

Name _____

Net Force and Momentum Answer Key

1. Momentum (p) = Mass (m) \times Velocity (v)

2. Momentum = $2 \text{ kg} \times 5 \text{ m/s} = 10 \text{ kg} \cdot \text{m/s}$

3. The momentum doubles (directly proportional).

4. Kilogram-meter per second ($\text{kg} \cdot \text{m/s}$)

5. The force required to stop the object is equal to the change in momentum over time.

$$\Delta p = m \times \Delta v = 50 \text{ kg} \times (-10 \text{ m/s}) = -500 \text{ kg} \cdot \text{m/s}$$

$$\text{Force} = \Delta p / \Delta t = (-500 \text{ kg} \cdot \text{m/s}) / 5 \text{ s} = -100 \text{ N (opposite direction of motion)}$$

6. Impulse is equal to the change in momentum.

7. The net force is zero (according to Newton's first law).

8. Force of gravity = mass \times acceleration due to gravity = $75 \text{ kg} \times 9.8 \text{ m/s}^2 = 735 \text{ N}$

9. The force required to lift the object is equal to its weight. Force required = 200 N

10. Force is equal to mass multiplied by acceleration ($F = m \times a$).