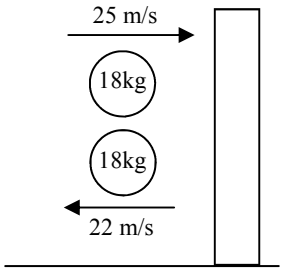
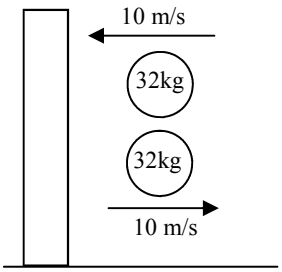
PreAP Momentum 8

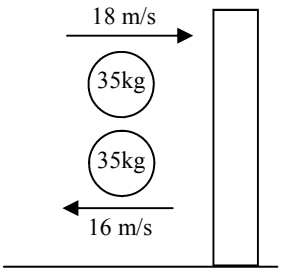
1. For each of the masses below decide if the Δp is + or − and calculate Δp.



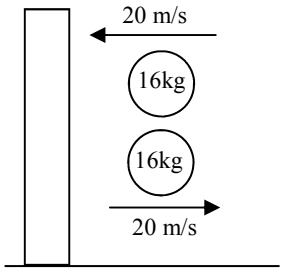
A. Δp: + or −?
*Δp = _____



B. Δp: + or −?
* Δp = _____

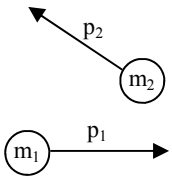


C. Δp: + or −?
Δp = _____



D. Δp: + or −?
Δp = _____

Remember when drawing vectors, longer arrows = greater magnitude.

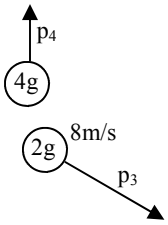


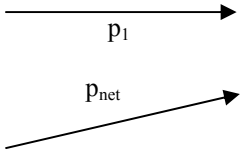
2. A. If $p_1 = p_2$ and m_2 is moving faster, which is more massive: m_1 or m_2?

B. * Draw the p_{net} of the system.

3. A. If $p_3 = 2p_4$, what is the velocity of the 4g mass?

B. Draw p_{net}.



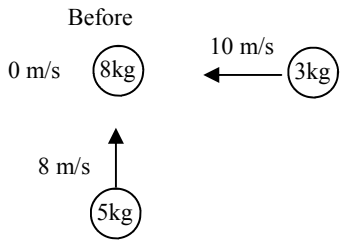


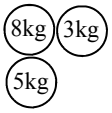
4. The momentum of m_1 and p_{net} are given.
A. *Draw the momentum of m_2.

B. If $m_1 = m_2$, which mass is moving faster?

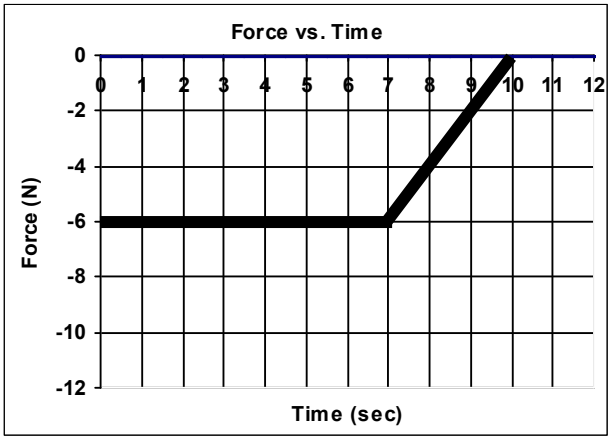
5. Three hockey pucks are on frictionless ice. Two hockey pucks slam into and attach to the third puck.
A. Since they stick together, m_{final} =
B. * Calculate the initial net momentum.

C. What must be the final net momentum?
D. Calculate the final velocity of the combined object.
(*Velocity is a vector, so magnitude and direction.)*





6. A 12 kg object is moving 20 m/s in the positive direction when it encounters the forces shown on the graph below.



A. When is the object feeling a positive acceleration?

B. When is the object feeling no acceleration?

C. When is the object experiencing a negative acceleration?

D. * Calculate the impulse on the object.

E. Calculate the change of momentum of the object.

F. Calculate its final momentum.

G. Calculate the object's final velocity.

7. Match the situations below with the concept you would use to solve at the right. You will use them more than once.

A. _____* An object is dropped. Find its velocity part-way down.

B. _____* A moving object stops. You are given time.

C. _____* An astronaut throws a tool and ends up going backwards.

D. _____An object at rest is pushed and accelerates. You are given the distance it is pushed.

E. _____An object is compressed against a spring. How fast is it moving when the spring is released?

F. _____Two cars collide at an intersection. (*Everyone was fine.)*

G. _____* A moving object slows down due to friction.

I. $E_B + W = E_A$ (Energy-Work)

II. $\Sigma E_B = \Sigma E_A$ (Conservation of Energy)

III. $p_B + J = p_A$ (Momentum-Impulse)

IV. $\Sigma p_B = \Sigma p_A$ (Conservation of Momentum)

Q1A: change is negative, since it started + and ended −. $\Delta p = -846$ kgm/s Q1B: + change; $\Delta p = 640$ kgm/s
Q2B: Crazy and Lazy, where p1 and p2 are crazy.
Q4A: p_{net} is Lazy. You have one of crazy's paths. Find the other one that makes Lazy's path.
Q5A: Find p1 and p2, then do pyth and inverse tan to find p_{net}. Be sure to do a quadrant check for the angle.
Q6D: Find the area of the graph.
7A: II 7B: III (since Ft = Impulse) 7C: IV (2 objects push off each other)
7G: I or III [depends on whether you are given distance (I) or time (III).]