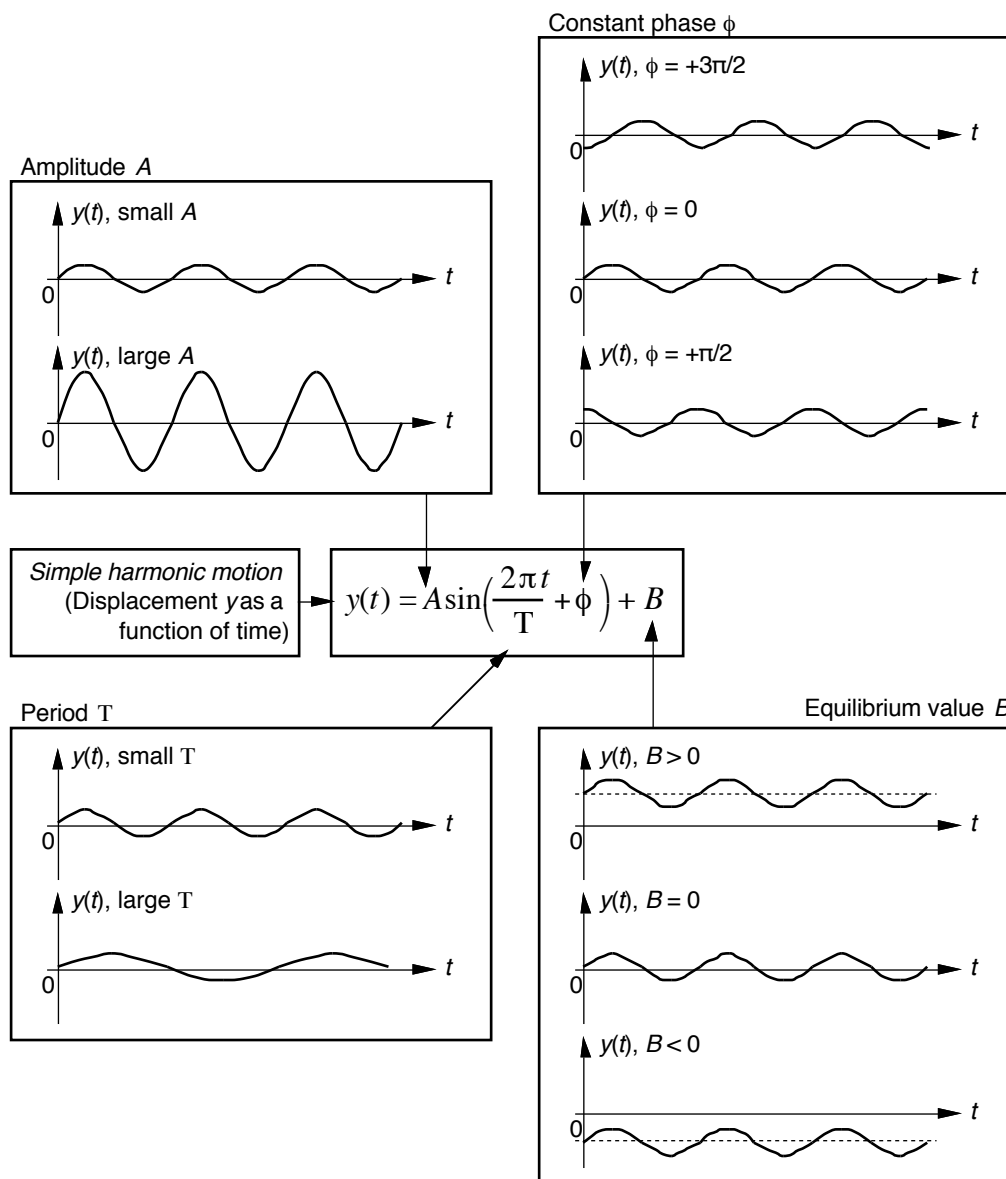Name_____

Simple Harmonic Motion (SHM) parameters

The most general form of the equation that describes *any* object undergoing SHM (simple harmonic motion) is given by:
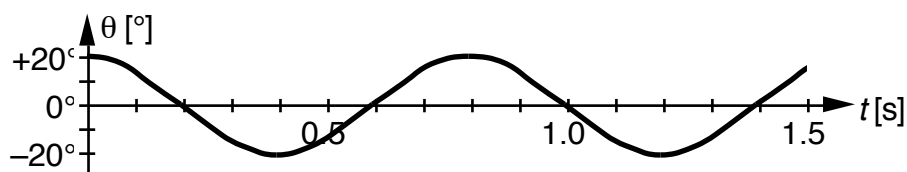
$$y(t) = A\sin\left(\frac{2\pi t}{T} + \phi\right) + B.$$

