Reminders 9-01-10:

-1st Webassign Homework Due Tuesday 8/31.

-Conceptual Quiz Today on how to add vectors.

-Quiz Next Wednesday on Vectors and Forces

-Read Chapter 2

Objectives:

-More on Statics

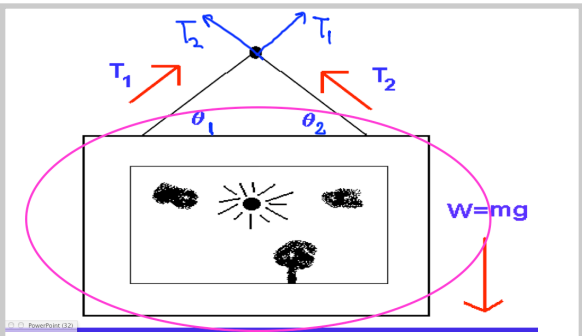
-Newton's Laws

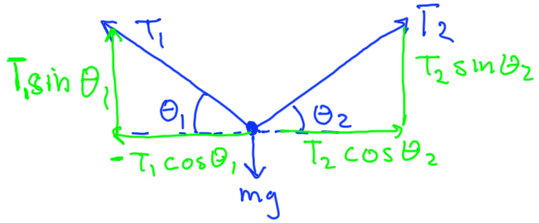
-Kinematics

Can a horizontal vector cancel a vertical vector? To help answer this question consider the following:

Suppose I walk 10 meters north? Is it possible to walk east and end up where I started?

Suppose I apply a 10N force in the east direction? Is it possible to apply a southward force to cancel the 10 N force?





$$\sum F_x = -T_1\cos\theta_1 + T_2\cos\theta_2 = 0$$

$$\sum F_y = T_1\sin\theta_1 + T_2\sin\theta_2 - mg = 0$$

$$T_1\cos\theta_1 = T_2\cos\theta_2$$

$$T_1 = T_2\frac{\cos\theta_2}{\cos\theta_1}$$

$$T_2\frac{\cos\theta_2\sin\theta_1}{\cos\theta_1} + T_2\sin\theta_2 - mg = 0$$

$$T_2\left[\cos\theta_2\tan\theta_1 + \sin\theta_2\right] = mg$$

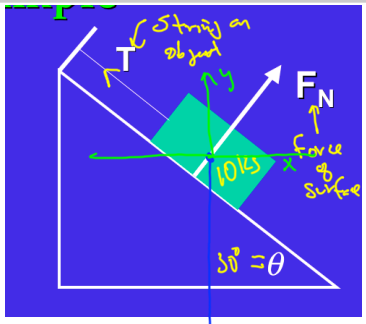
$$T_2 = \frac{mg}{\cos\theta_2\tan\theta_1 + \sin\theta_2}$$

let $\theta_1 = 60^\circ$ $\theta_2 = 30$

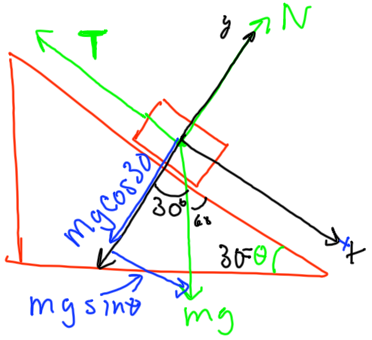
$m = 16.0\ kg$

$T_2 = 78.4\ N$

$T_1 = 136\ N$



mg



$$\Sigma F_x = -T + mg\sin\theta = 0$$

$$T = mg\sin\theta$$

$$= (10kg)\left(9.80\tfrac{m}{s^2}\right)\sin 30$$

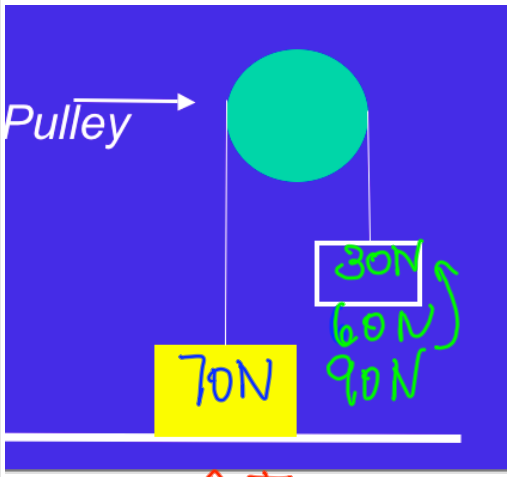
$$= \underline{49N}$$

$$\Sigma F_y = N - mg\cos 30 = 0$$

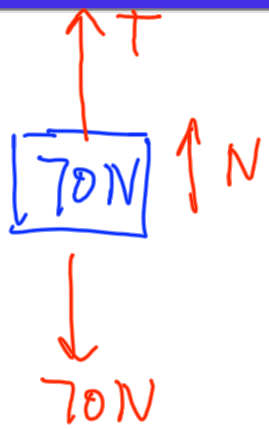
$$N = mg\cos 30^\circ$$

$$= \left(10kg\right)\left(9.80\tfrac{m}{s^2}\right)\frac{\sqrt{3}}{2}$$

$$= \underline{85N}$$



Want force table exerts on box. Normal force



$T + N - 70 = 0$

$30 + N - 70 = 0$

$N - 40 = 0$

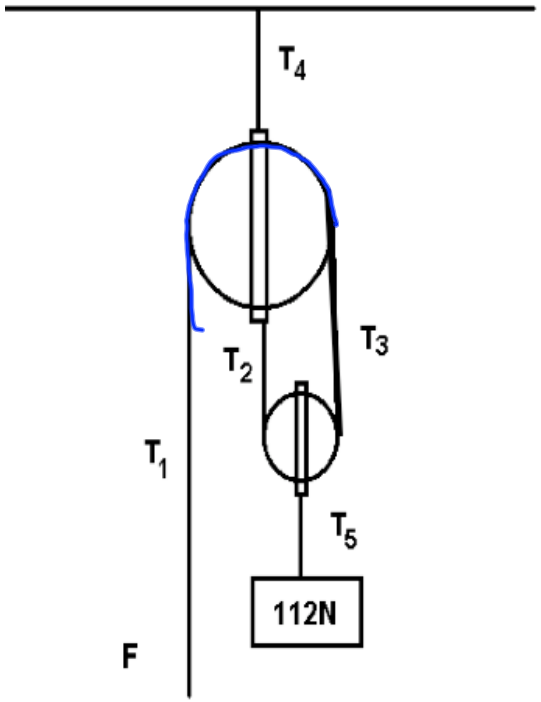
$N = 40$ Newtons

If $T = 60$

$N = 10N$

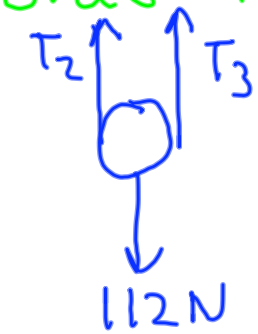
If $T = 90N$

$N = 0$



$T_6 = 112N$

Forces on pulley



$T_1 = 56N$

So $F = 56N$

$T_2 = T_3$

$T_2 + T_3 = 112N$

$T_2 = T_3 = 56N$

$T_4 = 112N + 56N = 168N$