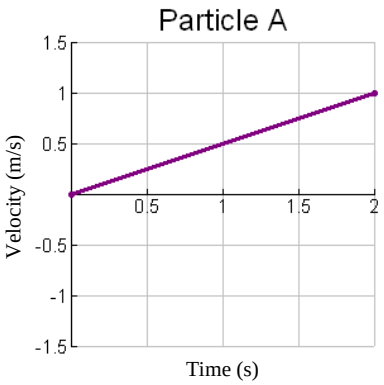
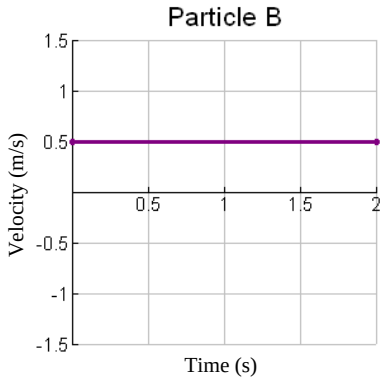
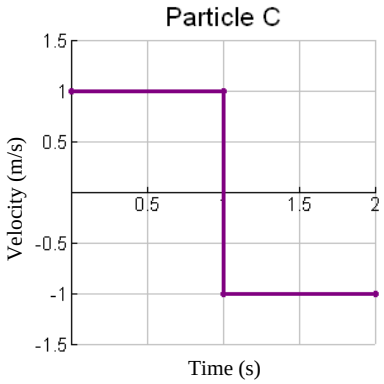
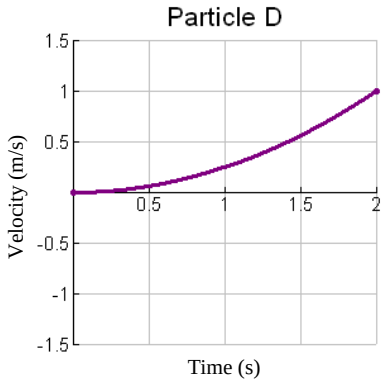
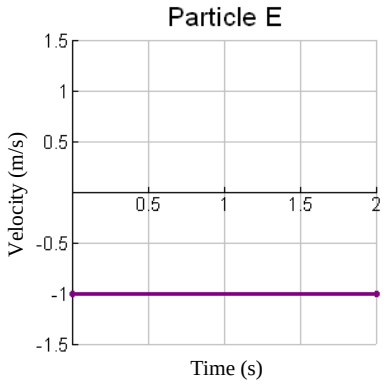
MULTIPLE CHOICE REVIEW: CHAPTERS 1 – 3











Five particles start at position $x = 0$ at time $t = 0$ and move in one dimension independently of one another. Graphs of the velocity of each particle versus time are shown above.

1974 – 12. Which particle is farthest from the origin at time $t = 2$ seconds?

a. Particle A b. Particle B c. Particle C d. Particle D e. Particle E

1974 – 13. Which particle moves with a constant, nonzero acceleration?

a. Particle A b. Particle B c. Particle C d. Particle D e. Particle E

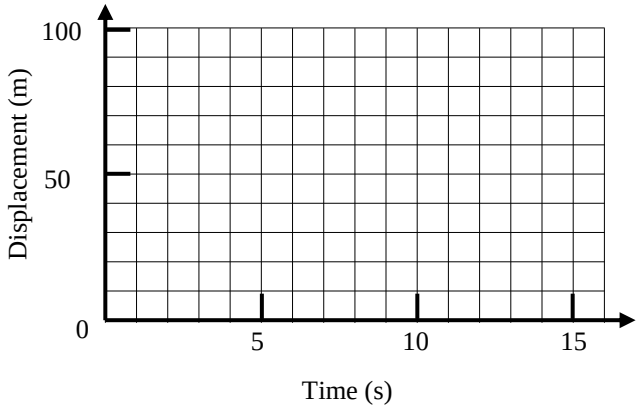
1974 – 14. Which particle is in its initial position at time $t = 2$ seconds?

