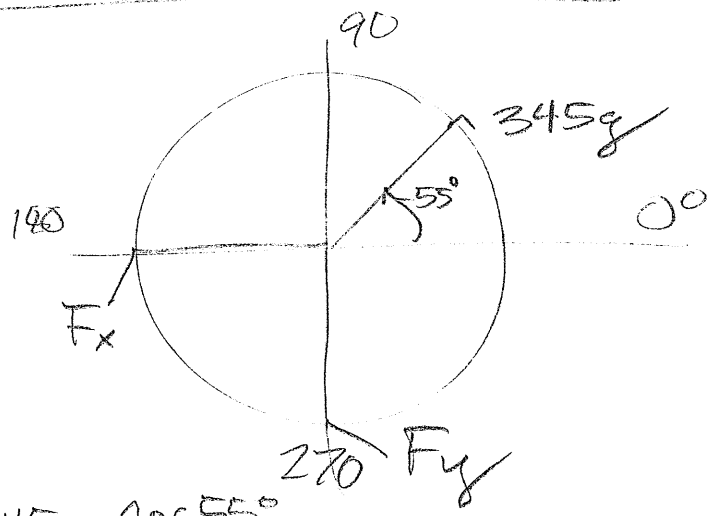
Physics 200 Lab 1 Homework: Solutions

1.



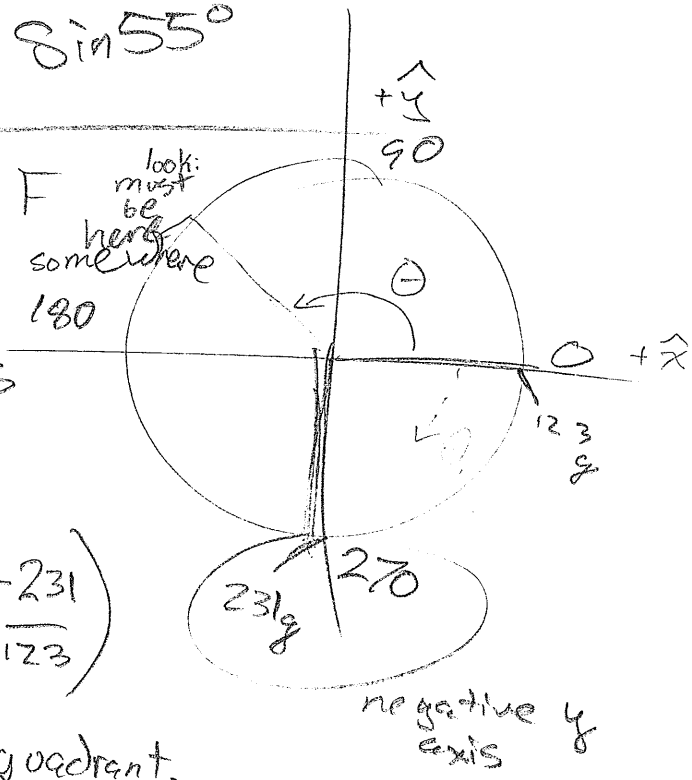
$F_x = 345g \times \cos 55°$

$F_x = 198g$

$F_y = 283g$ $= 345g \sin 55°$

↑ unit gram

2.



$F = \sqrt{231^2 + 123^2}$ grams

$F = 262g$

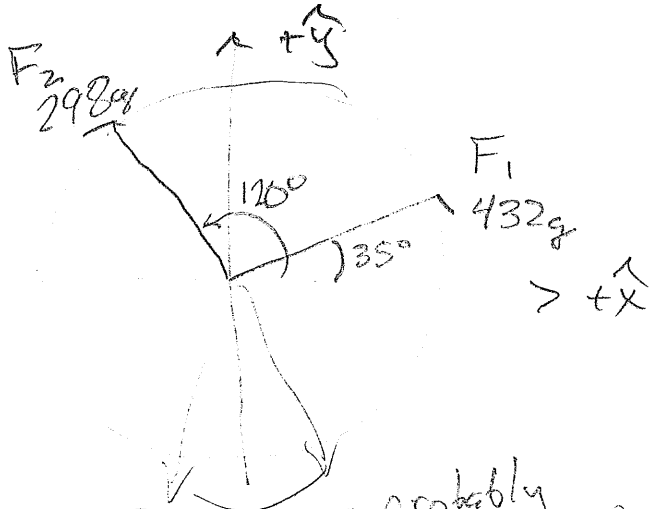
$\theta_1 = \tan^{-1}\left(\frac{F_y}{F_x}\right) = \tan^{-1}\left(\frac{-231}{123}\right)$

$\theta_1 = -62°$ down in 4th quadrant.

add $180° = 118°$, which looks right.

θ

3.



F_3 answer probably down here somewhere.

so $\vec{F_1} + \vec{F_2} + \vec{F_3} = 0$ when table is balanced.

$\vec{F_1} + \vec{F_2} = -\vec{F_3}$ ← $\vec{F_3}$ is what we want. $-\vec{F_3}$ is found.

$F_{1x} = 432g \cos 35°$ $\quad F_{1y} = 432g \sin 35°$

$F_{2x} = 298g \cos 120°$ $\quad F_{2y} = 298g \sin 120°$

Should be neg. see figure

$F_{1x} = 354g$ $\quad F_{1y} = 248g$

$F_{2x} = -149g$ $\quad F_{2y} = 258g$

the − sign

$-F_{3x} = 205g$ $\quad -F_{3y} = 506g$

$F_3 = \sqrt{(-205)^2 + (-506)^2}\ g = \boxed{546g}$ = magnitude.

$\theta_3 = \text{Tan}^{-1}\left(\frac{F_{3y}}{F_{3x}}\right) = \text{Tan}^{-1}\left(\frac{-506}{-205}\right) = 68°$

but add 180° since $F_{3x} < 0$.

$\boxed{\theta_3 = 248°, \text{ or } -112°.}$