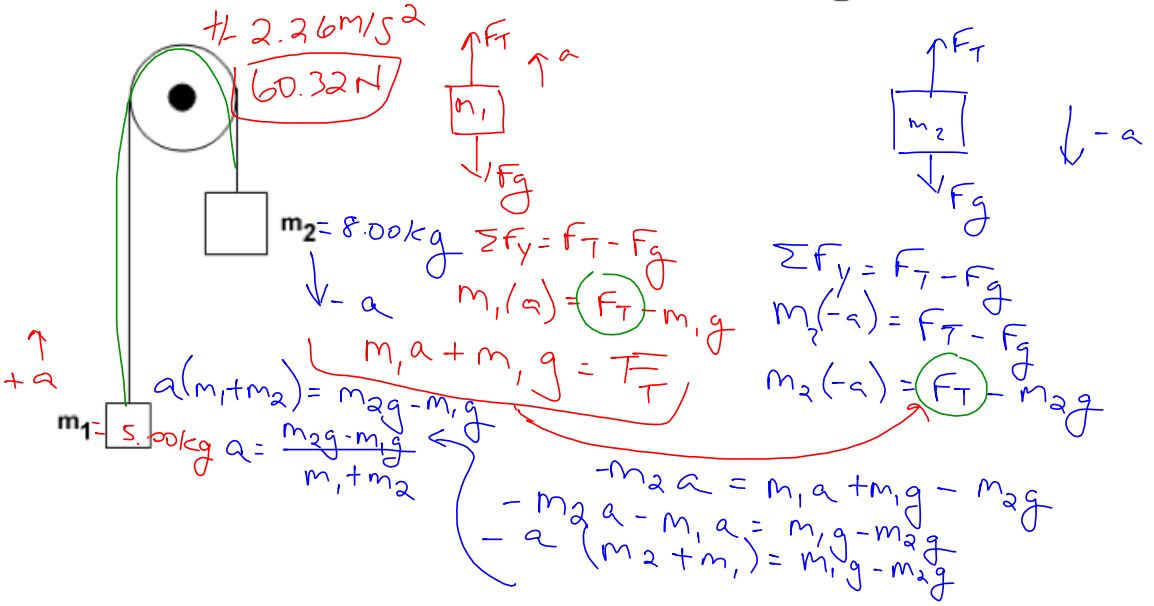
Example 13: Traditional Atwood

A traditional Atwood machine is constructed with two masses (m_1 and m_2). Ignore any mass from the cord or the pulley as well as any additional friction from the pulley. The mass of m_1 is 5.00 kg while the mass of m_2 is 8.00 kg.

~~A.~~ Find the acceleration of the masses.

B. What is the tension in the cord connecting the two?

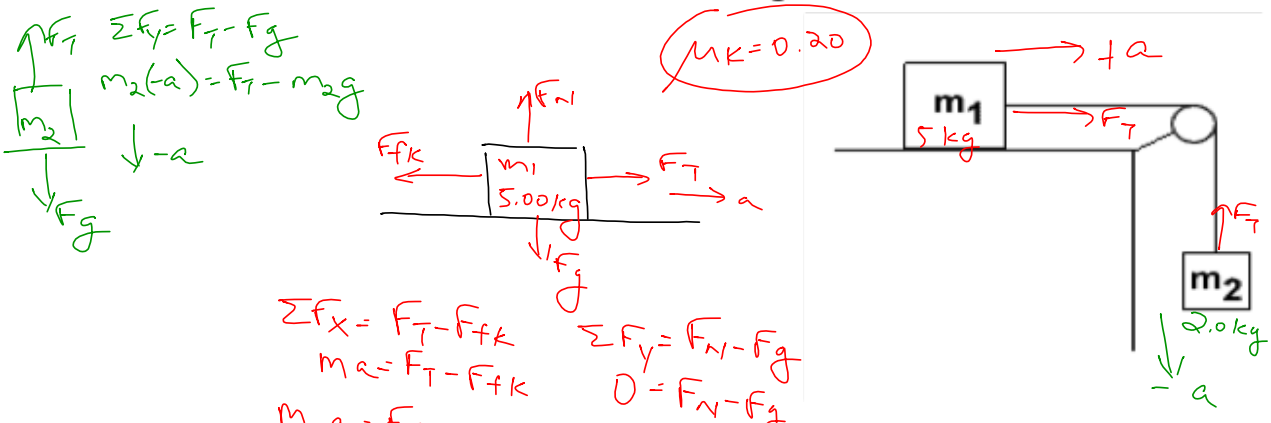


Example 14: Modified Atwood

Two boxes are connected by a cord running over a pulley. The coefficient of kinetic friction between box 1 and the table is 0.20. We ignore the mass of the cord and pulley as well as any friction in the pulley. Box 1 has a mass of 5.00 kg while box 2 has a mass of 2.00 kg.

A. What is the acceleration of the boxes? $a = 1.4\ m/s^2$

B. What is the tension in the cord connecting the two? $F_T = 16.8\ N$



$\Sigma F_x = F_T - F_{fk}$

$ma = F_T - F_{fk}$

$m_1 a = F_T - \mu_K \cdot F_{N1}$

$5.00 \cdot a = F_T - 9.8$

$5.00 \cdot a + 9.8 = F_T$

$\Sigma F_y = F_{N1} - F_g$

$0 = F_N - F_g$

$F_N = F_g$