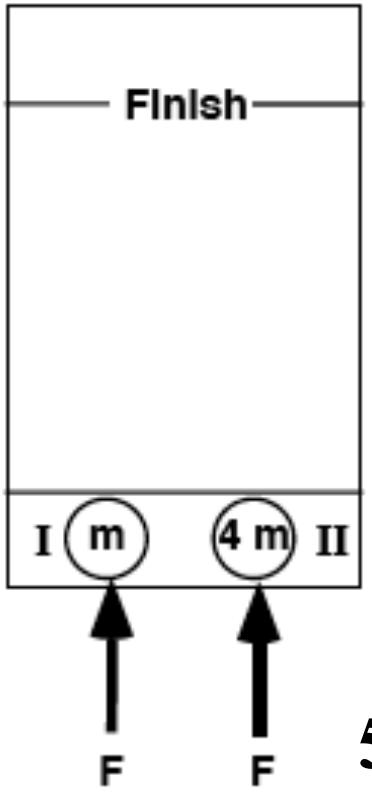
The diagram depicts two pucks on a frictionless table. Puck II is four times as massive as puck I. Starting from rest, the pucks are pushed across the table by two equal forces.

Which puck will have the greater momentum when it reaches the finish line?

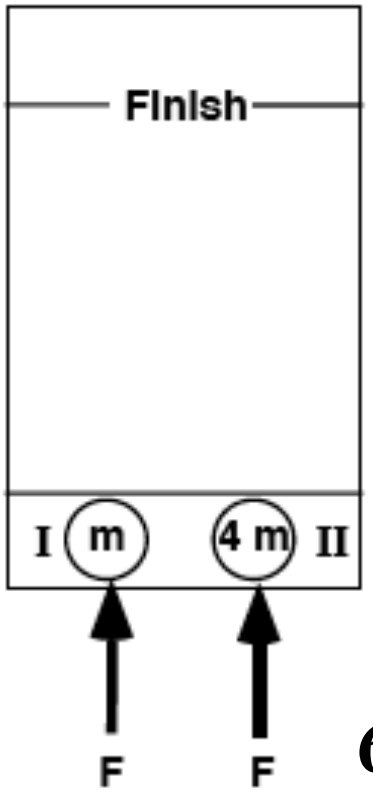
