

1. In the absence of air friction, an object dropped near the surface of the Earth experiences a constant acceleration of about 9.8 m/s^2 . This means that the

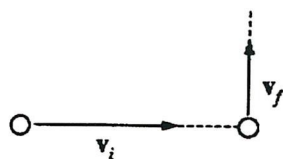
- (A) speed of the object increases 9.8 m/s during each second
- (B) speed of the object as it falls is 9.8 m/s
- (C) object falls 9.8 meters during each second
- (D) object falls 9.8 meters during the first second only
- (E) derivative of the distance with respect to time for the object equals 9.8 m/s^2

2. A 500-kilogram sports car accelerates uniformly from rest, reaching a speed of 30 meters per second in 6 seconds. During the 6 seconds, the car has traveled a distance of

- (A) 15 m
- (B) 30 m
- (C) 60 m
- (D) 90 m
- (E) 180 m

3. At a particular instant, a stationary observer on the ground sees a package falling with speed v_1 at an angle to the vertical. To a pilot flying horizontally at constant speed relative to the ground, the package appears to be falling vertically with a speed v_2 at that instant. What is the speed of the pilot relative to the ground?

- (A) $v_1 + v_2$
- (B) $v_1 - v_2$
- (C) $v_2 - v_1$
- (D) $\sqrt{v_1^2 - v_2^2}$
- (E) $\sqrt{v_1^2 + v_2^2}$



4. A ball initially moves horizontally with velocity v_i , as shown above. It is then struck by a stick. After leaving the stick, the ball moves vertically with a velocity v_f , which is smaller in magnitude than v_i . Which of the following vectors best represents the direction of the average force that the stick exerts on the ball?

- (A)
- (B)
- (C)
- (D)
- (E)