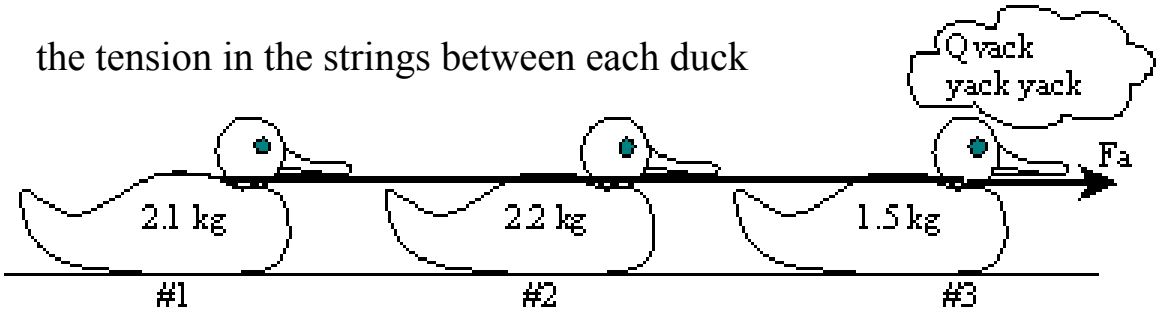
When a problem contains more than one mass in contact with each other it is called a **Multi-Mass** problem.

Ex: A student has three ducks tied together with string on a frictionless surface. He exerts a force of 10.0 N [Right] as shown below. Find:

a) the acceleration of the system

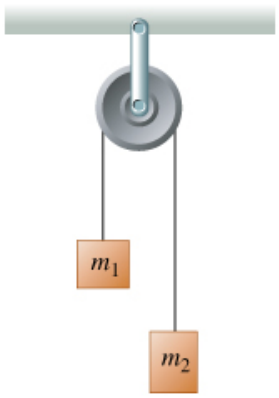
b) the tension in the strings between each duck



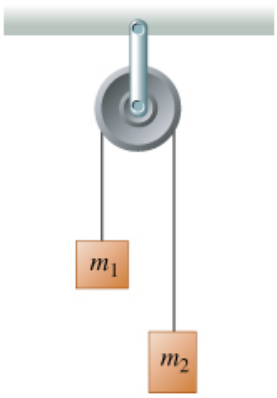
Atwood's Machine

Atwood's original illustrations show the main pulley's axle resting on the rims of another four wheels, to minimize friction forces from the bearings. Many historical implementations of the machine follow this design.

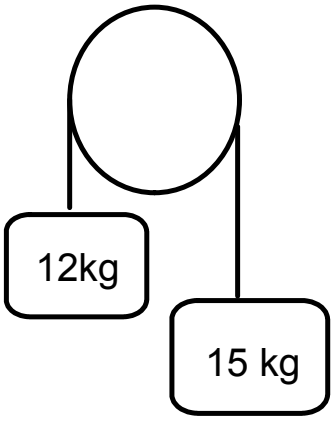
An elevator with a counterbalance approximates an ideal Atwood machine and thereby relieves the driving motor from the load of holding the elevator cab — it has to overcome only weight difference and inertia of the two masses.



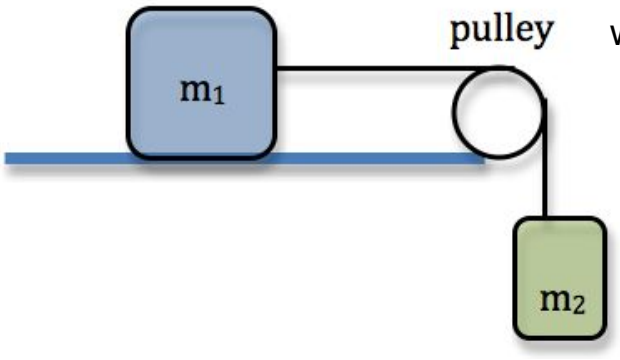
An ideal Atwoods Machine has a frictionless pulley and a string that does not stretch. Both masses move with uniform acceleration.



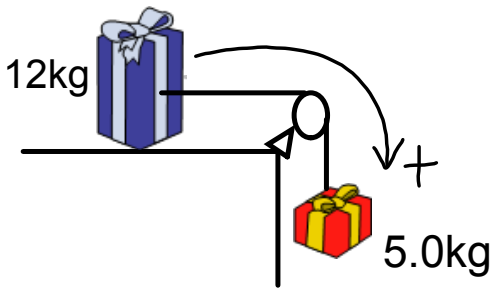
Find the acceleration and the tension when m1 = 7.0kg and m2 = 4.0kg.



Find the acceleration and the tension.



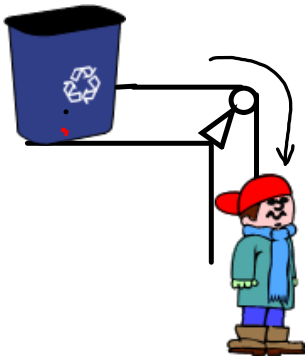
Find the acceleration and the tension when m1 = 5.5kg and m2 = 2.7kg.



Find the acceleration and the tension.

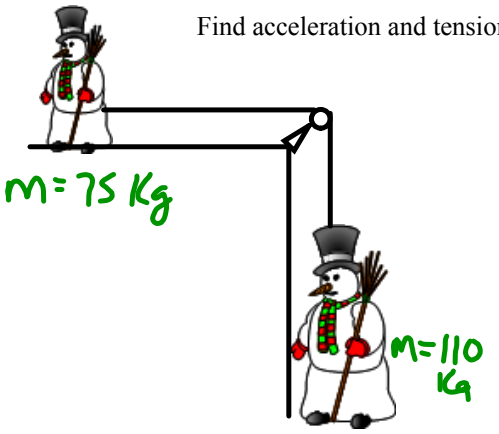
a)No Friction

b) $u_k = 0.1$

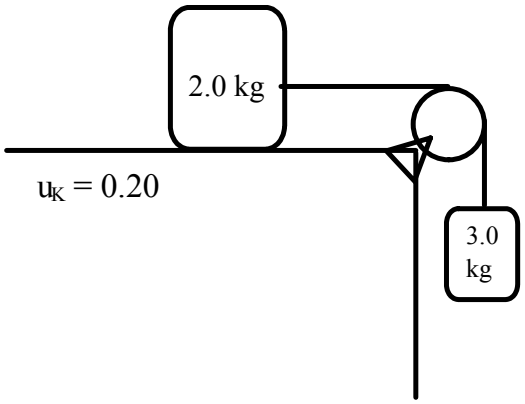


Find the acceleration and the tension when:
a)there is no friction
b) $u_k = 0.12$

Solution...



Find acceleration and tension when the coefficient of friction is 0.12.



Find the acceleration and the tension in the string.

PRACTICE...

Text page 202 1 (a) with and without friction

page 225 #11 (a) & (b) with and without friction

page 225 #12 & 13