a. Particle A b. Particle B c. Particle C d. Particle D e. Particle E

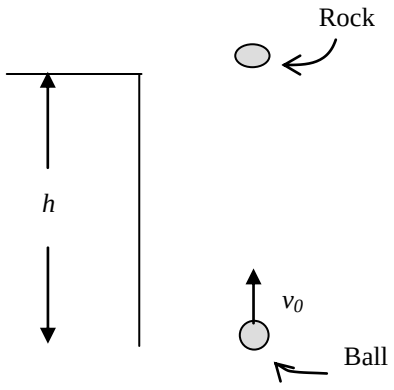
FREE RESPONSE REVIEW: CHAPTERS 1 – 3

1982 – 1. The first 10 meters of a 100-meter dash are covered in 2 seconds by a sprinter who starts from rest and accelerates with a constant acceleration. The remaining 90 meters are run with the same velocity the sprinter had after 2 seconds.

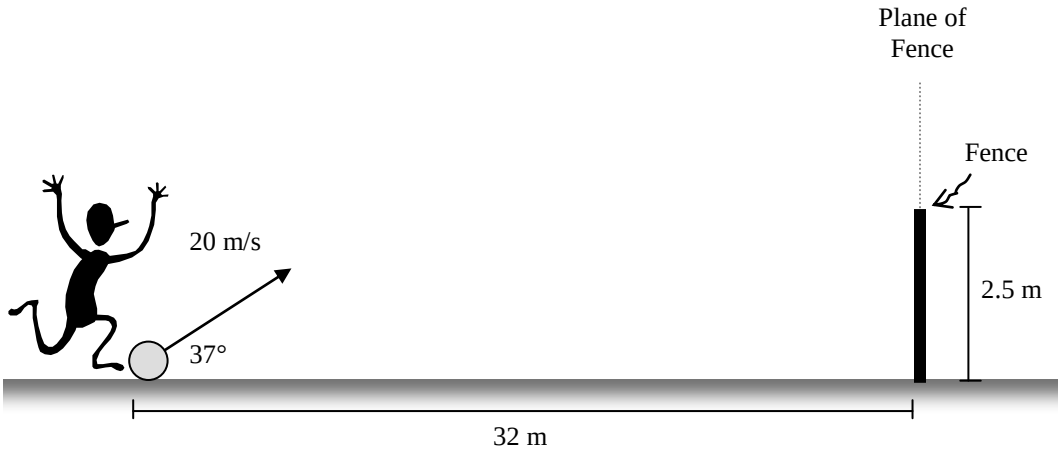
(a) Determine the sprinter's constant acceleration during the first 2 seconds.
(b) Determine the sprinter's velocity after 2 seconds have elapsed.
(c) Determine the total time needed to run the full 100 meters.
(d) On the axes provided below, draw the displacement vs. time curve for the sprinter.



1972 – 7. A rock is released from rest at the top of a cliff of height *h*. At the same instant, a ball is thrown vertically upwards from the foot of the cliff with an initial speed of v_0 such that it will collide with the rock. How much later will the collision occur?



FREE RESPONSE REVIEW: CHAPTERS 1 – 3 *(CONT)*



NOTE: Diagram not drawn to scale.

1994 – 1. A ball of mass 0.5 kilogram, initially at rest, is kicked directly toward a fence from a point 32 meters away, as shown above. The velocity of the ball as it leaves the kicker's foot is 20 meters per second at an angle of 37° above the horizontal. The top of the fence is 2.5 meters high. The ball hits nothing while in flight and air resistance is negligible.

(a) Determine the time it takes for the ball to reach the plane of the fence.
(b) Will the ball hit the fence? If so, how far below the top of the fence will it hit? If not, how far above the top of the fence will it pass?
(c) On the axes below, sketch the horizontal and vertical components of the velocity of the ball as functions of time until the ball reaches the plane of the fence.