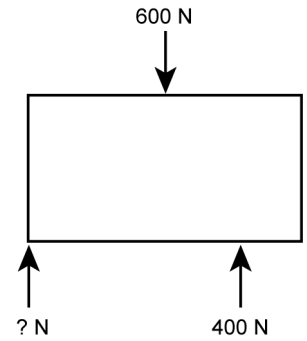


Equilibrium

When all forces acting on a body are balanced, the forces are in equilibrium. Here are free-body diagrams for you to use for practice working with equilibrium.

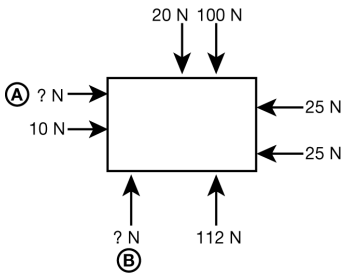
Remember that an unbalanced force results in acceleration. Therefore, the forces acting on an object that is not accelerating must be at balanced. These objects may be at rest, or they could be moving at a constant velocity. Either way, we say that the forces acting on these objects are in equilibrium.

What force is necessary in the free-body diagram at right to achieve equilibrium?

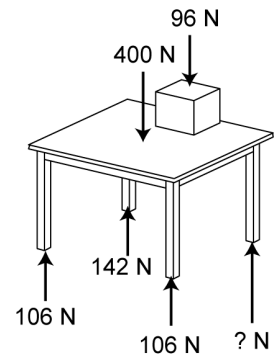


Looking for The unknown force: ? N	Solution: $600\text{ N} = 400\text{ N} + ?\text{ N}$ $600\text{ N} - 400\text{ N} = 400\text{ N} - 400\text{ N} + ?\text{ N}$ $200\text{ N} = ?\text{ N}$
Given 600 N is pressing down on the box. 400 N is pressing up on the box.	
Relationship: You can solve equilibrium problems using simple equations: $600\text{ N} = 400\text{ N} + ?\text{ N}$	

1. Supply the missing force necessary to achieve equilibrium. Draw a free body diagram of the forces in the space below.

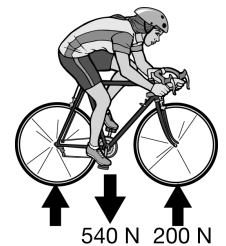


2. Supply the missing forces necessary to achieve equilibrium. Draw a free body diagram in the space at the right of the diagram.



3. In the picture, a girl with a weight of 540 N is riding her bike at a constant speed.

a. If the force exerted by the ground on her front wheel is 200 N, how much force is exerted by the ground on her back wheel?



b. If the back tire is pushing the ground west with 75 N of frictional force, what is the amount, direction and types of frictional forces?

c. Make a free body diagram of all of the forces involved in this diagram.