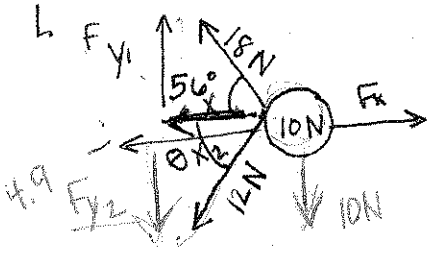
SOH CAH TOA Forces in Equilibrium

1. 

Find Fx & θ

$\cos 56 = \frac{F_{x_1}}{18}$ $\quad F_{x_1} = 10.065$

$\sin 56 = \frac{F_{y_1}}{18}$ $\quad F_{y_1} = 14.9$

$\sin\theta = \frac{4.9}{12}$

$\theta = 24°$

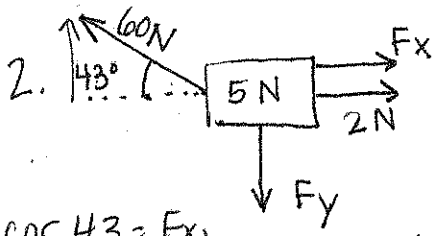
$F_{y_2} + 10N = 14.9$

$F_{y_2} = 4.9$

$4.9^2 + 10.9^2 = 12^2$

144

$F_{x_2} = 10.9N$

2. 

Find Fx & Fy

$F_x = F_{x_1} + F_{x_2} = 21\ N$ (10 + 10.9)

$\cos 43 = \frac{F_{x_1}}{60}$ $\quad F_{x_1} = 43.88 = 2N + Fx$ (−2, −2N)

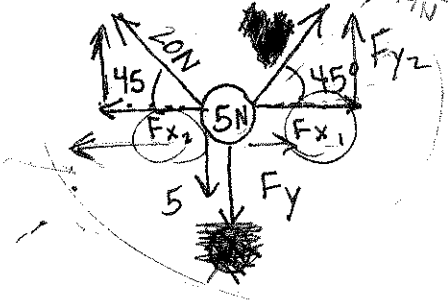
41.88 = Fx

$\sin 43 = \frac{F_{y_1}}{60}$ $\quad F_{y_1} = 40.9N = 5N + Fy$ (−5, −5)

$F_{y_1} = 40.9N$

35.9 = Fy

40.9N = Fy

3. 

Find Fy, F_{x_1}, F_{x_2}

$\sin 45 = \frac{F_{y_1}}{20} = 14.14$

$\sin 45 = \frac{F_{y_2}}{18} = 12.7$

$14.14 + 12.7 = 5N + Fy$

$21.84N = Fy$

NOT in Equil.

OBJ - moving left

$\cos 45 = \frac{F_{x_1}}{18} = 12.73$ (F_{x_1})

$\frac{\cos 45}{20} = 14.14$ (F_{x_2})