Name: _____

AP Physics: Dynamics
Forces HW

Conceptual Questions:

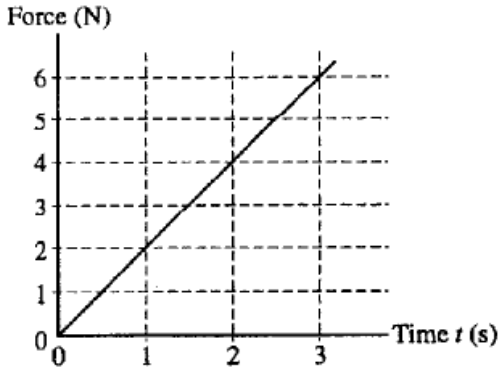
1. If the acceleration of an object is zero, are no forces acting on it?

2. A box is sitting in the bed of a truck. The truck slams on its brakes and the box slams into the cab of the truck. Why?

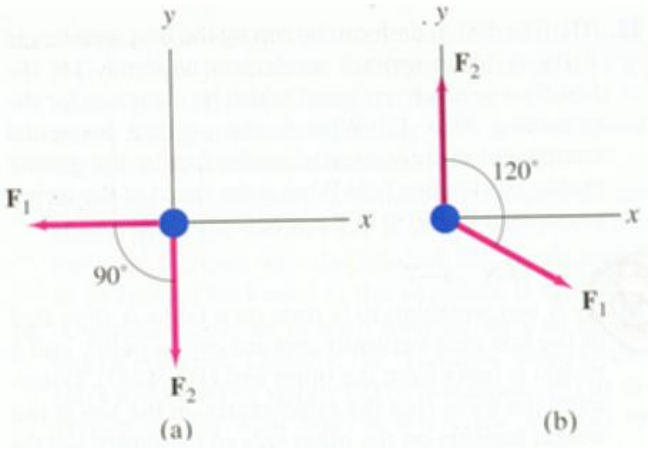
3. You are pulling on a box with a constant force across a frictionless table using an attached rope held horizontally. If you now pull the rope with the same force, but at an angle with respect to the horizontal (with the box still sliding horizontally along the surface) does the acceleration of the box remain the same, increase, or decrease? Explain your answer.

Mathematical Questions:

4. A block of mass 3 kg, initially at rest, is pulled along a frictionless, horizontal surface with a force shown as a function of time t by the graph above. The acceleration of the block at t = 2 s is….
   A. 4/3 m/s^2
   B. 2 m/s^2
   C. 8 m/s^2
   D. 12 m/s^2



5. Two forces, F_1 and F_2 shown below, act on a 27.0 kg object on a frictionless tabletop. If F_1 = 10.2 N and F_2 = 16.0 N, find the net force on the object and its acceleration for configuration (a) and (b).



6. A person pushes a 14.0 kg lawn mower at a constant velocity with a force of 88.0 N directed along the handle, which is at an angle of 45.0° with respect to the horizontal.

A. Draw a FBD showing all the forces acting on the mower.
B. Calculate the horizontal frictional force on the mower
C. Calculate the normal force exerted vertically upward on the mower by the ground.
D. What force must the person exert on the mower to accelerate it from rest to 1.50 m/s in 2.50 seconds, assuming the same frictional force?