D 1. Momentum
B 2. kgm/sec
A 3. Law of Conservation of momentum
C 4. Weight
E 5. Inertia

A. Momentum does not change in a closed system OR $m_L v_L = m_R v_R$
B. Units for momentum
C. Measure of the product of an object's mass and velocity.
D. Changes when gravity changes.
E. Doesn't change with gravity.

Which of Newton's Three Laws Applies?

3 A rocket moves forward because gases are pushed out the back.

2 More force creates more acceleration.

1 A magician pulls out the tablecloth from under the plates on a table and the plates stay put.

1. Newton's First Law
2. Newton's Second Law
3. Newton's Third Law

3 For every action there is an equal an opposite reaction.

1 Objects at rest stay at rest and objects in motion stay at motion unless acted on by a net force.

2 Force equals mass times acceleration.

3 You pull back on the paddle and the canoe goes forward.

2 A larger car takes a bigger engine to move it.

1 Once the engines stop, a rocket coasts through space.

Find the momentum of a 25 kg object going 4 m/s.

$$P = m \times v$$

$$\boxed{100 \; \frac{kg \cdot m}{s}}$$

An object is going 22 m/s and is 3 kg. Find momentum.

$$\boxed{66 \frac{kg \cdot m}{s}}$$

A pingpong ball has 2 kgm/s of momentum when thrown 8 m/s. Find the mass of the ball.

$$P = m \times v$$

$$m = \frac{P}{v} = \frac{8}{2} = \boxed{4 \, kg}$$

A 25 kg cart has 125 kgm/s of momentum. How fast is the cart going?

$$P = m \times v$$

$$v = \frac{P}{m} = \frac{125}{25} = \boxed{5 \frac{m}{s}}$$

A 50 kg boy on ice skates throws a 5 kg ball to the left. If the ball ends up going 20 m/s. How fast is the boy going?
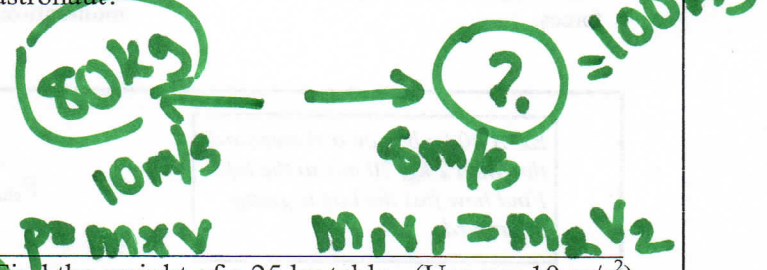
$$P = m \times v$$
$$v = \frac{P}{m}$$

$$\boxed{20 \, m/s}$$

Two astronauts push off of each other in space. The 80 kg astronaut ends up going 10 m/s. The other one ends up going 8 m/s. What is the mass of the other astronaut?

80kg → = 100 kg

10m/s   8m/s

$$P = m \times v \qquad m_1 v_1 = m_2 v_2$$

Find the weight of a 25 kg table. (Use g = 10 m/s²)

$$P = m \times v$$

$$\boxed{250 \frac{kg \cdot m}{s}}$$

A 20 N force pulls to the right and friction pulls 5 N. If the mass is 5 kg, find acceleration.

5N ← 5kg → 20 N

$$a = F/m$$
$$+15 N \quad \boxed{3 \frac{m}{s}}$$

$$F = m \times a$$