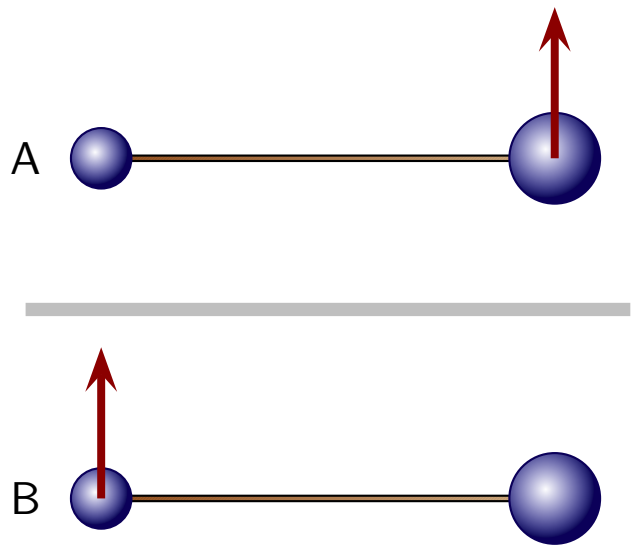
Warm Up Question 1

A wooden circular disk has the same thickness and density everywhere; this implies that the center of mass is at the center of the disk. A metal rim with uniform thickness is fixed to the edge of the disk. Does this change the center of mass of the disk? If so how? Explain your answer.

1. No. Mass is still uniformly distributed.
2. Yes. Toward the rim.
3. Yes. To the junction between the rim and disk.

Question 1

Two identical barbells have anti-symmetrical arrangements of masses (the connecting rod is negligible). In each case the mass of the barbell on the left is smaller than that on the right. Identical forces are applied as illustrated.

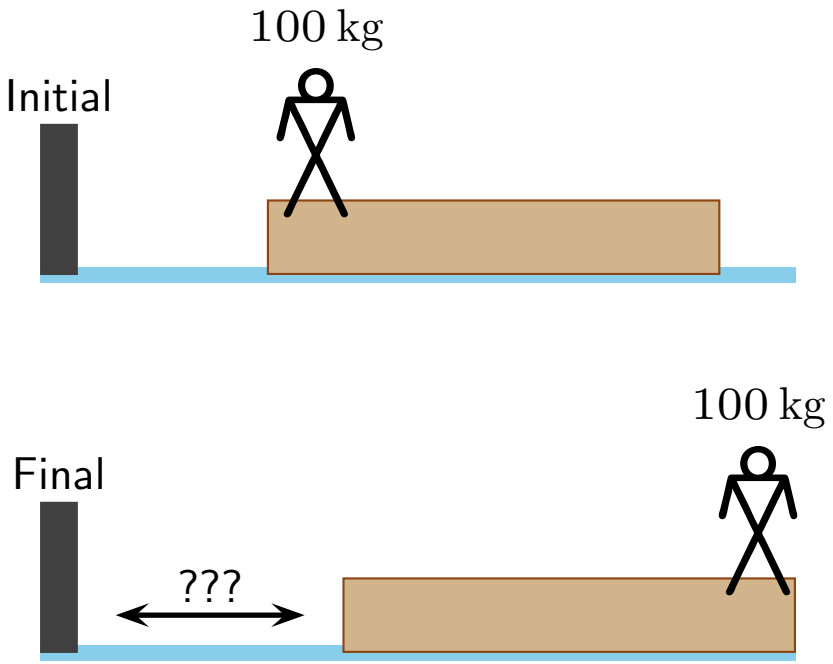


How do the accelerations of the centers of mass compare?

1. Same for both.
2. Same magnitude for both but different directions.
3. Larger for A.
4. Larger for B.

Question 2

A $100\,\mathrm{kg}$ person stands at the left end of a $6.0\,\mathrm{m}$ long raft on a still lake. The person and raft are initially at rest. The person then walks to the right end of the raft. Air resistance and friction are negligible and the shore is indicated on the left.



Which of the following is true once the person reaches the right end?

1. The raft has shifted away from the shore.
2. The raft has shifted toward the shore.
3. The raft has not shifted.

Warm Up Question 2

Assume that Earth rotates at a constant rate. Consider any two locations on Earth. Are the angular velocities at these locations the same or different? Are the magnitudes of the linear velocities the same or different? Explain your answers.

1. Angular velocity same. Linear velocity magnitudes different.
2. Angular velocities different. Linear velocity magnitudes different.
3. Angular velocities different. Linear velocity magnitudes same.