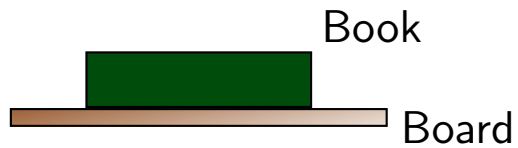


# Question 1

A book, with mass  $m$ , sits on the surface of a horizontal board. The board is raised with decreasing speed. The book remains in contact with the board during this process.

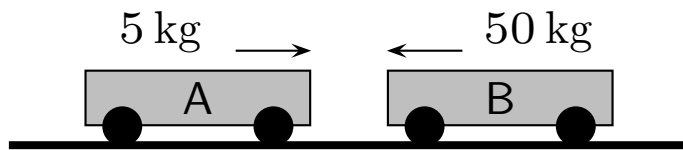


Which of the following is true regarding the magnitude of the normal force exerted by the board on the book?

1.  $n = g$
2.  $n = mg$
3.  $n < mg$
4.  $n > mg$

## Question 2

Two carts approach each other on a track. Let  $\vec{F}_{A \text{ on } B}$  be the force that A exerts on B and  $\vec{F}_{B \text{ on } A}$  be the force that B exerts on A while they are in contact.

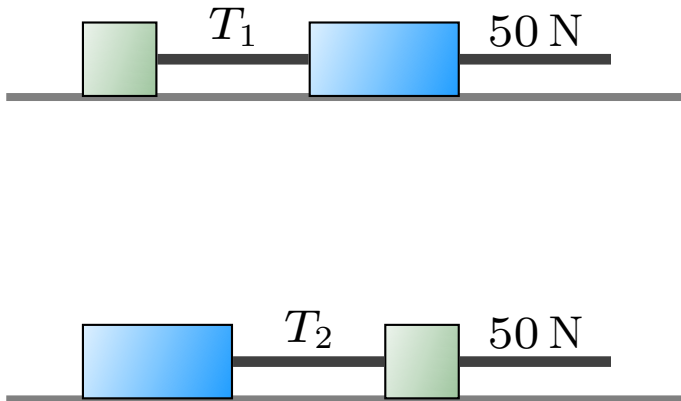


Which of the following is true?

1.  $F_{A \text{ on } B} = F_{B \text{ on } A}$  regardless the carts' motion.
2.  $F_{A \text{ on } B} > F_{B \text{ on } A}$  whenever A approaches faster than B.
3.  $F_{A \text{ on } B} < F_{B \text{ on } A}$  whenever A approaches slower than B.
4.  $F_{A \text{ on } B} > F_{B \text{ on } A}$  whenever A approaches with speed at least 10 times that of B; otherwise  $F_{A \text{ on } B} < F_{B \text{ on } A}$ .

## Question 3

Two blocks are on a frictionless horizontal surface. The larger block has a larger mass than the smaller block. These are connected by a massless rope. The rightmost block is pulled by another massless rope. In both configurations this exerts the same force.

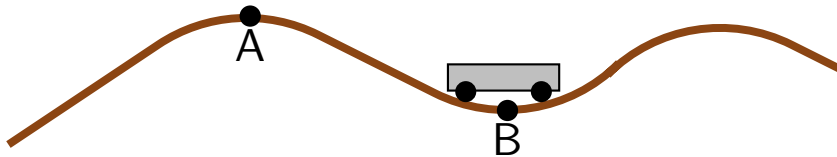


Which of the following is true?

1.  $T_1 = T_2$
2.  $T_1 > T_2$
3.  $T_1 < T_2$

## Question 4

A cart carrying a passenger moves along the road whose profile is as illustrated. The passenger stands on a scale, which measures the normal force exerted on the passenger.

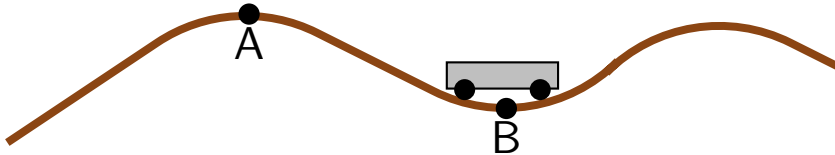


Suppose that the cart is at rest at location B. How does the scale reading compare to the gravitational force on the person?

1. Same.
2. Larger.
3. Smaller.

## Question 5

A cart carrying a passenger moves along the road whose profile is as illustrated. The passenger stands on a scale, which measures the normal force exerted on the passenger.



Suppose that the cart is moving at location B. How does the scale reading compare to the gravitational force on the person?

1. Same.
2. Larger.
3. Smaller.