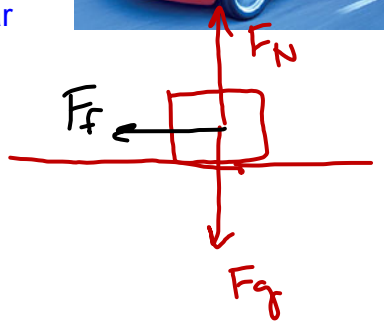
The coefficient of static friction between the tires of a car and a horizontal road is $\mu_s = 0.6$.
(a) What is the maximum acceleration of the car when is braked?
(b) What is the least distance in which the car can stop if it is initially traveling at 30 m/s?



$$F_f = \mu_s F_N$$

$$F_f = .6\, F_g$$

$$F_{net} = F_f$$

$$ma = .6(mg)$$

$$a = .6g$$

$$a = 5.9\ m/s^2$$

$v_i = 30\ m/s$

$v_f = 0\ m/s$

$a = -5.9\ m/s^2$

$d = ?$

$$v_f^2 = v_i^2 + 2ad$$

$$0 = (30)^2 + (2)(-5.9)d$$

$$0 = \left(30\ \tfrac{m}{s}\right)^2 + 2\left(-5.9\ \tfrac{m}{s^2}\right)d$$

$$\frac{-30^2}{2(-5.9)} = \frac{2(-5.9)d}{2(-5.9)}$$

$$\frac{-900}{-11.8} = d$$

$$d = \frac{-900\ m^2/s^2}{-11.8\ m/s^2} = 76.3\ m$$

A 72 kg skydiver is descending on a parachute. His speed is still increasing at 1.2 m/s^2 accelerating

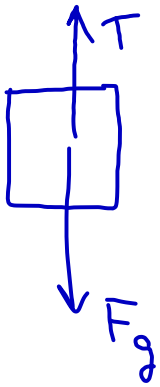
a.) What are the magnitude and direction of the force of the parachute harness on the diver?

b) What are the magnitude and direction of the net force on the diver?

$g = 9.8 \frac{m}{s^2}$

$a_{net} = 1.2 \frac{m}{s^2}$

$m = 72 kg$



$F_{net} = F_g - T$

$ma_{net} = mg - T$

$72kg\left(1.2\frac{m}{s^2}\right) = 72kg\left(9.8\frac{m}{s^2}\right) - T$

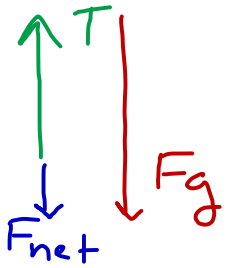
$T + 72(1.2) = 72(9.8) - T + T$

$T + 86.4 = 705.6$

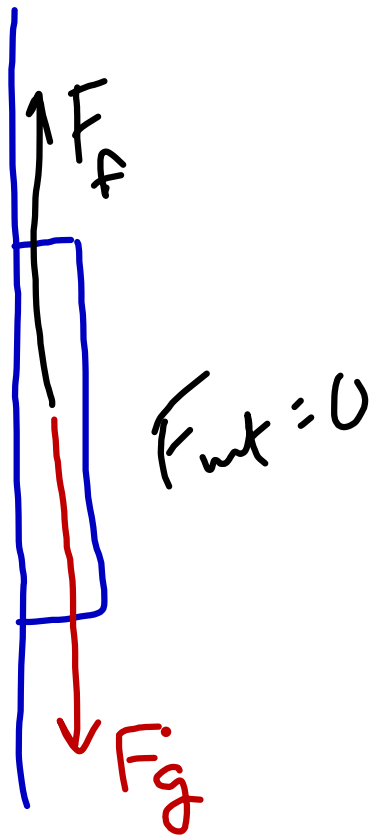
$-86.4 \Rightarrow \quad -86.4$

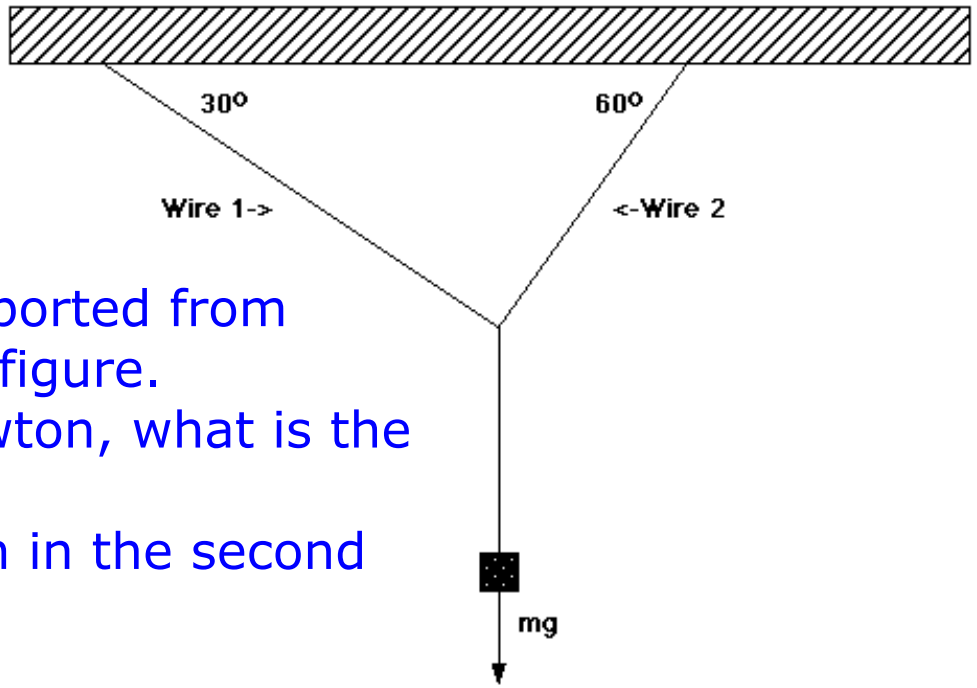
$T = 705.6 - 86.4$

$= 619.2 N$



$F_{net} = 86.4 N$


F_f
$F_{net} = 0$
F_g



A mass of 15 kg is supported from above as shown in the figure.

a.) To the nearest Newton, what is the tension in wire 1?

b.) What is the tension in the second wire?