A. Puck I
B. Puck II
C. Both will have the same.
D. There is not enough information to decide.



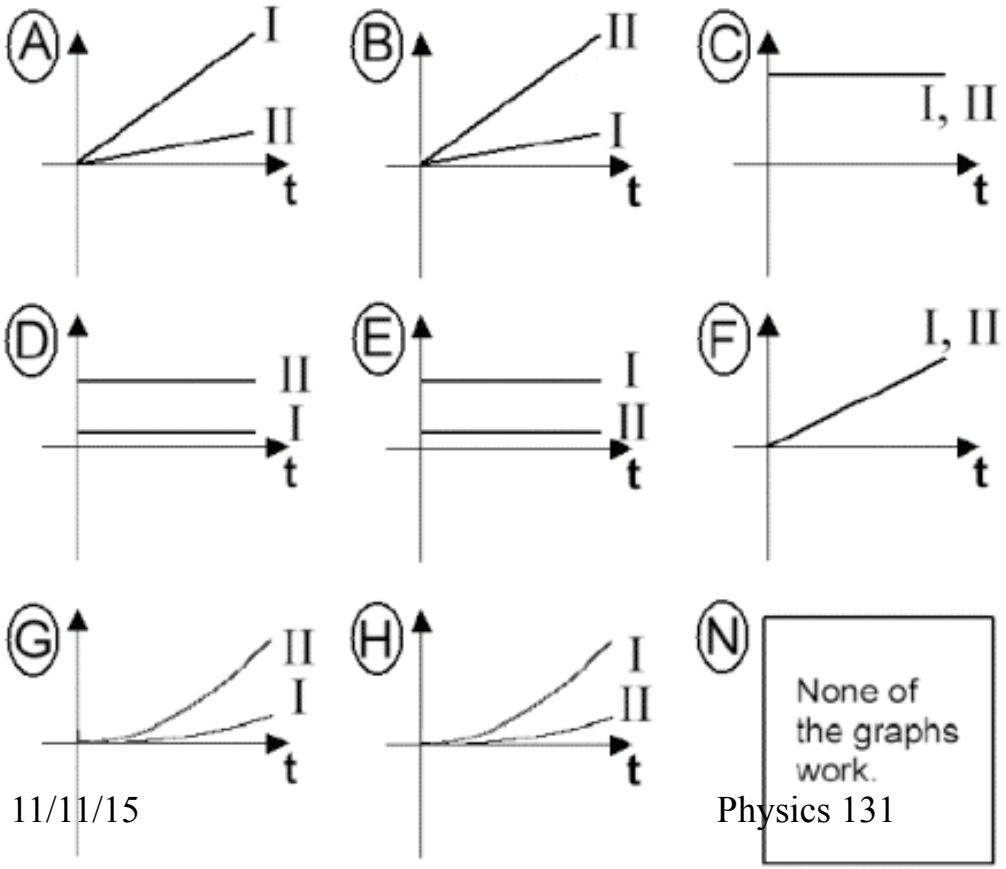
The diagram depicts two pucks on a frictionless table. Puck II is four times as massive as puck I. Starting from rest, the pucks are pushed across the table by two equal forces.

