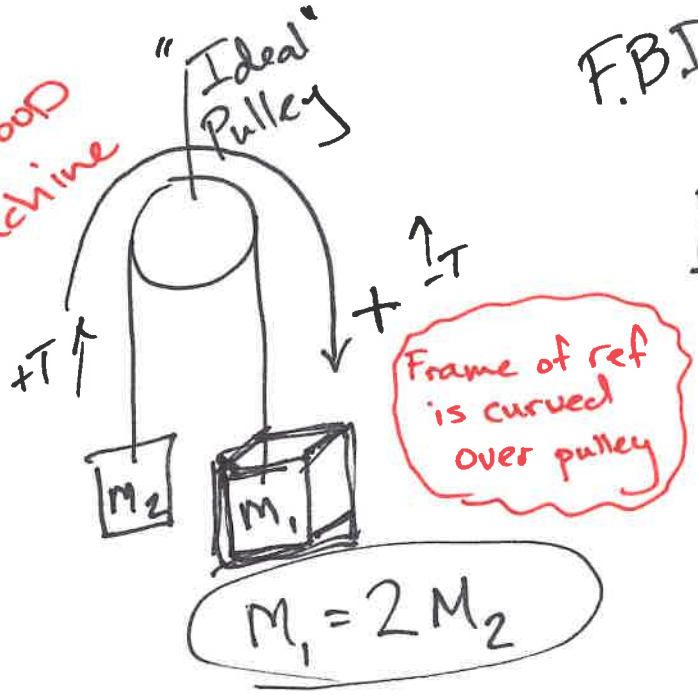
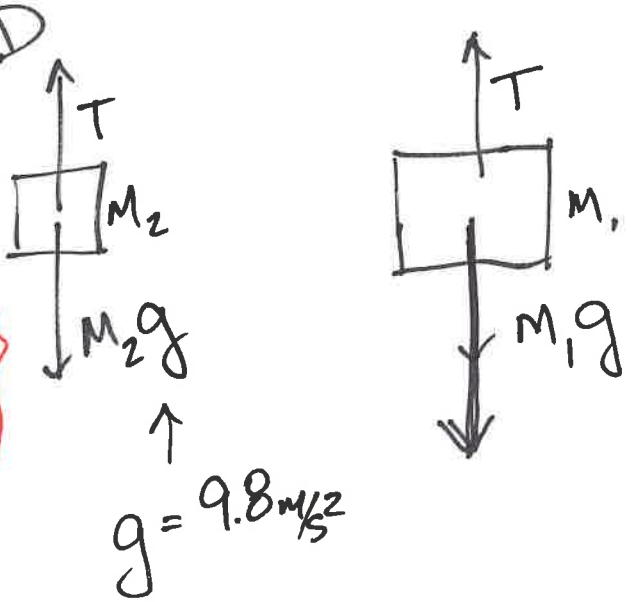
Atwood Machine



$m_1 = 2m_2$

F.B.D



$g = 9.8 m/s^2$

$$a = \frac{\Sigma F}{m} = \frac{m_1 g + -m_2 g}{m_1 + m_2}$$

Substituted $m_1 = 2m_2$

$$a = \frac{2m_2 g - m_2 g}{2m_2 + m_2}$$

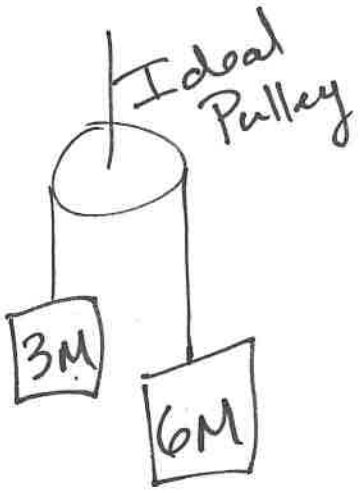
$$a = \frac{m_2 g}{3m_2} = \frac{g}{3} = \frac{9.8 m/s^2}{3}$$

