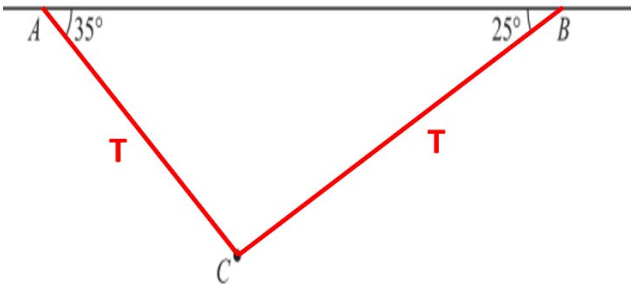
Year 2 Applied Chp 7 - Application of Forces

Inextensible String

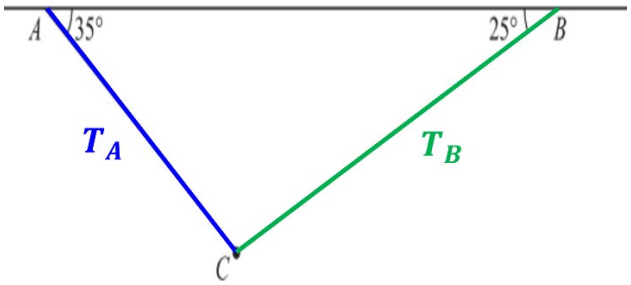
No matter how much you pull on it, it won't extend.

One continuous piece of string.



T and T same tension

Two seperate pieces of string.



T_A and T_A different tensions

Solving

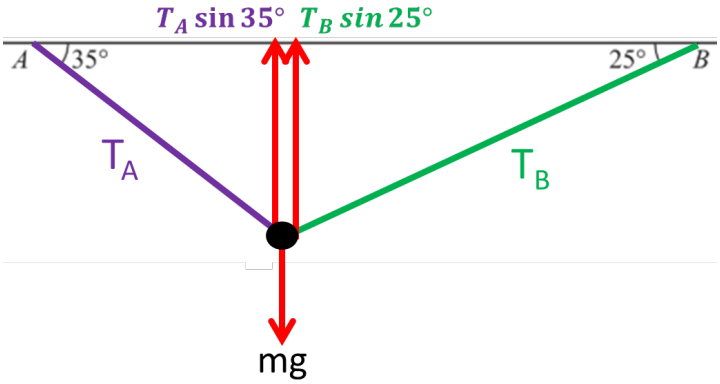
Write two equations.

One for vertical equations.
Forces up = Forces down

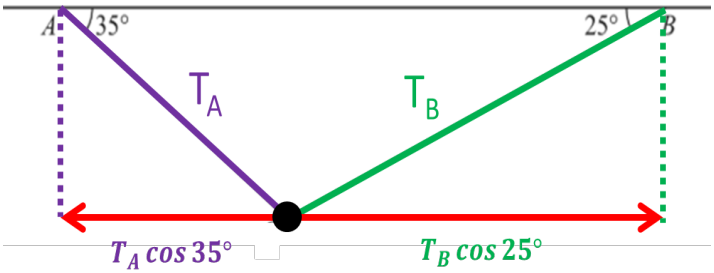
One for horitional equations.
Forces right = Forces left

Then solve the two equations simultaneous if needed.

Vertical Forces

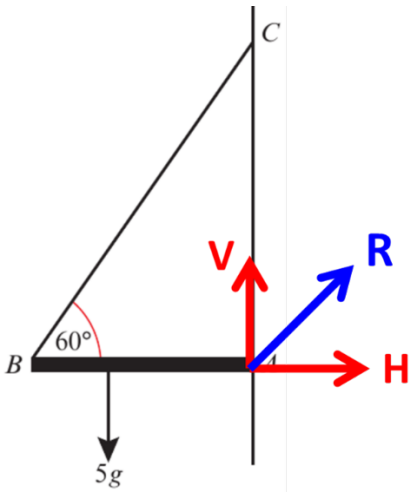


Horizontial Forces



Hinges

Freely hinged means that a rod can rotate about the point it is hinged.



