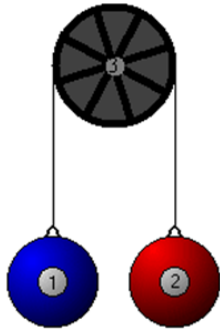# Multiple Masses and Finding Net Force
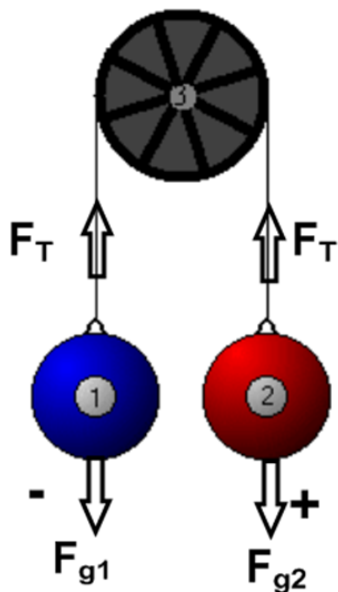
Chapter 10.2 of MHR:
Read Pg 478 - 489
Problems Pg 485 #s 19 - 22, Pg 488 #s 24 - 28

This is an example of a system where there are multiple masses, the Atwood machine.

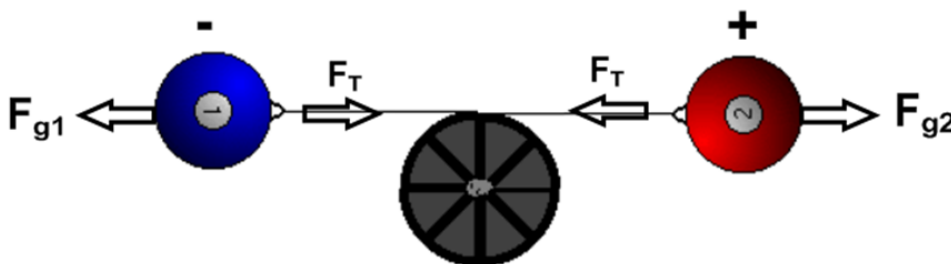We will apply the concept of forces to determine the resulting acceleration.

Define the Direction of Forces

Our problems will not include friction and the pulley will be massless.

You may find it easier to picture, or draw, the system horizontally.

$$\sum F = \sum m \times a$$

F_T F_T

F_{g1} F_{g2}

F_{g1} F_T F_T F_{g2}

Calculate the acceleration of the connected masses of an Atwood machine that has a 15 kg mass on one side and 24 kg on the other.

Calculate the tension in the rope connecting the masses in the above problem.

$$\Sigma F = \Sigma m \times a$$

$$F_{g_1} + F_{g_2} = (m_1 + m_2)a$$
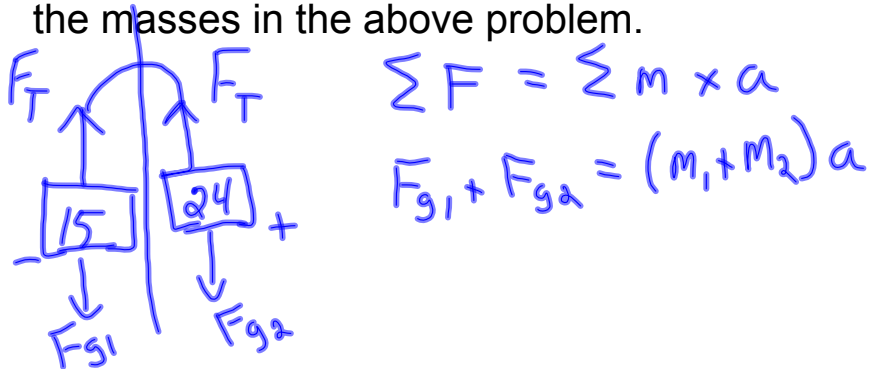
$$-(15)(9.81) + (24)(9.81) = (39)a$$

$$-147 \, N + 235 \, N = 39a$$

$$88.3 = 39a$$

$$\boxed{2.3 \, m/s^2 = a}$$

(b) $$\Sigma \bar{F} = ma$$

$$F_{g_1} + F_T = ma$$

$$-(15)(9.81) + F_T = 15(2.3)$$

$$-147 + F_T = 34.5$$

$$F_T = 34.5 + 147$$

$$\boxed{= 183 \, N}$$