$a = 3.27$

$a = 3.3 m/s^2$

$$+T + -m_1 g = \bar{+} ma$$

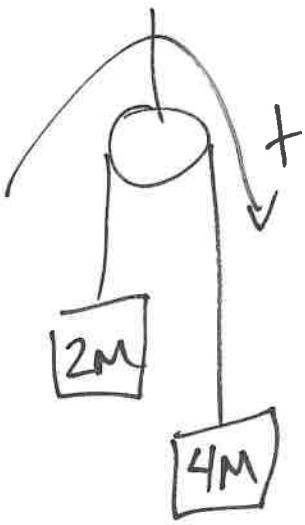
$$T = \bar{+} ma + mg$$



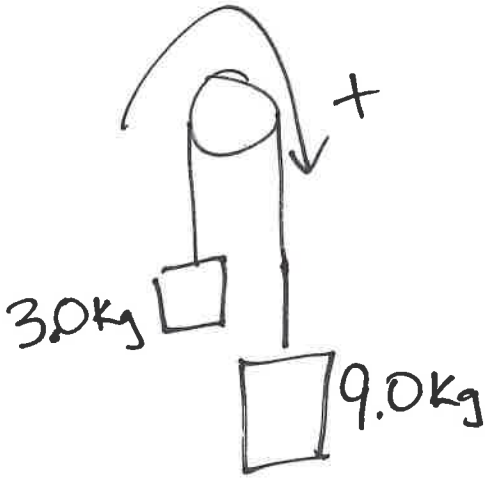
$a = \_\_\_ g$

$$a = \frac{6Mg - 3Mg}{6M + 3M} = \frac{3Mg}{9M}$$

$$= \frac{3}{9}g = \frac{1}{3}g$$



$$a = \frac{4Mg - 2Mg}{4M + 2M} = \frac{2Mg}{6M} = \frac{1}{3}g$$

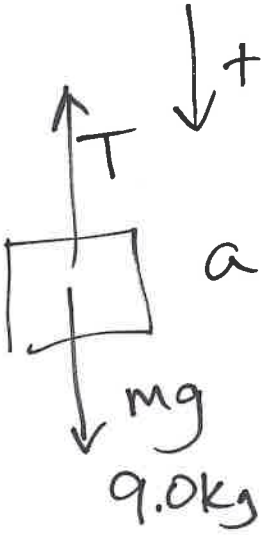


$a = ?$

$T = ?$

$$a = \frac{\Sigma F}{m} = \frac{9.0kg \cdot 9.8 m/s^2 - 3.0kg \cdot 9.8 m/s^2}{9.0kg + 3.0kg}$$

$$a = 4.9 m/s^2$$



$$\Sigma F = ma$$

$$+mg + -T = ma$$

$$-T = ma - mg$$

~~$T = -ma + mg$~~

$$= +9.0kg \cdot 4.9 m/s^2 - 9.0kg \cdot 9.8 m/s^2$$

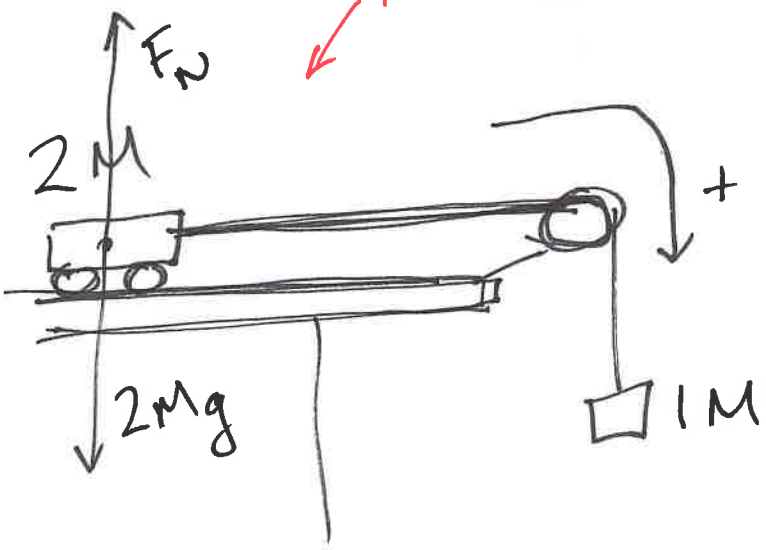
$$T = m(+a + -g)$$

$$T = -44.1 N$$

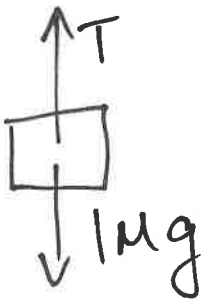
Note: You must know the acceleration and masses (kg) to find the tension

See Edpuzzle for additional example of finding tension.