At a hinge there will be a vertical and horizontal forces producing a resultant force.

$$\sqrt{(Vertical)^2 + (Horizontial)^2} = Resultant$$

Solving

Write three equations.

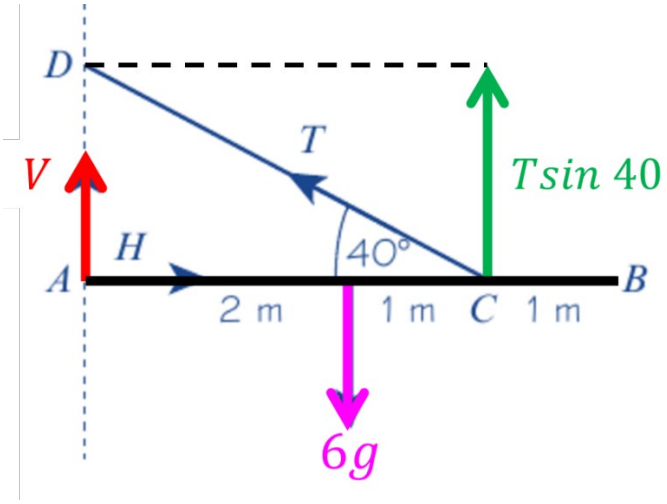
One for vertical equations.
Forces up = Forces down

One for horitional equations.
Forces right = Forces left

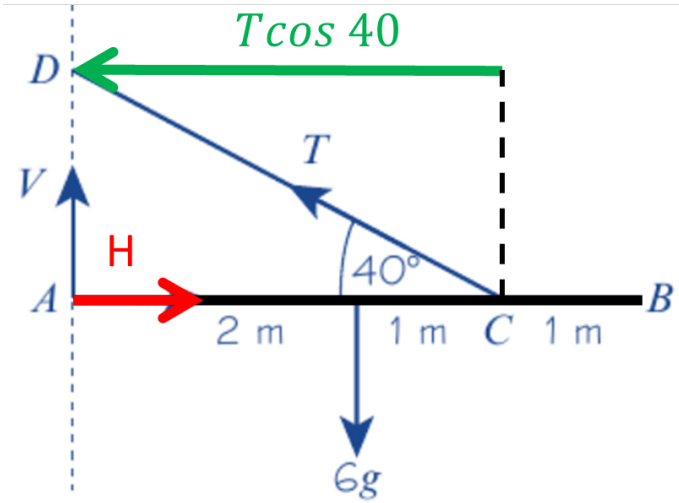
One for Moments
(often use the hinge as the pivot point)

Then solve the two equations simultaneous if needed.

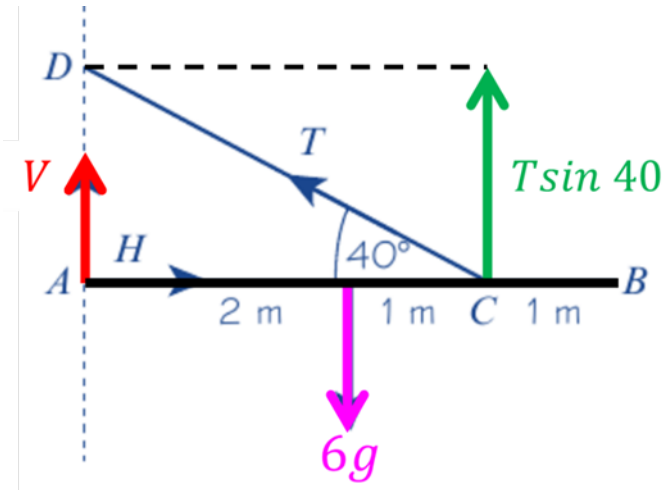
Vertical Forces



Horizontial Forces



Moments



Pivot A to find T

Pivot C to find V

Year 2 Applied Chp 7 – Application of Forces

Ladders and Solving

Write three equations.

