PhyzJob: SHM Kinematics
Unfair Advantage: Calc Students

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A Trip Down Memory Lane

Remember graphical kinematics? Of course you do; who could forget the joys of graphing *x* vs. *t*, *v* vs. *t*, and *a* vs. *t*?

On the other side of this sheet is a set of axes (the old favorites: *x*, *v*, and *a* vs. *t*). The position graph has been produced by a mass in simple harmonic motion.

Your task is to determine the other two graphs based on characteristics of the position graph.

WARNING: Unlike our previous experiences in graphical kinematics, the plots on the other side will involve curved lines (changing slopes) on all three graphs.

Hint: All graphs will resemble a sine curve (they will oscillate sinusoidally, but not necessarily in phase with each other).

Post Graphing Analysis

List the position or positions—using the letters A-E from the diagram—at which

1. the magnitude of displacement is at a maximum. B and D

2. the magnitude of velocity is maximum. A, C, and E

3. the magnitude of acceleration is maximum. A, C, and E

4. the magnitude of displacement is at a minimum. A, C, and E

5. the magnitude of velocity is minimum. B and D

6. the magnitude of acceleration is minimum. B and D

The graph shown below depicts the position of an oscillating mass at various times during one cycle of motio
Based on this information, complete the concurrent graphs of velocity *vs*. time and acceleration *vs*. time.