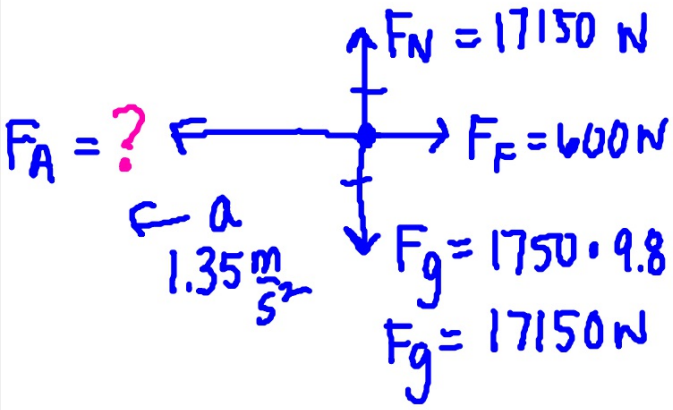
NEWTON'S 2nd – SOLVING FOR INDIVIDUAL FORCES

A tow rope is used to pull a 1750-kg car, giving it an acceleration of 1.35 m/s^2. If the frictional force is 600 N, what force does the rope exert?



net $F_y = 0$

net $F_x = ma$

$F_A - F_F = ma$

$F_A - 600 = 1750 \cdot 1.35$

$F_A - 600 = 2362.5$

$F_A = 2962.5$ N

A 50-kg bucket is being lifted by a rope. The rope is guaranteed not to break if the tension is 500 N or less. The bucket started at rest, and after being lifted +3.0 m, it is moving at 3.0 m/s. Assume the acceleration is constant.

a) What is the tension (F_A) in the rope?

b) Is the rope in danger of breaking?

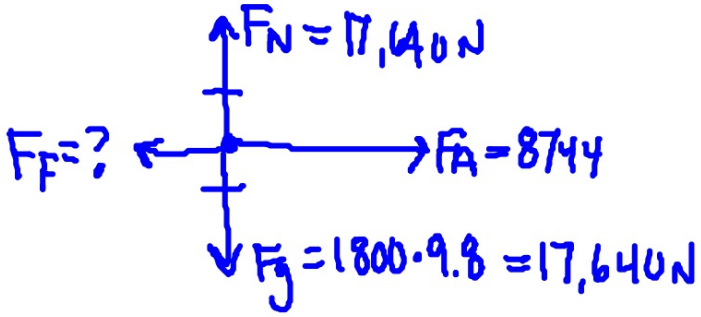
The Rock 'n Roller Coaster at Disney's Hollywood Studios has a mass of 1800 kg. It starts from rest and travels 110.0 m in 7.0 s. If an applied force of 8744 N is required to accelerate the coaster during this time, what is the force of friction the car experiences from the track?

m $v_i = 0$ Δx F_A t $F_F = ?$

Solve for a:

$$\Delta x = v_i t + \frac{1}{2} a t^2$$

$$a = 4.49 \frac{m}{s^2}$$



$$\text{net } F_y = 0$$

$$\text{net } F_x = ma$$

$$F_A - F_F = ma$$

$$8744 - F_F = 1800 \cdot 4.49$$

$$F_F = 662\ N$$

In bench pressing 100 kg, a weight lifter applies a force of 1040 N. How large is the upward acceleration of the weights during the lift?

A 60 kg bucket is being lifted by a rope. The rope is guaranteed not to break if the tension is 670 N or less. The bucket started at rest, and after being lifted 3.5 m, it is moving at 2.75 m/s. Assuming that the acceleration is constant, is the rope in danger of breaking?

The instant a skydiver pulls his parachute he accelerates up at 3.0 m/s^2 for 3 s. If this diver has a mass of 75 kg, what is the frictional force (force due to air resistance) exerted on the diver?