

Quiz 9

Name: _____ Group: _____

- Two vehicles collide head on. Initially the first vehicle is traveling at 10.0 m/s due North and the second vehicle, which is twice the mass of the first, is traveling due South at 20.0 m/s. After the collision, the bumpers are locked.
 - What is the final velocity of the two vehicles?
 - What is the impulse delivered to each vehicle?

- Explain why, using conservation of angular momentum, a skater spins faster when they bring their arms tighter into their body.

$$\vec{p} = m\vec{v}$$

$$\vec{F} \Delta t = \Delta \vec{p}$$

$$\vec{p}_i = \vec{p}_f$$

$$\Sigma \vec{F} = m\vec{a}$$

$$g = 9.8 \text{ m/s}^2$$

$$m_1 v_{1i} + m_2 v_{2i} = m_1 v_{1f} + m_2 v_{2f}$$

$$\Delta m_1 v_1 = - \Delta m_2 v_2$$

$$v_x = \frac{\Delta x}{\Delta t} = \frac{x_f - x_i}{\Delta t}$$

$$a_x = \frac{\Delta v_x}{\Delta t} = \frac{v_{xf} - v_{xi}}{\Delta t}$$

$$x_f = x_i + v_{xi} \Delta t + \frac{1}{2} a_x (\Delta t)^2$$

$$v_{xf} = v_{xi} + a_x \Delta t$$

$$v_{xf}^2 = v_{xi}^2 + 2a_x (\Delta x)$$

$$\sin \theta = \text{opp/hyp}$$

$$\cos \theta = \text{adj/hyp}$$

$$\tan \theta = \text{opp/adj}$$

$$a^2 + b^2 = c^2$$