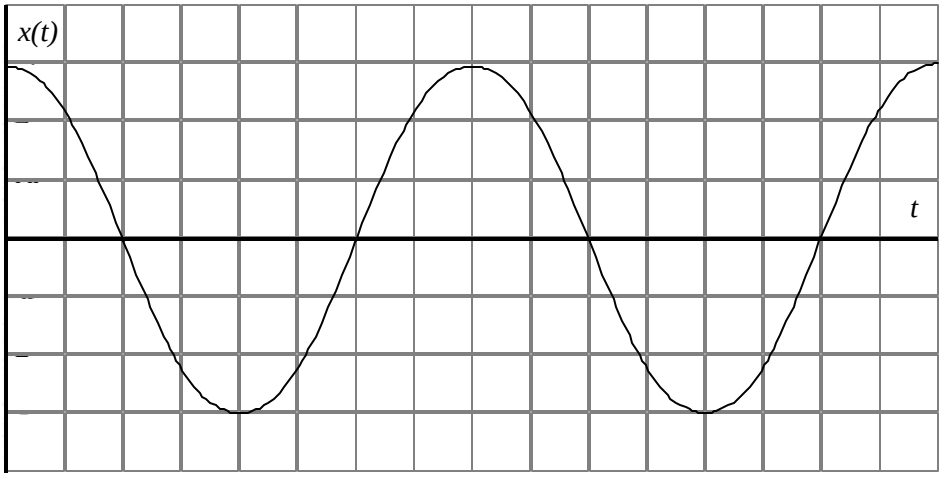
Pretest: Damped harmonic motion: Motion graphs Name _____

The x vs. t graph below represents the motion of a simple harmonic oscillator that is released from rest at $t = 0$.

A. On the graph, clearly label these features of the motion:

- amplitude
- period



B. Suppose that a retarding force were applied to cause the oscillator to become underdamped (*i.e.*, the resulting motion remains oscillatory, but the amplitude of the oscillation changes with time).

i. On the graph above, sketch a qualitatively correct x vs. t graph that could represent the motion of the underdamped oscillator when it is released *from rest* at the *same initial position as before.*

In the space below, explain how you decided to draw the graph the way you did.

ii. Consider the motion of the underdamped oscillator as it first passes through the location $x = 0$. Does the oscillator attain a *maximum speed* when it first passes through this location?

If so: Explain how you can tell.

If not: Does the oscillator move with *increasing speed* or *decreasing speed* at that instant? Explain how you can tell.

©2006 Physics Department, Grand Valley State University, Allendale, MI.