

Name: _____

Date: _____

Section C D F

Momentum I

1. A truck loaded with sand is moving down the highway in a straight path.
 - a. What happens to the momentum of the truck if the truck's velocity is increasing? (*circle one*)
 - i. Momentum decreases
 - ii. Momentum increases
 - iii. Momentum stays the same
 - iv. I don't know.
 - b. What happens to the momentum of the truck if sand leaks at a constant rate through a hole in the truck bed while the truck maintains a constant velocity? (*circle one*)
 - i. Momentum decreases
 - ii. Momentum increases
 - iii. Momentum stays the same
 - iv. I don't know.
2. Calculate the linear momentum for each of the following cases. *Remember to put units and direction.*
 - a. a proton with mass 1.67×10^{-27} kg moving with a velocity of 3.2×10^6 m/s straight up
 - b. a 15.0 g bullet moving with a velocity of 700 m/s to the right
 - c. a 95 kg sprinter running with a velocity of 40 m/s southwest
 - d. Earth ($m = 5.98 \times 10^{24}$ kg) moving in its orbit with a velocity equal to 2.98×10^4 m/s west

3. A 0.025 kg golf ball moving at 21 m/s crashes through the window of a house in 2.0×10^{-4} s. After the crash, the ball continues in the same direction with a speed of 10 m/s. Assuming the force exerted on the ball by the window was constant, what was the magnitude of this force?
4. A 0.150 kg baseball moving at 24 m/s is slowed to a stop by a catcher in 0.007 s.
- What constant force did the catcher exert on the ball during this time?
 - How far did the ball travel before stopping? (*remember to use your Chapter 3 formulas*)