LOG-11-14 FP] #5 BRUTE FORCE

12:50

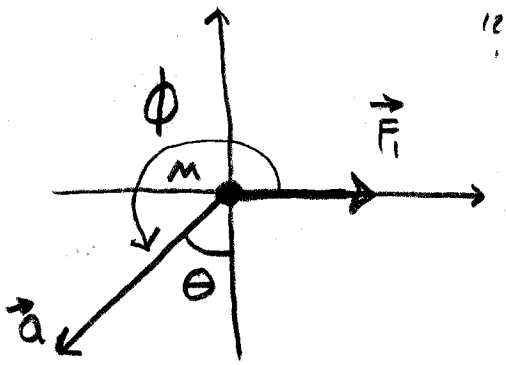
$m = 2.00$ kg

$F_1 = 20.0$ N

$a = 12$ m/s²

$\Theta = 30°$ $\Rightarrow \Phi = 180 + 60 = 240°$

$\Phi = \pi + \frac{\pi}{3} = \frac{4\pi}{3}$



m acted on by two forces, $\vec{F}_1$ given, and $\vec{F}_2$ to find.

SOLN

F = net force on m due to $\vec{F}_1$ and $\vec{F}_2$

$\vec{F} = \vec{F}_1 + \vec{F}_2$

① $\vec{F}_2 = \vec{F} - \vec{F}_1$

② $\vec{F} = m\vec{a}$

$= m\langle a\sin\phi, a\cos\phi\rangle$

$\vec{F}_2 = \langle ma\sin\phi, ma\cos\phi\rangle - \langle 20, 0\rangle$

$= \langle ma\sin\phi - 20, ma\cos\phi - 0\rangle$

$= \langle 24(-\frac{1}{2}) - 20, 24(-\sqrt{3}/2)\rangle$

$\boxed{\vec{F}_2 = \langle -32, -12\sqrt{3}\rangle = \langle -32.0\text{N}, -20.8\text{N}\rangle}$

$|\vec{F}_2| = \sqrt{32^2 + 12^2(3)}$

$\boxed{|\vec{F}_2| = 4\sqrt{91} \approx 38.2\text{ N}}$

$\alpha = \text{Tan}^{-1}\frac{-12\sqrt{3}}{-32} = \text{Tan}^{-1}\frac{3\sqrt{3}}{8}$

$\approx .576$ RAD

$\alpha \approx 33.0°$

$\boxed{180 + 33 = 213°}$ or $-147°$