

Solving Force Problems

2/19/14

1. Givens
2. Draw situation – identify object and forces on it
3. Free Body diagram (FBD) w/ appropriate coordinate system
4. Identify if equilibrium $a = 0$ or dynamic $a \neq 0$
5. Read FBD to apply Newton's 2nd law

$$\Sigma F_x = m\vec{a}_x \quad \text{and} \quad \Sigma F_y = m\vec{a}_y$$
6. Solve equations for the unknowns
7. Assess your answer!

A 10.2 kg sign hangs by a cable. Find the tension in the cable.

A 10.2 kg sign is suspended by two strings with different lengths. One makes an angle of 40° and the other 50° with the ceiling. Find the tension in each string.

Connected Objects

A 3,000 kg truck is used to tow a 1500kg car. A chain is used to attach the two vehicles. Neglect air resistance.

- a) If the truck accelerates at a constant rate from rest to 20 m/s in 10.0 s, what is the tension on the chain?
- b) If the chain can withstand 6,000 N before breaking, at what rate can the truck safely accelerate?

Worksheet

Complete the worksheet for Wednesday.

Friction is proportional to the normal force.

$$f = \mu n$$