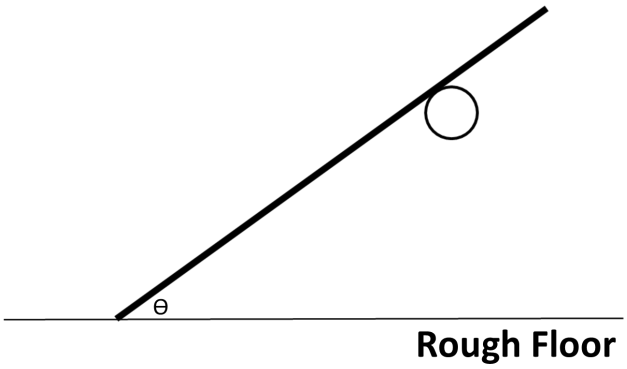
One for vertical equations.
Forces up = Forces down

One for horitional equations.
Forces right = Forces left

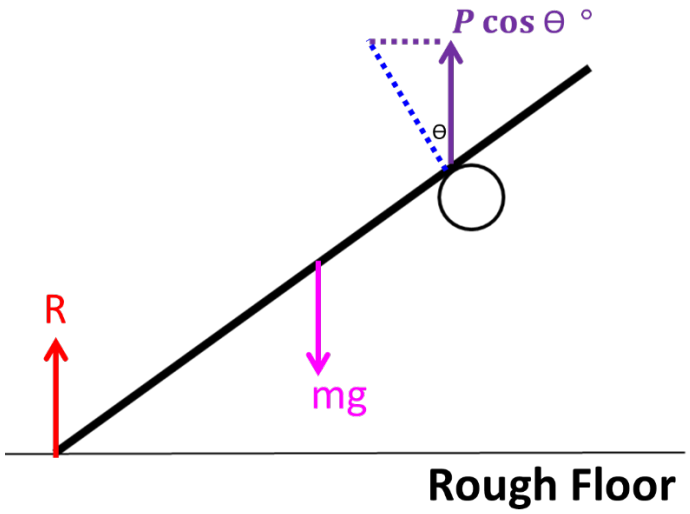
One for Moments
(often use the hinge as the pivot point)

Then solve the two equations simultaneous if needed.

