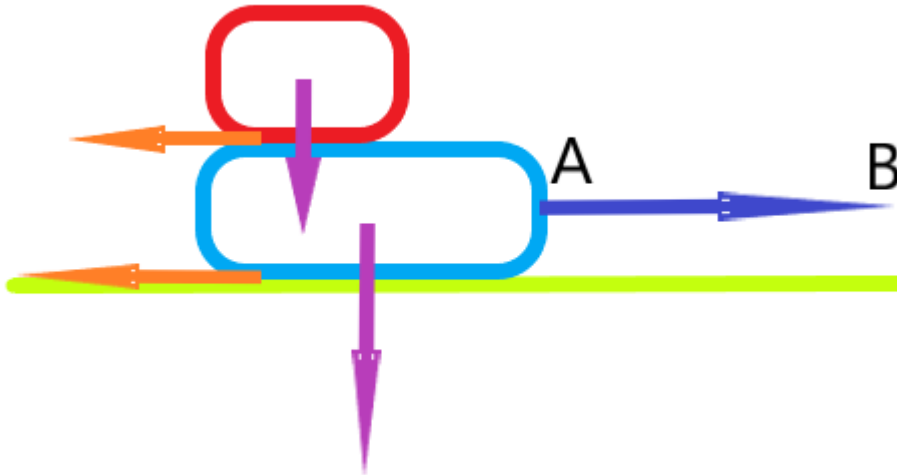


Answer on Question #81806 - Physics - Mechanics – Relativity

Calculate the force F required to cause the block of weight $W_1=200$ N just to slide under the block of weight $W_2=100$ N. What is the tension in the string AB (coefficient of friction is 0.25)?

Solution



We see that to pull the light-blue block from under the red block, we must apply the blue force, which must be greater than the sum of orange forces of friction:

$$F > F_1 + F_2$$

Find the forces of friction. It is defined as:

$$F_f = \mu N,$$

where N – normal force. In our situation the normal forces are equal to the weights:

$$N_1 = W_1, \quad N_2 = W_2.$$

The lower force of friction depends on weights of both blocks since the lower side of the bigger block is under pressure of both blocks:

$$F_1 = \mu(W_1 + W_2).$$

The upper force of friction:

$$F_2 = \mu W_2.$$

Finally,

$$F > \mu(W_1 + W_2) + \mu W_2 = \mu(W_1 + 2W_2) = 0.25(200 + 2 \cdot 100) = 100 \text{ N}.$$

According to Newton's third law, the tension will be

$$T = -F = -100 \text{ N}.$$

Answer

More than 100 N, less than -100 N.

Answer provided by <https://www.AssignmentExpert.com>

