Friction Problems

Block A weighs 4.0 N and block B weighs 8.0 N. The coefficient of kinetic friction between all surfaces is $\mu_k = 0.25$. Find the magnitude of the horizontal force $F$ necessary to drag block B to the left at a constant speed.

\[ \text{Answer: } F = 3 \text{ N} \]

\[ \text{Find } \vec{F} \text{ and } T \]

\[ \text{Answer: } T = 1 \text{ N}, F = 4 \text{ N} \]

\[ \text{Pulley is ideal} \]

\[ \text{Find } \vec{F} \text{ and } T \]

\[ \text{Answer: } T = 1 \text{ N}, F = 5 \text{ N} \]

Now let the static friction have a coefficient of $\mu_s = 0.50$. Calculate $\vec{F}$ and $T$ at the instant that motion just starts. (Blocks are initially at rest.)

\[ \text{Answers: } 1^{\text{st}} \text{ Case } F = 6 \text{ N} \]
\[ 2^{\text{nd}} \text{ Case } T = 2 \text{ N}, F = 8 \text{ N} \]
\[ 3^{\text{rd}} \text{ Case } T = 2 \text{ N}, F = 10 \text{ N} \]
If the coefficient of static friction between a table and a uniform massive rope is $\mu_s$, what fraction $x$, $0 \leq x \leq 1$, of the rope of total length $L$ can hang over the edge of the table without the rope sliding off the table?

Answer: $x = \frac{\mu_s}{1 + \mu_s}$