

Name \_\_\_\_\_

Date: \_\_\_\_\_ Period: \_\_\_\_\_

## Forces, Momentum, and Impulse

**Useful Equations:**  $F=ma$        $p=mv$        $I=Ft$ 

**Read these directions carefully:** You should write the formula that you will use for each problem and show as much of your work as possible. All answers should be rounded to the correct number of significant figures. Circle or box all final answers.

1. What force will give a 25.6 kg box an acceleration of 0.93 m/s<sup>2</sup>?

$$F = ma = (25.6)(0.93) = 24 \text{ N}$$

2. What is the impulse provided by a 275 N force when it is applied for 2.4 seconds?

$$I = Ft = (275)(2.4) = 660 \text{ N}\cdot\text{s}$$

3. What is the momentum of a 720 kg car traveling at 18 m/s?

$$p = (720)(18) = 13000 \text{ kg}\cdot\text{m/s}$$

4. What is the acceleration of a 94 kg skateboarder when a 265 N force is applied to him?

$$\frac{265}{94} = 2.8 \text{ m/s}^2$$

5. What is the weight of a 73-kg man?

$$715.4 \text{ N} = 720 \text{ N}$$

6. What is the momentum of a 0.79 kg football that has a velocity of 23 m/s?

$$p = (0.79)(23) = 18.17 = 18 \text{ kgm/s}$$

7. What force would give an impulse of 480 kg\*m/s when it is applied for 0.35 seconds?

$$F = \frac{I}{t} = 1400 \text{ N}$$

8. What is the velocity of a 42 kg child who has a momentum of 400 kg\*m/s?

$$\frac{400}{42} = 9.5 \text{ m/s}$$

9. A 1.65 kg box that is initially at rest has a 48 N force applied to it for 0.94 seconds. What is the final velocity of the box?

$$a = \frac{48}{1.65} = 29.09 \text{ m/s}^2$$

$$a = \frac{v_f - v_i}{t}$$

$$at + v_i = v_f = (29.09 \times 0.94) + 0$$
$$= 27 \text{ m/s}$$