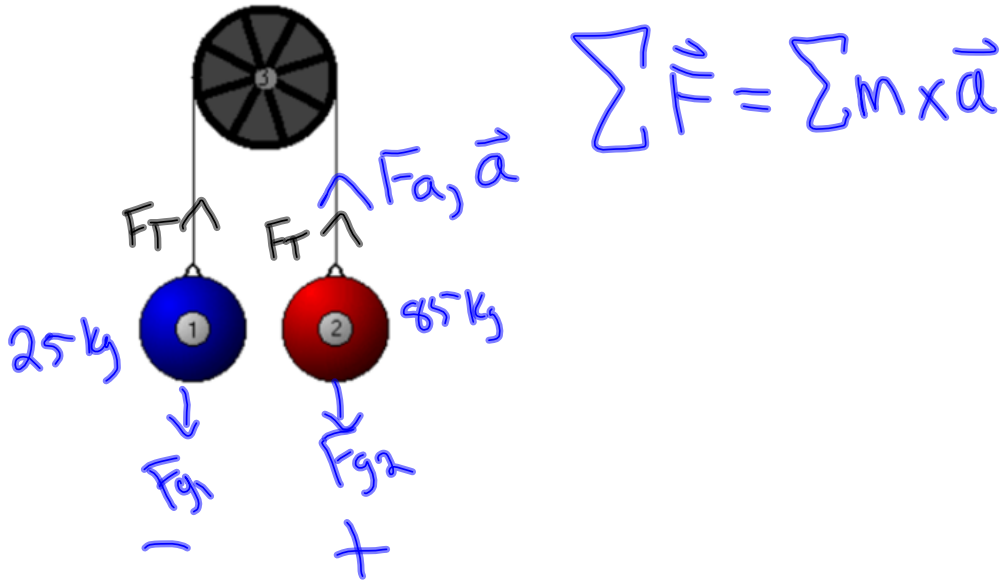


A counter weight of 25 kg is used to help a person of mass 85 kg to do chin ups. What is the force applied by the person if he accelerates at 1.2 m/s^2 ?



$$F_{g1} + F_{g2} + \bar{F}_a = (m_1 + m_2) a$$

$$-(25)(9.81) + (85)(9.81) + F_a = (25 + 85)(-1.2)$$

$$-245 + 834 + F_a = -132$$

$$F_a = -721 \text{ N}$$

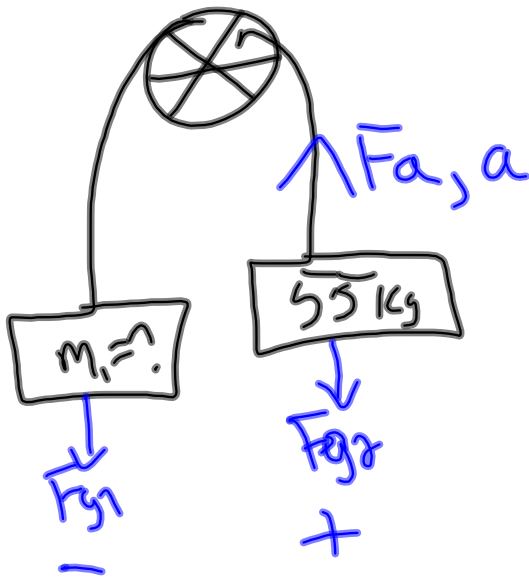
$F_T = ?$ Using mass # 1

$$F_{g1} + F_T = M \cdot a$$

$$-245 + F_T = (25)(-1.2)$$

$$F_T = 215 \text{ N}$$

A counterbalance is set up to help someone lift an object. The largest mass a person can lift is 33 kg. What must be the minimum mass of the counter weight for a 55 kg object to be lifted with an acceleration of 1.5 m/s^2 ? (mass = 36 kg)



$$F_a = ?$$

$$F_a = 33 \text{ kg} \times 9.81$$

max weight person can lift.

$$F_a = 324 \text{ N}$$

$$F_{g1} + F_{g2} + F_a = (m_1 + m_2)a$$

$$-m_1(9.81) + (55)(9.81) - 324 = (m_1 + 55)(-1.5)^*$$

$$-9.81m_1 + 540 - 324 = -1.5m_1 - 82.5$$

$$-8.31m_1 = -298.5$$

$$m_1 = 36 \text{ kg}$$