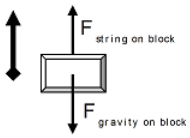
I-70

A block hangs from the ceiling of an elevator by a string. For each of the following situations, circle the correct relationship symbol between the force of the string on the block and the force of gravity on the block and explain your reasoning.

a. The elevator is at rest.

$F_{string\ on\ block}$ > =◯ < ? $F_{gravity\ on\ block}$

Explanation:



Since the block is not accelerating, the two forces acting on it must be equal in magnitude.

b. The elevator is moving upward at an constant speed.

$F_{string\ on\ block}$ > =◯ < ? $F_{gravity\ on\ block}$

Explanation:

Since the block is still not accelerating, the two forces acting on it must be equal in magnitude.

c. The elevator is moving downward at a decreasing speed.

$F_{string\ on\ block}$ > ◯= < ? $F_{gravity\ on\ block}$

Explanation:

Since the block is accelerating upward, the force directed upward (the force of the string) must be larger than the force directed downward (the force of gravity).

d. The elevator is moving upward at an increasing speed.

$F_{string\ on\ block}$ > ◯= < ? $F_{gravity\ on\ block}$

Explanation:

The block is accelerating upward, so the force directed upward must be larger than the force directed downward.