

Impulse

Quick review

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

Momentum is a vector
measured in $\frac{\text{kgm}}{\text{s}}$

Impulse momentum
theorem

$$\Delta p = F \Delta t$$

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

$$\text{impulse} = F \Delta t$$

ex) A 1400 kg car moving west with a velocity of $15 \frac{\text{m}}{\text{s}}$ collides with a utility pole & is brought to rest in 0.30 sec. Find the force exerted on the car during the collision.

$$\Delta p = F \Delta t \quad F = \frac{\Delta p}{\Delta t}$$

$$p_f = 0 \quad p_o = mv_o = (1400 \text{ kg})(15 \frac{\text{m}}{\text{s}})$$

$$p_o = 21,000 \frac{\text{kgm}}{\text{s}}$$

$$F = \frac{-21,000}{0.30 \text{ sec}}$$

$$F = -70,000 \text{ N}$$

$$F = 70,000 \text{ N east}$$