

## NEWTON'S FIRST AND SECOND LAW

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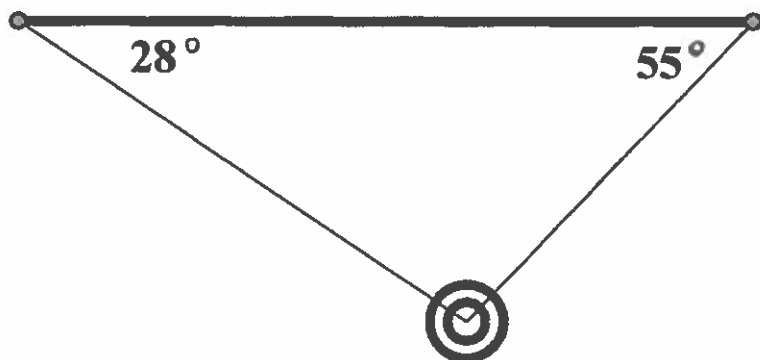
1. Consider a 15.0-kg object that moves at constant velocity along a horizontal surface. The object is pulled with two forces:  $F_1 = 15\text{N}$  [right  $14^\circ$  up] and  $F_2 = 25\text{N}$  [right  $25^\circ$  up]. Include a free-body diagram.

a) Find the magnitude and direction of the normal force.

b) Find the magnitude and direction of the force of friction.

c) Determine the coefficient of kinetic friction?

2. Find the magnitude of the force of tension in both ropes that are tied to a 50.0-kg object that is at rest.



3. Determine the force that needs to be applied in order to ensure a constant velocity of a 120.0-kg crate that is moving along a horizontal surface. The coefficient of kinetic friction is 0.15.

4. How much net force is required to have a 15.0-kg object move at constant velocity along a horizontal surface if the coefficient of static friction is 0.18 and the coefficient of kinetic friction is 0.11?

5. How much and at what direction will the objects accelerate?

