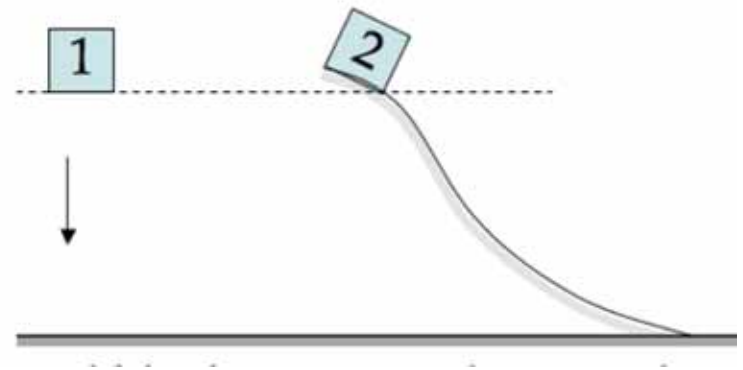




Two identical blocks are simultaneously released from the same height above a level floor. Block 1 reaches the floor by dropping straight down. Block 2 reaches the floor by sliding down a frictionless ramp. Which of the following correctly compares the two motions?

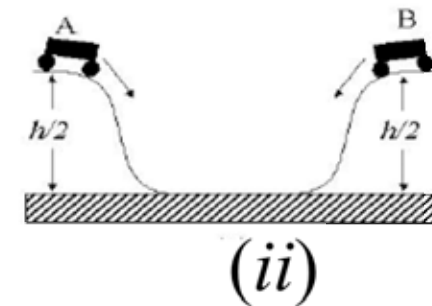
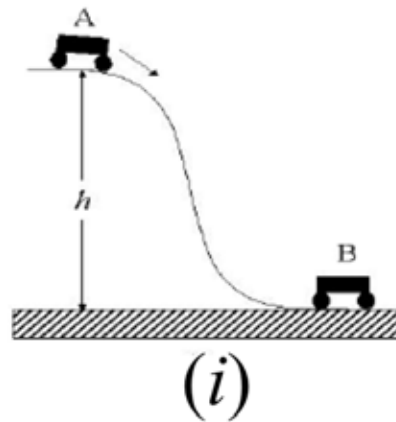
1. Both reach the ground at the same time with the same speed.
2. 2 reaches later but with the same speed.
3. 2 reaches later and with less speed.
4. 2 reaches at the same time and with less speed
5. Something else.



# Example 1



- Two identical carts roll down hills and stick together in two different situations.



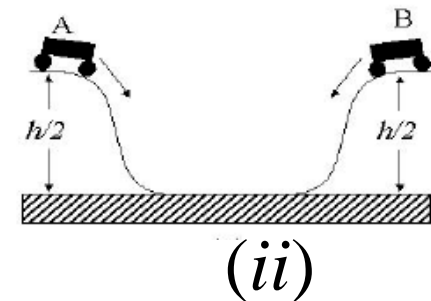
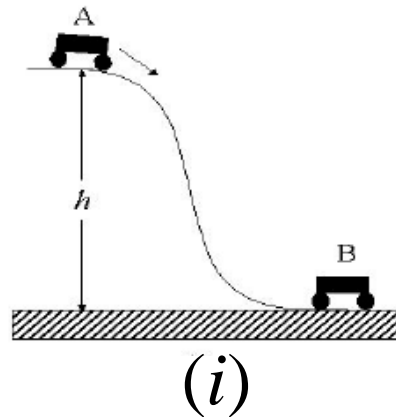
Which one of the following statements is true **just before** the carts collide in the two cases?

- (1) the kinetic energy of the system is zero in case (ii).
- (2) the kinetic energy of the system is greater in case (i) than in case (ii).
- (3) the kinetic energy of the system is the same in both cases.
- (4) the momentum of the system is greater in case (ii) than in case (i).
- (5) the momentum of the system is the same in both cases.
- (6) more than one of these statements

# Example 2



- Two identical carts roll down hills and stick together in two different situations.



Which one of the following statements is true

**just after** the carts collide in the two cases?

- (1) the kinetic energy of the system is greater in case (ii) than in case (i).
- (2) the kinetic energy of the system is the same in both cases.
- (3) the momentum of the system is greater in case (ii) than in case (i).
- (4) the momentum of the system is non-zero in case (i) while it is zero in case (ii).
- (5) the momentum of the system is the same in both cases.
- (6) more than one of these statements.