Half Atwood

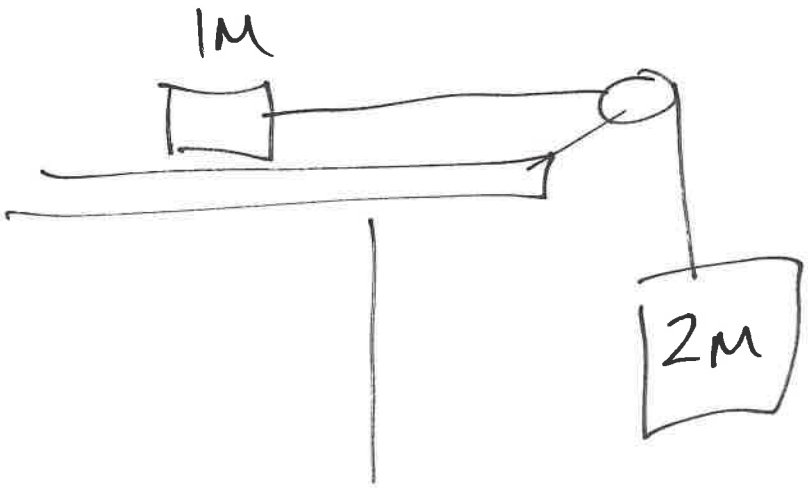


$a = ?$ g



$$a = \frac{\Sigma F}{m} = \frac{1Mg}{1M + 2M} = \frac{1Mg}{3M}$$

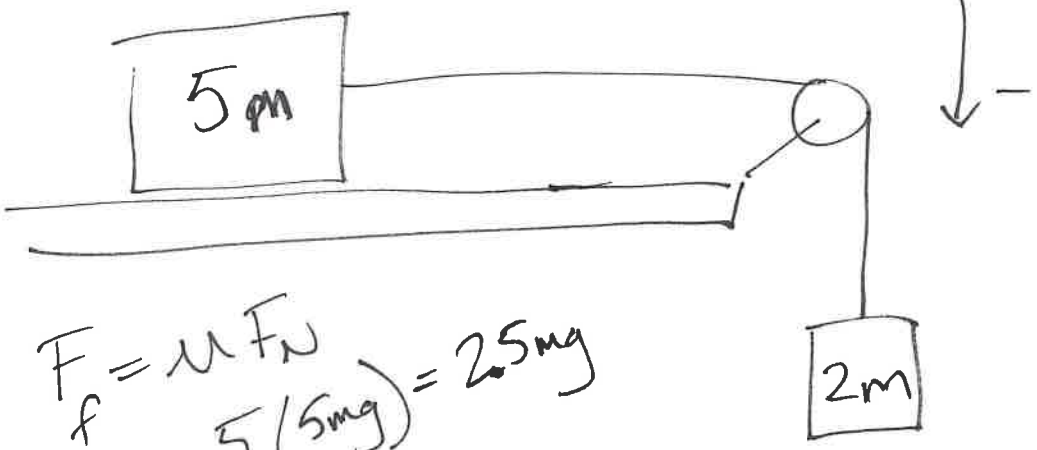
$$a = \frac{1}{3}g$$



$$a = \frac{2Mg}{2M + 1Mg} = \frac{2}{3}g$$

$V_0 = -4.0\,m/s$ $\quad \mu_k = 0.50$ $\quad +$ F.O.R

Half Atwood with friction



$F_f = \mu F_N$

$= .5(5mg) = 2.5mg$

$$a = \frac{\Sigma F}{m} = \frac{-2mg + 2.5mg}{5m + 2m} = \frac{.5mg}{7m} = 0.071g$$

$$t = \frac{\Delta V}{a} = \frac{V_f - V_0}{a} = \frac{0 - -4.0\,m/s}{0.071(9.8\,m/s^2)} = 5.75\,sec.$$