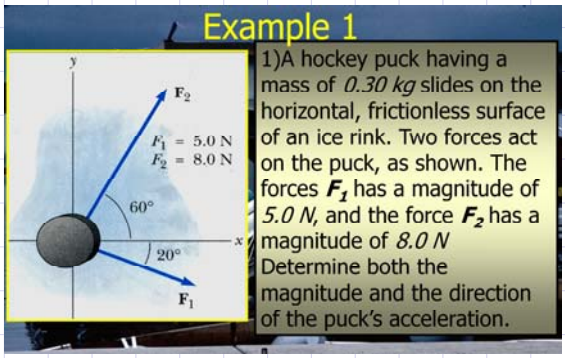
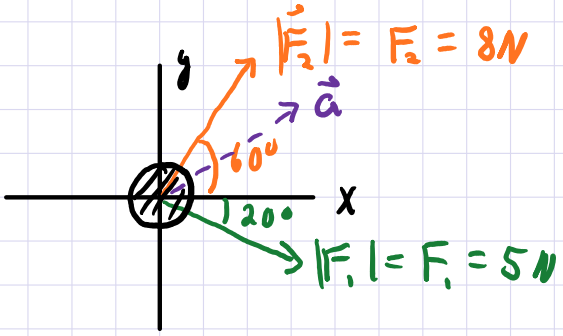
Example 1

Sunday, September 20, 2015 1:26 PM





$$\Sigma F_x = m a_x$$

$$F_1 \cos(20°) + F_2 \cos(60°) = m a_x$$

$$a_x = \frac{F_1 \cos(20°) + F_2 \cos(60°)}{m} = \frac{(5N)\cos(20°) + (8N)\cos(60°)}{.30kg}$$

$$a_x = 28.99\ m/s^2 \approx 29\ m/s^2$$

$$\Sigma F_y = m a_y$$

$$-F_1 \sin(20°) + F_2 \sin(60°) = m a_y$$

$$a_y = \frac{-F_1 \sin(20°) + F_2 \sin(60°)}{m} = \frac{-(5N)\sin(20°) + (8N)\sin(60°)}{.3kg}$$

($kg\,m/s^2$)

$$a_y = 17.4\ m/s^2$$

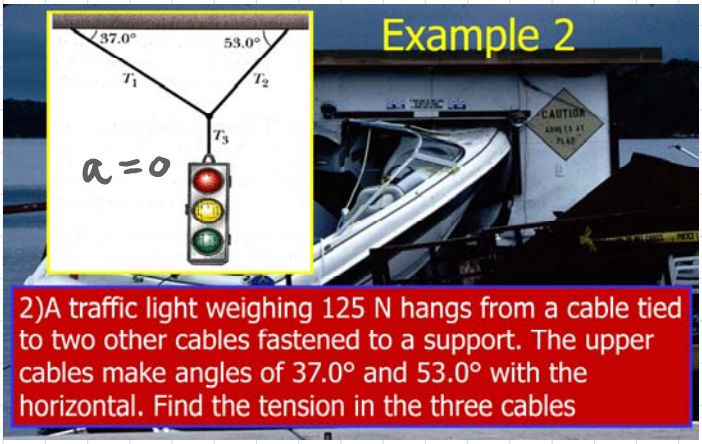
$$|\vec{a}| = \sqrt{a_x^2 + a_y^2} = \sqrt{(29 m/s^2)^2 + (17.4 m/s^2)^2}$$

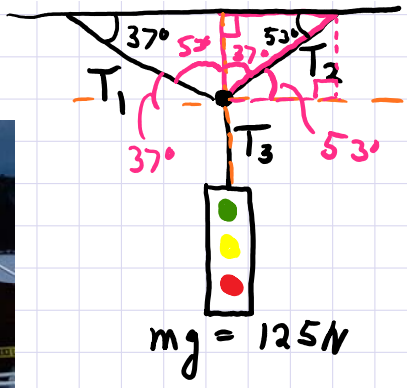
$$|\vec{a}| = 33.8\ m/s^2$$

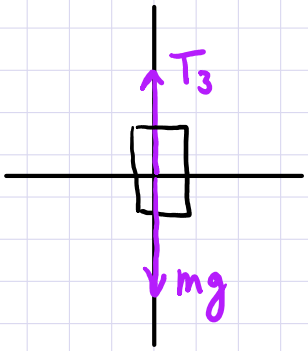
$$\theta = \tan^{-1}\left(\frac{a_y}{a_x}\right) = \tan^{-1}\left(\frac{17.4 m/s^2}{29 m/s^2}\right) = 30.9° \approx 31°$$

Example 2

Sunday, September 20, 2015 1:27 PM



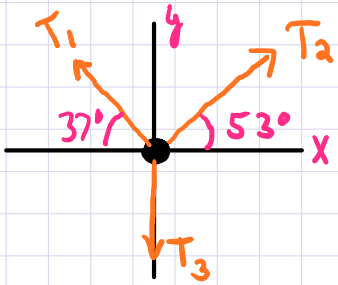




$\Sigma F_y = 0$

$T_3 - mg = 0$

$\boxed{T_3 = mg = 125N}$



$\Sigma F_x = 0$

$-T_1 \cos(37°) + T_2 \cos(53°) = 0$

$T_2 \cos(53°) = T_1 \cos(37°)$

$T_2 = T_1 \frac{\cos(37°)}{\cos(53°)} = (75.3N) \frac{\cos(37°)}{\cos(53°)} = \boxed{99.9N}$

$\Sigma F_y = 0$

$T_1 \sin(37°) + T_2 \sin(53°) - T_3 = 0$

$T_1 \sin(37°) + \left[T_1 \frac{\cos(37°)}{\cos(53°)}\right] \sin(53°) = T_3$

$T_1 \left[\sin(37°) + \frac{\cos(37°)}{\cos(53°)} \sin(53°)\right] = T_3$

$T_1 = \frac{T_3}{\sin(37°) + \frac{\cos(37°)}{\cos(53°)} \sin(53°)}$

$T_1 = \frac{125\,N}{\sin(37°) + \frac{\cos(37°)}{\cos(53°)} \sin(53°)}$

$\boxed{T_1 = 75.3N}$