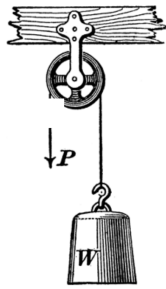


# The Atwood's Pulley



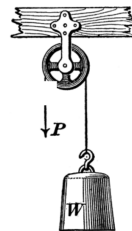
## POS Checklist:

- calculate the resultant force, or its constituents, acting on an object by adding vector components graphically and algebraically
- apply Newton's laws of motion to solve, algebraically, linear motion problems in horizontal, vertical and inclined planes near the surface of Earth, ignoring air resistance.

Questions from last day's homework?

## Pulleys

Many practical problems involve the use of one or more pulley. Here's a few pieces of info about pulleys:



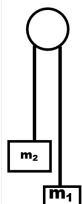
- we assume the pulley system has no friction.

- the pulley only changes the direction of the force!

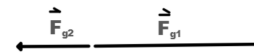
## Atwood's Pulley

If  $m_1 = 0.100 \text{ kg}$   
 $m_2 = 0.200 \text{ kg}$

What is the acceleration of the system?



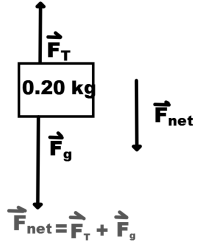
\*Hint = the pulley only changes the direction of force. If you straighten out the diagram, it would look like this:



$$\vec{F}_{net} = \vec{F}_{g1} + \vec{F}_{g2}$$

**Key Tip:** when finding the acceleration of the system, you must use the mass of the system!

ex) Find the tension in the rope in the previous problem.



\*Now consider only one mass (it doesn't matter which one). Draw a free-body diagram.

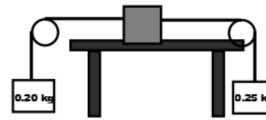
\*For the total force, use the acceleration of the system.

\*For the mass, use the mass of the single pulley.

\*Mind your integers!

## Two Pulley Systems

- the same as before, now with double the pulleys for double the fun!!!



ex) A box of mass 0.665 kg is on a horizontal frictionless table. Attached via pulleys are two masses, one 0.20 kg and one 0.25 kg. What is the acceleration of the system?

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- the same as before, now with double the pulleys for double the fun!!!



ex) What is the acceleration of the box if the force of friction between the table and the 15 kg box is 10 N?

**HW: Page 158 #7, 9**

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