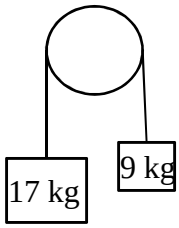
FORCE DIAGRAMS

Sample Problem

- A 65 kg person stands on a scale in an elevator. What weight does the scale register when the elevator accelerates at a rate of 3.5 m/s^2?

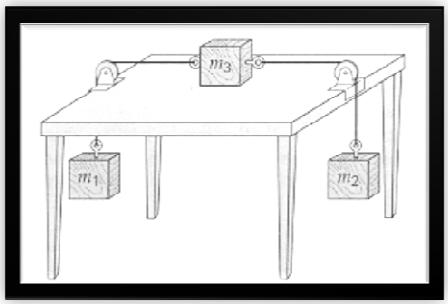
Atwood's Machine

- What is the acceleration of the masses?
- What is the tension in the rope?

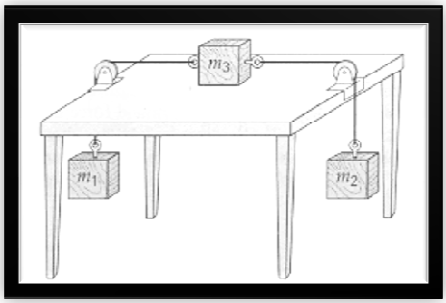


Atwood's Machine 2

- There is no friction in the system.
- m_1= 0.73kg, m_2= 0.32kg, m_3= 0.51kg
- Find the acceleration of the system.
- Find the tension in the string.

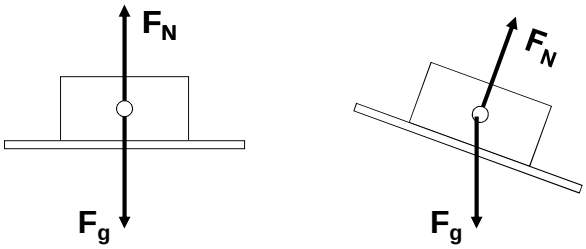


Atwood's Machine 2



Normal Force

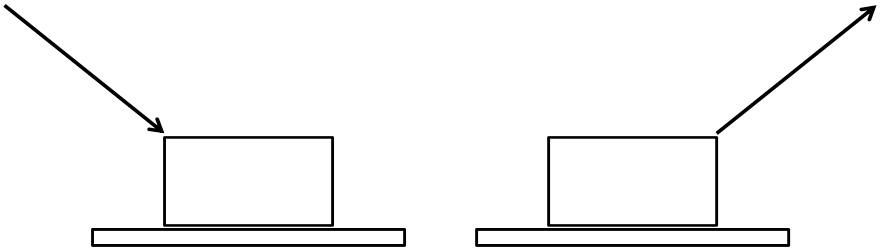
- The force acting perpendicular to the surface that the object is resting on.



- <u>On a flat surface</u>, the normal force, F_N, is equal to weight of the object.

Forces Applied at Angles

- When applying a force at an angle, some of the applied force is used to move the object and some is used to change the normal force.



Forces Applied at Angles Example 1

- A 30 kg lawnmower is pushed with a force of 55 N. If the handle of the mower makes an angle of 40^0 to the horizontal, what is the acceleration of the lawn mower and the normal force that the ground is supplying to the mower?

Forces Applied at Angles Example 1

Forces Applied at Angles Example 2

- A worker drags a 310 kg crate across a factory floor by pulling on a rope attached to the crate. The worker applies a 450 N force on the rope which is at a 38° to the horizontal. The floor exerts a horizontal force of 125 N that opposes the motion. Calculate the acceleration of the crate and the normal force supplied by the floor?

Forces Applied at Angles Example 2

Forces Applied at Angles Example 3

- You hang a 30 kg sign from the ceiling using 2 cables. If each of the cables make a 60^0 angle with the ceiling, what is the tension in each cable?