

Equations of Motion in SHO's

1. An object of mass 0.75 kg oscillates according to the equation

$$y_1(t) = 0.50 \cos(12.47 \cdot t) ,$$

where x is measured in meters and t is measured in seconds.

- (a) What is the amplitude?
- (b) What is the frequency?
- (c) What is the total energy of the system?

- (d) Plot the equation on Desmos (www.desmos.com/calculator) and explain how it the resulting graph matches your answers for (a) and (b).

- (e) Where will the mass on the end of the spring be located at $t = 1.6$ s?

- (f) Also plot

$$y_2(t) = 0.50 \sin(12.47 \cdot t) .$$

What's the difference between these two graphs? See if you can find a phase shift ϕ that makes these graphs the same.

2. Now, try plotting $x(t) = A \sin(2\pi f \cdot t + \phi)$ on Desmos. Use the “slider” capability of Desmos to investigate how changing f and A changes the graph.

Name: _____

Date: _____

Period: _____

Damped Harmonic Motion

