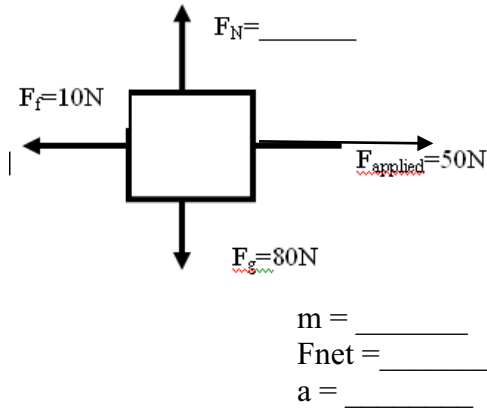


# Free Body Diagrams

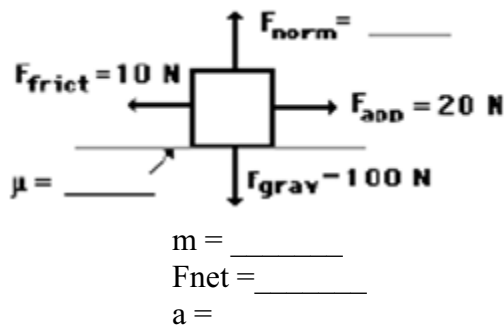
Answer the balanced/unbalanced questions on the right for each problem first.  
In all problems, the box is resting on a surface.

An applied force of 50N is used to accelerate an object to the right across a frictional surface. The object encounters 10N of friction. Use the diagram to determine the normal force, the net force, the mass, and the acceleration of the object. (Neglect air resistance)



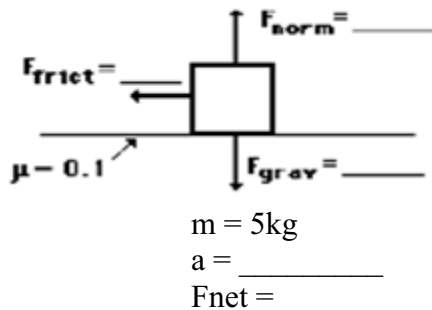
In the horizontal direction the forces [balanced / unbalanced]  
So in the horizontal direction the object [will / will not] accelerate.  
In the vertical direction the forces [balanced / unbalanced]  
So in the vertical direction the object [will / will not] accelerate.

An applied force of 20N is used to accelerate an object to the right across a frictional surface. The object encounters 10N of friction. Use the diagram to determine the normal force, the net force, the coefficient of friction, the mass, and the acceleration of the object. (Neglect air resistance)



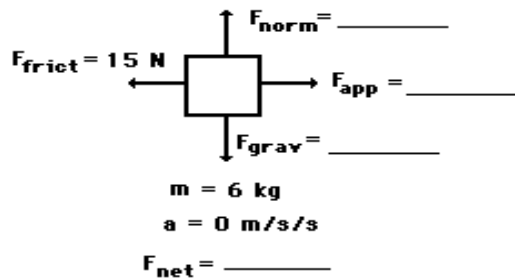
In the horizontal direction the forces [balanced / unbalanced]  
So in the horizontal direction the object [will / will not] accelerate.  
In the vertical direction the forces [balanced / unbalanced]  
So in the vertical direction the object [will / will not] accelerate.

A 5 kg object is sliding to the right and encountering a friction force which slows it down. The coefficient of friction between the object and the surface is 0.1. Determine the force of gravity, the normal, the force of friction, the net force, and the acceleration.



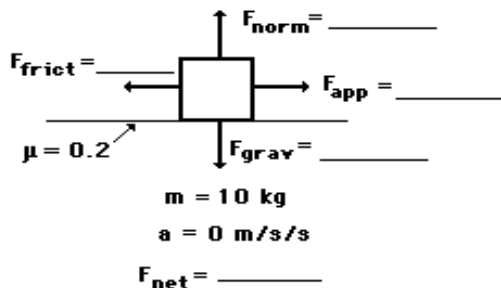
In the horizontal direction the forces [balanced / unbalanced]  
So in the horizontal direction the object [will / will not] accelerate.  
In the vertical direction the forces [balanced / unbalanced]  
So in the vertical direction the object [will / will not] accelerate.

A rightward force is applied to a 6-kg object to move it across a rough surface at constant velocity. The object encounters 15 N of frictional force. Use the diagram to determine the gravitational force, normal force, net force, and applied force. (Neglect air resistance.)



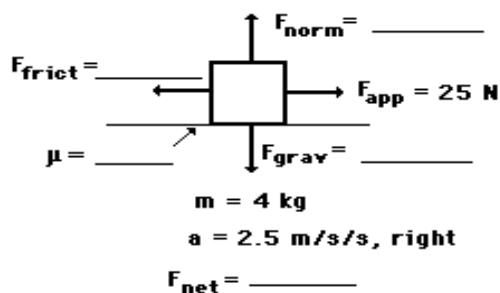
In the horizontal direction the forces [balanced / unbalanced]  
 So in the horizontal direction the object [will / will not] accelerate.  
 In the vertical direction the forces [balanced / unbalanced]  
 So in the vertical direction the object [will / will not] accelerate.

A rightward force is applied to a 10-kg object to move it across a rough surface at constant velocity. The coefficient of friction,  $\mu$ , between the object and the surface is 0.2. Use the diagram to determine the gravitational force, normal force, applied force, frictional force, and net force. (Neglect air resistance.)



In the horizontal direction the forces [balanced / unbalanced]  
 So in the horizontal direction the object [will / will not] accelerate.  
 In the vertical direction the forces [balanced / unbalanced]  
 So in the vertical direction the object [will / will not] accelerate.

A rightward force of 25 N is applied to a 4-kg object to move it across a rough surface with a rightward acceleration of  $2.5 \text{ m/s}^2$ . Use the diagram to determine the gravitational force, normal force, frictional force, net force, and the coefficient of friction between the object and the surface. (Neglect air resistance.)



In the horizontal direction the forces [balanced / unbalanced]  
 So in the horizontal direction the object [will / will not] accelerate.  
 In the vertical direction the forces [balanced / unbalanced]  
 So in the vertical direction the object [will / will not] accelerate.