Now that you’ve practiced equilibrium and non-equilibrium situations with angled forces, you can demonstrate your knowledge by completing the following application questions. Make sure to completely answer each question and to show all of your work.

1. A man pulls a 75 kg box at a *constant speed* across the floor. He applies a 200 N force at an angle of 30˚.
   1. Determine the magnitudes and directions of the horizontal and vertical components of the pull force.
   2. Determine the magnitude and direction of the frictional force opposing the motion.
   3. What is the magnitude of the normal force?
2. A person pushes on a 50 kg desk with a 200 N force acting at a 40˚ angle below the horizontal. The desk does not budge.
   1. Draw a free body diagram of the desk.
   2. Determine the magnitudes and directions of the horizontal and vertical components of the push force
   3. Determine the magnitude of the frictional force
   4. Determine the magnitude of the normal force
3. A girl pushes an 8 kg sled with a force of 65 Newtons downward at an angle of 35 degrees below the horizontal on a frictionless surface.
   1. Determine the vertical and horizontal components of the push force.
   2. Calculate the acceleration of the sled.
   3. What is the speed of the sled after it has moved 15 meters from rest?