Applying SHM Parameters

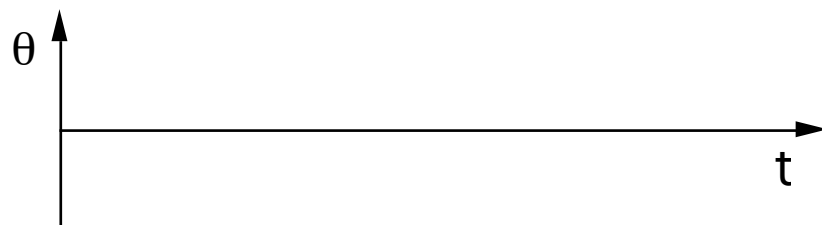Consider the specific case of this graph of angular position versus time for an $m = 0.2$ kg pendulum:

1. What are the values *and* units of these SHM parameters?

|	Value?	Units?
(a) A		
(b) T		
(c) ϕ		
(d) B		

For the following situations (2)-(5), redraw the angular position $\theta(t) \leftrightarrow y(t)$ versus time graph from (1) if the physical parameters below are changed. Scale (rescale) your axes as necessary.

2. The mass m is doubled.

3. The string L is doubled.

4. The amplitude A is doubled.

5. The parameter ϕ is doubled.

6. For each of the above situations (2)-(5), demonstrate for yourselves what the actual pendulum motion looks like, by using the appropriate m, L, A, and ϕ in your demonstration.
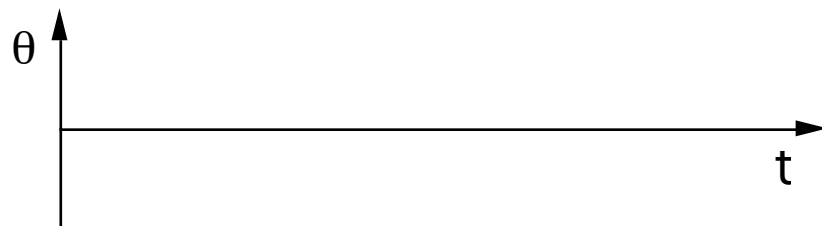
*Name*_____

θ ↑
|
|————————————————————————→
| t

mass is doubled

θ ↑
|
|————————————————————————→
| t

string L is doubled

θ ↑
|
|————————————————————————→
| t
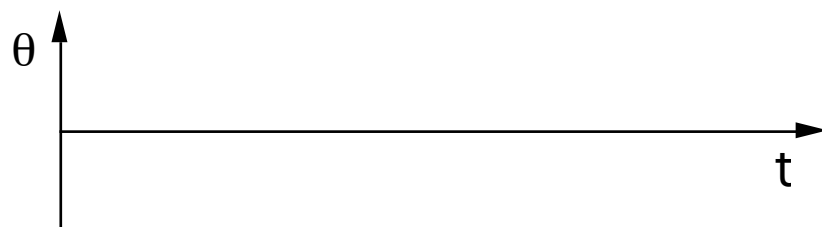
amplitude is doubled

θ ↑
|
|————————————————————————→
| t
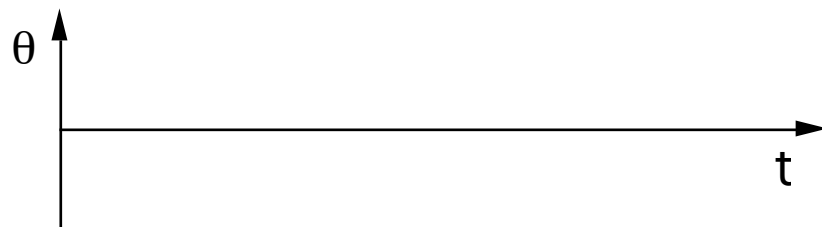
φ is doubled

Slinky waves

Your group will be assigned to act out one of the following waves on a slinky:

1. A longitudinal harmonic wave with a frequency of 0.5 Hz.

2. A transverse harmonic wave with a frequency of 0.5 Hz.

3. A longitudinal harmonic wave with a frequency of 1.0 Hz.

4. A transverse harmonic wave with a frequency of 1.0 Hz.

5. A wave pulse with an amplitude of 5 cm.

For five minutes or so, discuss in you group what you would need to do to create your assigned waves.

When you are done, your group will have a chance to show the whole class your assigned slinky waves.

*Name*_____

Analyzing Slinky Waves

(Each group should present their wave—then the rest of the class decides whether the demonstrated wave is correct or not!)

Which of the following wave parameters below are set by the behavior of the wave source, which are set by the properties of the medium, and which depend on both source and medium properties?

	Depends on wave source	*Depends on medium*	*Depends on both*
amplitude A			
frequency f			
period T			
phase shift ϕ			
velocity ☐			
wavelength λ			
polarization type			