Forces at Angles

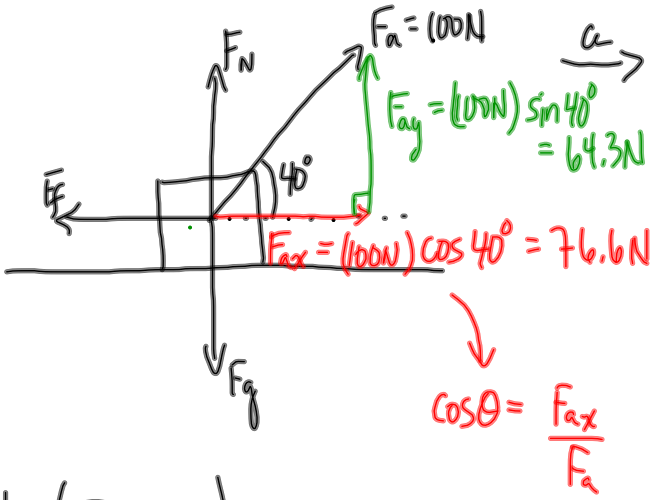
$m = 20\,kg$

$F_a = 100N$

$\theta = 40^\circ$

$\mu = 0.32$

$a = ??$



Vertically ($F_{net} = 0$)

$$F_N + F_{ay} = F_g$$

$$F_N = F_g - F_{ay}$$

$$F_N = (20kg)(9.81m/s^2) - 64.3N$$

$$F_N = 131.92N$$

The normal force is LESS than F_g since F_a is pulling up at an angle.

Horizontally ($\vec{F}_{net} = m\vec{a}$)

$$\vec{F}_{net} = m\vec{a}$$

$$F_{ax} - F_f = ma$$

$$F_{ax} - \mu F_N = ma$$

$$76.6N - (0.32)(131.92N) = (20kg)a$$

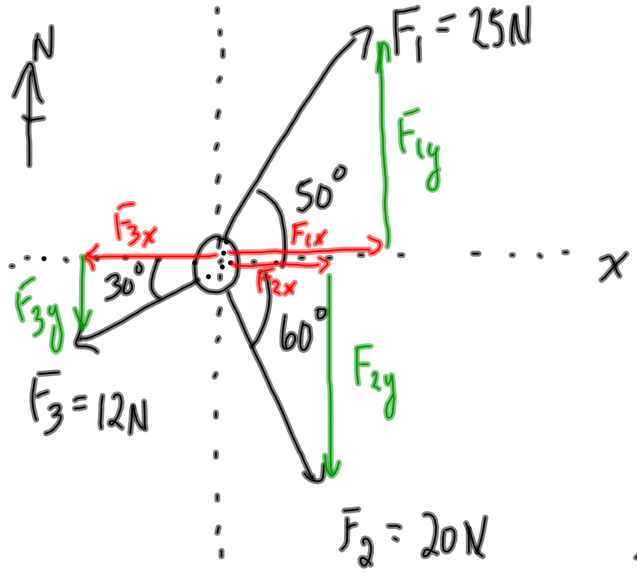
$$76.6N - 42.2N = (20kg)a$$

$$34.4N = (20kg)a$$

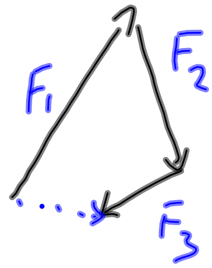
$$a \doteq 1.7\,m/s^2$$

Example

Bird's Eye View



$\vec{F}_{net} = ??$



	x	y
F_1	$(25N)\cos 50° = 16.1N$	$(25N)\sin 50° = 19.2N$
F_2	$(20N)\cos 60° = 10N$	$-(20N)\sin 60° = -17.3N$
F_3	$-(12N)\cos 30° = -10.4$	$-(12N)\sin 30° = -6N$
F_{net}	15.7N	-4.1N