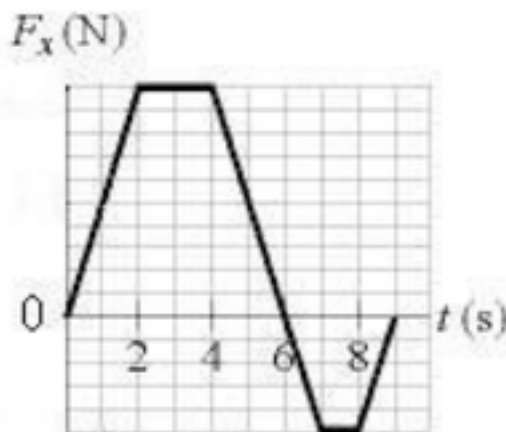


1. A 0.70 [kg] ball is moving horizontally with a speed of 9.8 [m/s] when it strikes a vertical wall. The ball rebounds with a speed of 1.0 [m/s]. What is the magnitude of the change in linear momentum of the ball?
2. In February 1955, a paratrooper fell 380 [m] from an airplane without being able to open his chute but happened to land in snow, suffering only minor injuries. Assume that his speed at impact was 56 [m/s] (terminal speed), that his mass (including gear) was 85 [kg], and that the force on him from the snow was at the survivable limit of 1.2×10^5 [N].
 - a. What is the minimum depth of snow that would have stopped him safely?
 - b. What is the magnitude of the impulse on him from the snow?
3. A 1.0 [kg] ball drops vertically onto a floor, hitting with a speed of 25 [m/s]. It rebounds with an initial speed of 5 [m/s].
 - a. What impulse acts on the ball during the contact?
 - b. If the ball is in contact with the floor for 0.020 [s], what is the average force exerted on the floor?
4. A 4.2 [kg] toy racecar can move along an x-axis. The figure shows the horizontal force F_x acting on the car, which begins at rest at time $t = 0$. The vertical axis is marked in increments of 0.5 [N].



- a. What is the momentum of the car at $t = 2.0$ s?
- b. What is the momentum of the car at $t = 9.0$ s?
- c. What is the car's velocity at $t = 8.0$ s?

HW Set 9 Answers

1. 7.56 [kg m/s]

2a. 1.11 [m]

2b. 5760 [kg m/s]

3a. 30 [kg m/s]

3b. 1500 [N]

4a. 5 [kg m/s]

4b. 15 [kg m/s]

4c. 3.87 [kg m/s]