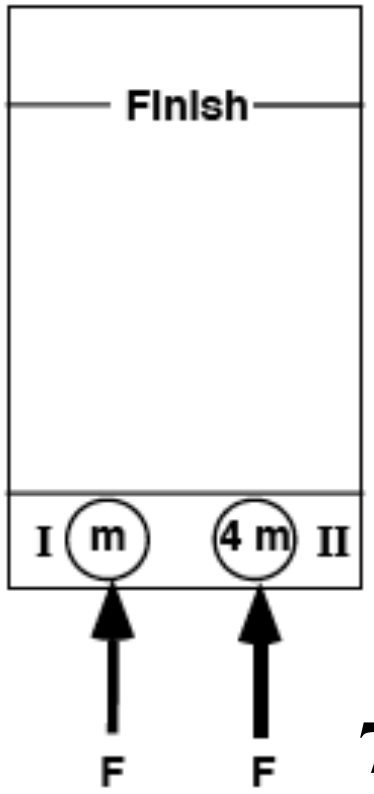
Which puck will have the greater KE upon reaching the finish line?

A. Puck I
B. Puck II
C. Both will have the same.
D. There is not enough information to decide.

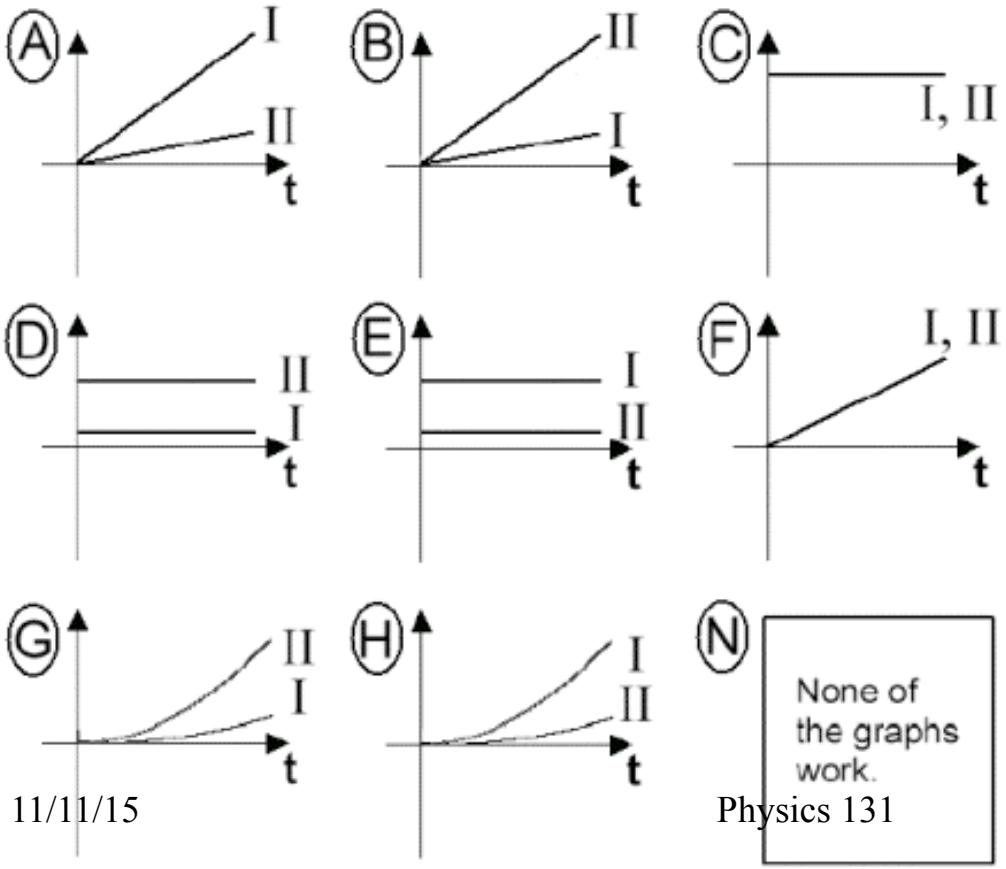


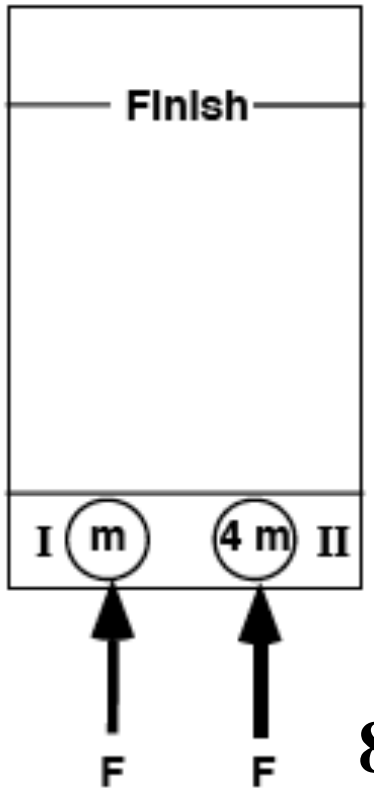
The diagram depicts two pucks on a frictionless table. Puck II is four times as massive as puck I. Starting from rest, the pucks are pushed across the table by two equal forces. Which graph might show the **speed** of the two pucks.



