The box is sliding down the ramp with an acceleration of $3.5 \text{ m/s}^2$. What is the coefficient of kinetic friction between the box and ramp?
Find acceleration with a coefficient of kinetic friction of .1
**Tension**

- Tension is simply a force that has a maximum that can't be exceeded.
- If exceeded the rope breaks.

\[ T = 100\, N \]

\[ F_g = mg = 11 (9.8) = 107.8\, N \]

\[ F_g = 11\, Kg \times 9.8 = 107.8\, N \]

\[ T = 100\, N \]

\[ \Sigma F = ma \]

\[ T - F_g = ma \]

\[ 100 - 49 = 5 (a) \]

\[ a = 10.2\, m/s^2 \]
1500 kg
1. We need to figure out what forces are acting on the ball.
2. What forces are acting on the rope?
3. Find the Fy on the rope at the wall
4. Find the Tension in the rope for each side
5. Notice T1 + T2 > Fg
A 150 kg street light hangs from a cable at an intersection. The cable makes a 30° with the pole. How much tension is needed in the cable to keep the light hanging?

\[ \begin{align*}
\sum F_x &= 0 \\
\sum F_y &= 0 \\
T_y - F_g &= 0
\end{align*} \]

Zip Line Problem
\[ F = m_1 a \]
\[ T_B = m_1 n_1 \]
\[ T_B = 2(l) \]
\[ T_B = 2N \]

Overall:

\[ F = m n \]
\[ F_p = (27,000 + 5000)(.78) = 27,690 N \]
\[ F = ma \]
\[ F_g = (m_1 + m_2) \cdot g \]
\[ g_1 = 30 \text{(m/s)}^2 \]
\[ a = 3.27 \text{m/s}^2 \]

\[ F_g - T = m_1 u \]
\[ g_6 - T = 10 \cdot (3.27) \]

\[ T = 65.3 \text{N} \]

\[ T = m_1 u \]
\[ T = 20 \cdot (3.27) \]
\[ F = ma \]
\[ 100 - (110 \times 0.9) (50 + 10) \]
\[ a = 8.13 \text{ m/s}^2 \]
\[ a = 0.69 \text{ m/s}^2 \]

\[ F_p = 6.8 \text{ N} \]
\[ F_k = 58.8 \text{ N} \]
\[ F_T = 100 \text{ N} \]
\[ 100 - 58.8 - 6.8 = \]

\[ F_p = 45(45 \text{ N}) \]
\[ F_p = F_s \]
\[ F_p = 0.3(m+M)(9.8) \]

\[ M = 5 \]
\[ M_s = 3 \]

\[ F_p = 100 \text{ N} \]
\[ a = 7 \text{ m/s}^2 \]
\[ F_{50} = 7 \text{ N} \]
\[ F_p = 100 \text{ N} \]
\[ \Sigma F = ma \]
\[ F_p - F_k = ma \]
\[ F_p - n_k F_N = ma \]
\[ F_p - m_k (n_T) = m_A \]
\[ F_{50} = m \text{ N} \]
\[ F_{52} = 10 \text{ (68)} \]
\[ F = 6.4 \text{ N} \]
\[ F_2 - T_s = mu \]
\[ 9.8 - T = 10(2.61) \]

\[ T = \]

\[ F_{2x} = ma \]
\[ T - F_k = ma \]
\[ T - 0.1(20)(9.8) = 20(2.61) \]
\[ T = 71.9 \text{ N} \]

\[ T - F_9 = 0 \]
\[ T = F_9 \]

\[ F_{2s} - F_5 = ma \]
\[ 8(9.8) - F_5 = 80(2.61) \]
\[ 8(9.8) = F_5 \]
\[ 8(9.8) = Ms(80)(9.8) \]
\[ Ms = 0.1 \]
\begin{align*}
\mathbf{m}_A &= 15 \text{ kg} \\
\mathbf{m}_B &= 20 \text{ kg} \\
T &= \quad A = \\
\mu_k &= 0.1
\end{align*}

\begin{align*}
\mathbf{m}_A &= 25 \text{ kg} \\
\mathbf{m}_B &= 15 \text{ kg} \\
\mathbf{a} &= \quad \mathbf{T} = \quad ?
\end{align*}

\begin{align*}
\mathbf{m}_S &= 1000 \text{ kg} \\
\mathbf{m}_F &= 500 \text{ kg} \\
\mu_k &= 0.5 \\
D &= 3 \text{ m} \\
\mathbf{V}_f &= \quad \mathbf{V}_i = 0 \\
\alpha &= ?
\end{align*}
\[ M_k = 0.5 \]
\[ m_a = 100 \text{ kg} \]
\[ m_F = 500 \text{ kg} \]
\[ T = 3 \text{ m} \]
\[ V_F = \text{?} \]
\[ V_a = \text{?} \]

\[ F_{T_1} - F_k = \text{ma} \]
\[ a = 1 - \gamma \]

\[ M_k = 1 \]

\[ F_{T_2} = \text{F_a} \]
Elevators and apparent weight

\[ F_g = mg \]
\[ F_n = mg \]
\[ F_n = 81(9.8) = 794 N \]

Initial acceleration is 3 m/s²

\[ F_n = F_g + F_P \]

\[ F_n = F_g + ma \]

\[ F_n = 794 + 81(3) = 1037 N \]

\[ F_n = F_g + F_P \]

\[ F_n = 794 - 81(3) = 551 N \]

Initial acceleration is 3 m/s²

\[ F_g = mg \]
\[ F_n = F_g - ma \]
add on pg 164: 30, 45, 53, 64, 70, 72, 74
\[ \vec{F} = ma \]
\[ F_s = M_s F_N \]
\[ F_k = M_k F_N \]
\[ F_N = mg \cos \theta \]
\[ F_{sx} = mg \sin \theta \]
\[ F_g = mg \]

Elevator \[ \Rightarrow F_N = F_g \pm F_p \text{ for apparent weight} \]