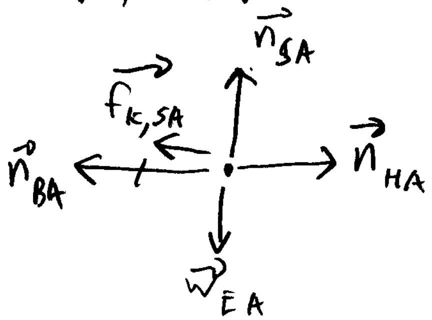
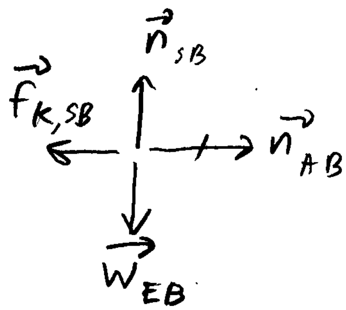
Oand P

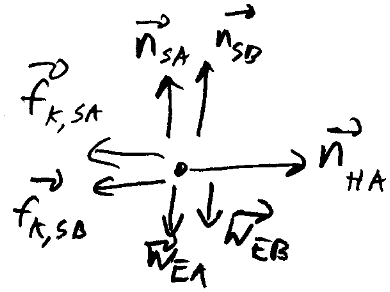
1. a) A:



B:



System: A+B



The two objects will move together so it will be helpful to analyze them as a system as above

Solve We can find each of the kinetic friction forces from the normal forces: $f_{k,SA} = \mu_K n_{SA}$, $f_{k,SB} = \mu_K n_{SB}$

The normal forces can be determined by analyzing the y-motion: $n_{SA} - W_{EA} = m_A a_{Ay} = 0 = n_{SA} - m_A g$

$\Rightarrow n_{SA} = m_A g$

and, similarly, $n_{SB} = m_B g$.

So $f_{K,SA} = \mu_K m_A g$ $\quad f_{K,SB} = \mu_K m_B g$.

Now look at the x-motion of the system A and B.

$F_{net,x} = m_{A+B} a_x$

$n_{HA} - f_{K,SA} - f_{K,SB} = m_{A+B} a_x$

$$\Rightarrow a_x = \frac{n_{HA} - \mu_K m_A g - \mu_K m_B g}{m_A + m_B} = 5.06 \text{ m/s}^2$$

b) Looking at object B:

$F_{net,x} = n_{AB} - f_{KSB} = m_B a_{Bx}$

$\Rightarrow n_{AB} = m_B a_{Bx} + f_{KSB}$

$= m_B a_{Bx} + \mu_K m_B g$

$= 32\text{N}$ this is equal in magnitude to n_{BA}, since they are a 3rd Law pair

Reflect If we treat the two as a system the internal forces $\vec{n}_{BA}$ and $\vec{n}_{AB}$ don't matter.