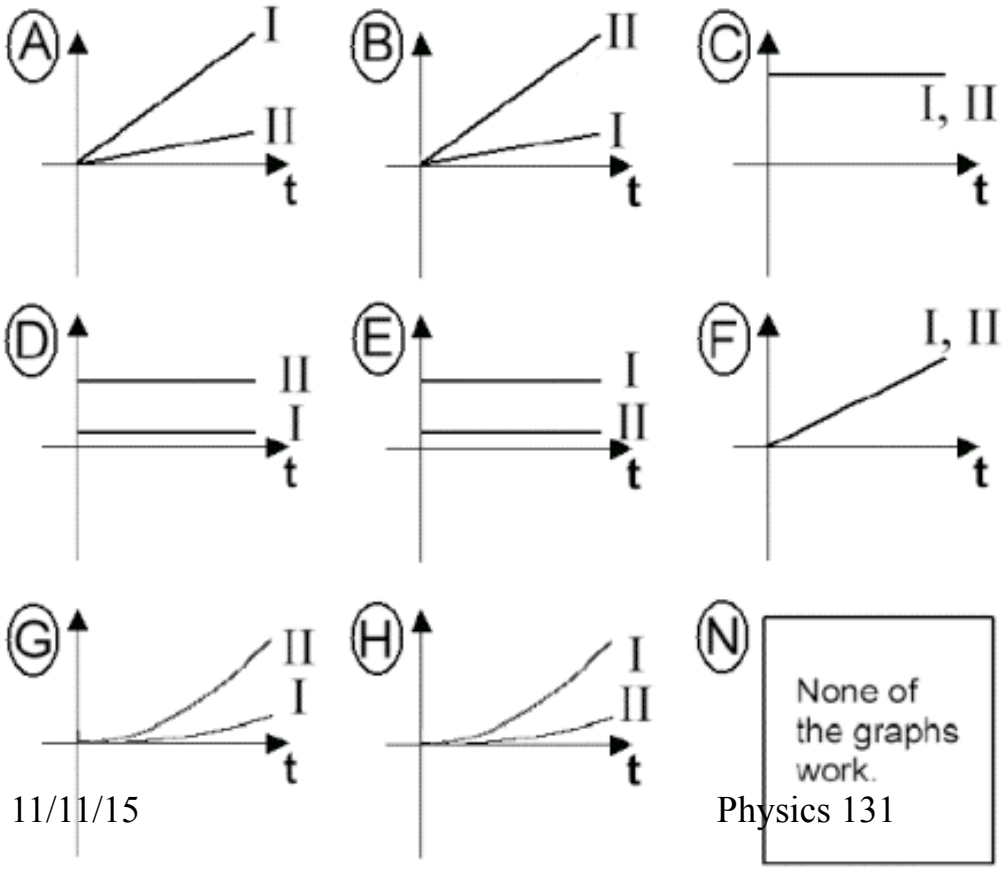


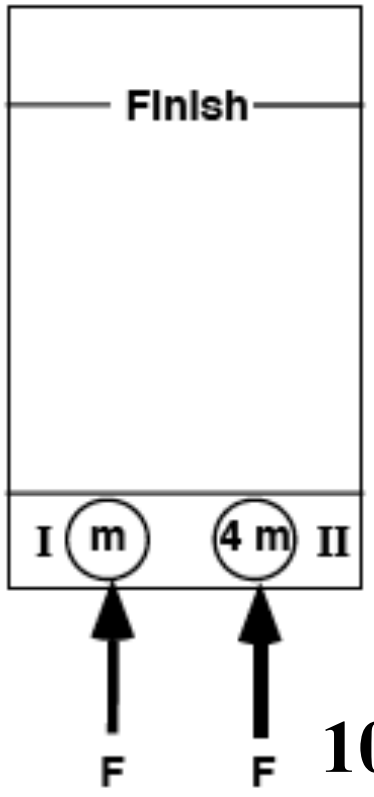
The diagram depicts two pucks on a frictionless table. Puck II is four times as massive as puck I. Starting from rest, the pucks are pushed across the table by two equal forces. Which graph might show the **momentum** of the two pucks.





The diagram depicts two pucks on a frictionless table. Puck II is four times as massive as puck I. Starting from rest, the pucks are pushed across the table by two equal forces. Which graph might show the **kinetic energy** of the two pucks.





Momentum vs. energy

- If we change the motion of two interacting objects so the momentum of each changes in the same way, it might be useful to look at the KE in terms of that momentum.
- Suppose each starts with $p = 0$ and they only move as a result of each other's forces.

$$\vec{p}_A = \Delta\vec{p}_A = -\Delta\vec{p}_B = -\vec{p}_B$$

$$KE_A = \tfrac{1}{2} m_A v_A^2 = \tfrac{1}{2}\frac{\left(m_A^2 v_A^2\right)}{m_A} = \frac{p_A^2}{2m_A}$$

$$KE_B = \tfrac{1}{2} m_B v_B^2 = \tfrac{1}{2}\frac{\left(m_B^2 v_B^2\right)}{m_B} = \frac{p_B^2}{2m_B}$$

If each object gets the same momentum, which has bigger KE?

1. The object with the bigger mass.
2. The object with the smaller mass.
3. They will have the same KE.