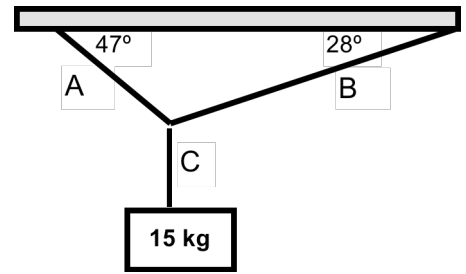
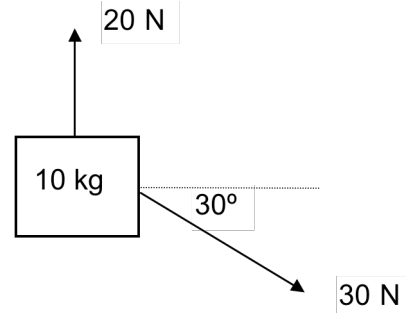


Problem Set 4

1. A block of mass 15 kg is hanging from three cords (A, B, C). What are the tensions in each of the cords?



2. A 10 kg object is subjected to two forces F_1 and F_2 , as shown in the diagram to the right. A third force F_3 is applied so that the object is in static equilibrium. Find F_3 . (Note: This is an overhead view – like the Force Table Lab.)



3. A 2 kg mass is connected by a cord to the ceiling of an elevator that accelerates up at 3 m/s^2 . Determine the tension in the cord of the elevator.

4. A skydiver weighing 588 N reaches a velocity of 45 m/s before opening her parachute. After falling an additional 30 m, her velocity has decreased to 25 m/s.
- Draw a FBD of the forces acting on the woman after her parachute has opened.
 - What was the upward force exerted on the parachute during that time?



5. The speed of a projectile ($m = 100 \text{ kg}$) traveling horizontally and slowing down under the influence of air friction can be approximately represented by

$$v = 2150 - 206 t + 11 t^2$$

where v is measured in m/s and t in s. Find a formula for the force of air as a function of time.

6. A 40 kg girl and an 8.4 kg sled are on the surface of a frozen lake, 15 m apart. By means of a rope, the girl exerts a 5.2 N force on the sled, pulling it toward her. (Assume lake is frictionless.)
- What is the acceleration of the sled?
 - What is the acceleration of the girl?
 - How far from the girl's initial position do they meet, assuming the force remains constant?