. | **FIGURE EX5.15** shows the acceleration of objects of different mass that experience the same force. What is the magnitude of the force?

‖ A particle's trajectory is described by $x = \left(\frac{1}{2}t^3 - 2t^2\right)$ m and $y = \left(\frac{1}{2}t^2 - 2t\right)$ m, where t is in s.

a. What are the particle's position and speed at $t = 0$ s and $t = 4$ s?

b. What is the particle's direction of motion, measured as an angle from the x-axis, at $t = 0$ s and $t = 4$ s?

| A constant force is applied to an object, causing the object to accelerate at 10 m/s^2. What will the acceleration be if
a. The force is halved?
b. The object's mass is halved?
c. The force and the object's mass are both halved?
d. The force is halved and the object's mass is doubled?

| A construction worker with a weight of 850 N stands on a roof that is sloped at 20°. What is the magnitude of the normal force of the roof on the worker?

| A 50 kg box hangs from a rope. What is the tension in the rope if:

a. The box is at rest?

b. The box moves up at a steady 5.0 m/s?

c. The box has $v_y = 5.0$ m/s and is speeding up at 5.0 m/s^2?

d. The box has $v_y = 5.0$ m/s and is slowing down at 5.0 m/s^2?