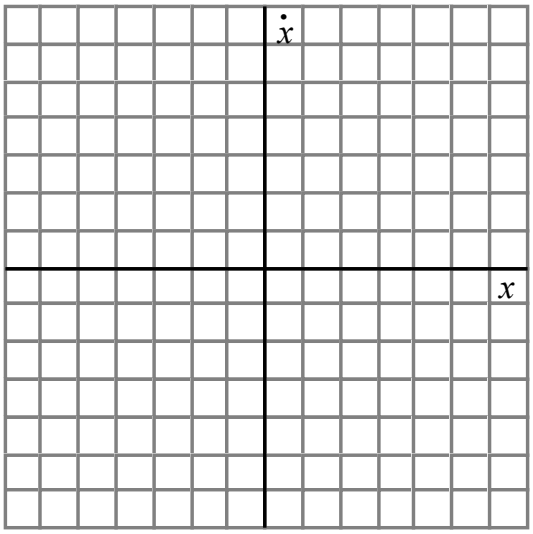
Pretest: Phase space diagrams: Simple harmonic motion Name _____

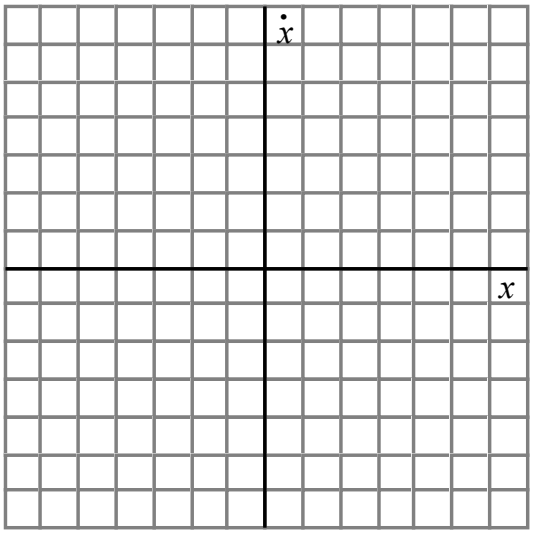
On this pretest you will be asked to draw examples of *phase space diagrams.* Unlike a graph of x vs. t or $\dot{x}$ vs. t, a phase space diagram is drawn to show velocity with respect to position ($\dot{x}$ vs. x).

Below are listed several situations, each describing an object that moves along a single axis, defined to be the x-axis. For each situation described below, sketch a qualitatively correct phase space diagram that represents the motion of the object. **Explain your reasoning in each case.**

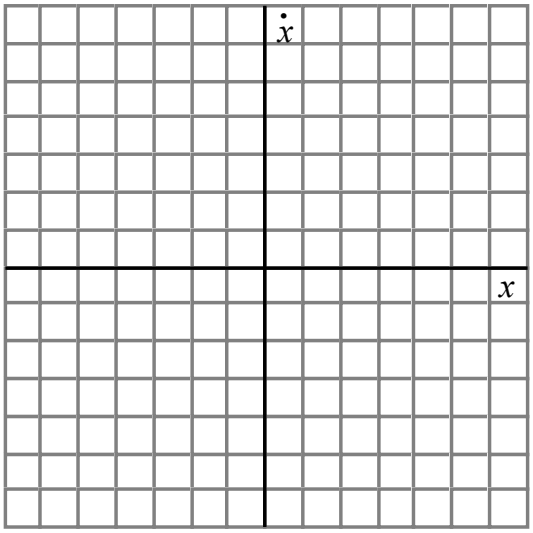
A. A book is at rest at a location along the $+x$ axis.



B. A roller-skater moves with constant speed in the negative x-direction.



C. A ball is dropped from rest at a height above the floor. (Let $x = 0$ represent floor level and take $+x$ to point upward. Ignore air resistance.)



D. A block, initially at rest at a location along the $+x$ axis, undergoes simple harmonic motion.