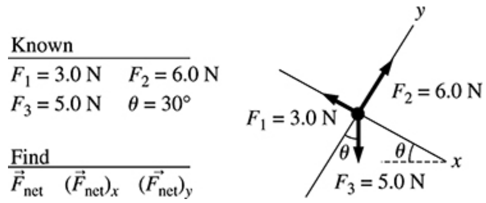
3.45. Visualize:



Use a tilted coordinate system such that x-axis is down the slope.

Solve: Expressing all three forces in terms of unit vectors, we have $\vec{F}_1 = -(3.0\text{ N})\hat{i}$, $\vec{F}_2 = +(6.0\text{ N})\hat{j}$, and $\vec{F}_3 = (5.0\text{ N})\sin\theta\,\hat{i} - (5.0\text{ N})\cos\theta\,\hat{j}$.

(a) The component of $\vec{F}_{net}$ parallel to the floor is $(F_{net})_x = -(3.0\text{ N}) + 0\text{ N} + (5.0\text{ N})\sin 30° = -0.50\text{ N}$, or 0.50 N up the slope.

(b) The component of $\vec{F}_{net}$ perpendicular to the floor is $(F_{net})_y = 0\text{ N} + (6.0\text{ N}) - (5.0\text{ N})\cos 30° = 1.67\text{ N}$.

(c) The magnitude of $\vec{F}_{net}$ is $F_{net} = \sqrt{(F_{net})_x + (F_{net})_y} = \sqrt{(-0.50\text{ N})^2 + (1.67\text{ N})^2} = 1.74\text{ N}$. The angle $\vec{F}_{net}$ makes is

$$\phi = \tan^{-1}\frac{(F_{net})_y}{|(\vec{F}_{net})_x|} = \tan^{-1}\left(\frac{1.67\text{ N}}{0.50\text{ N}}\right) = 73°$$

$\vec{F}_{net}$ is $73°$ above the floor on the left side of $\vec{F}_2$.00000