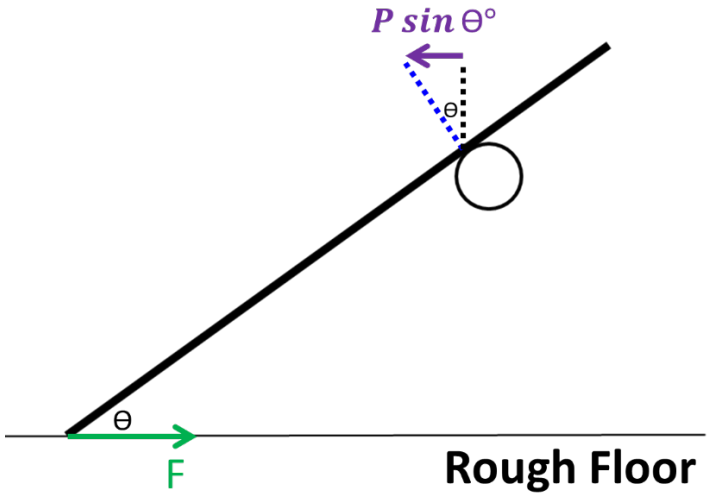
Ladders and pegs



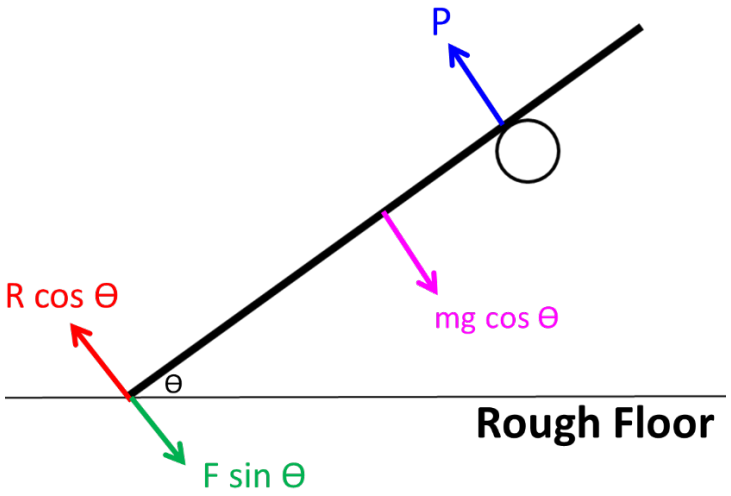
Vertical Forces



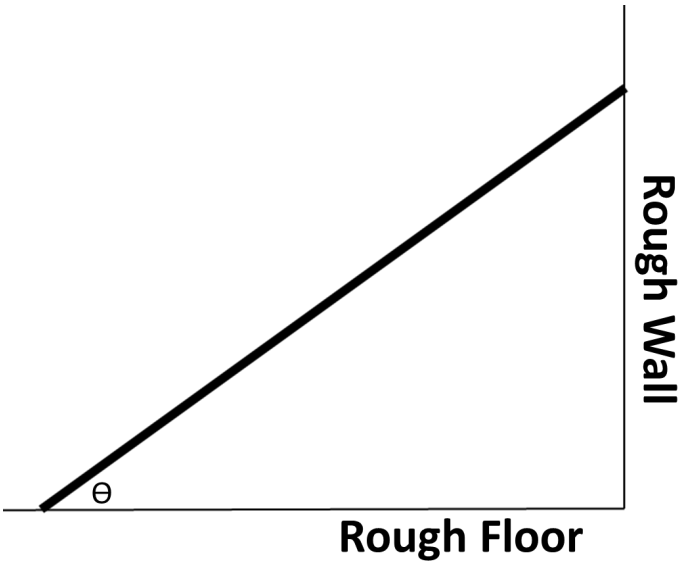
Horizontial Forces



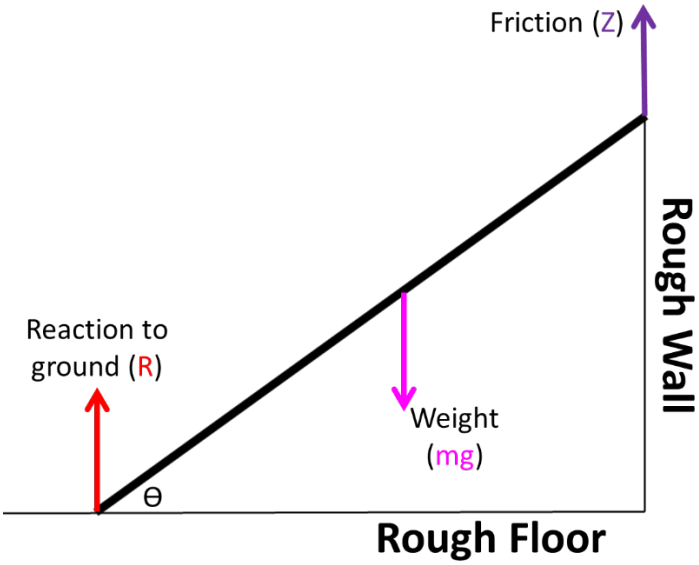
Moments



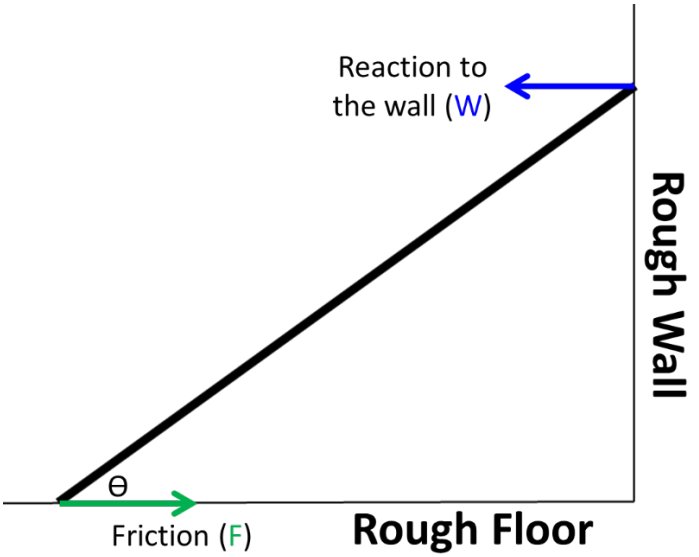
Ladders and Walls



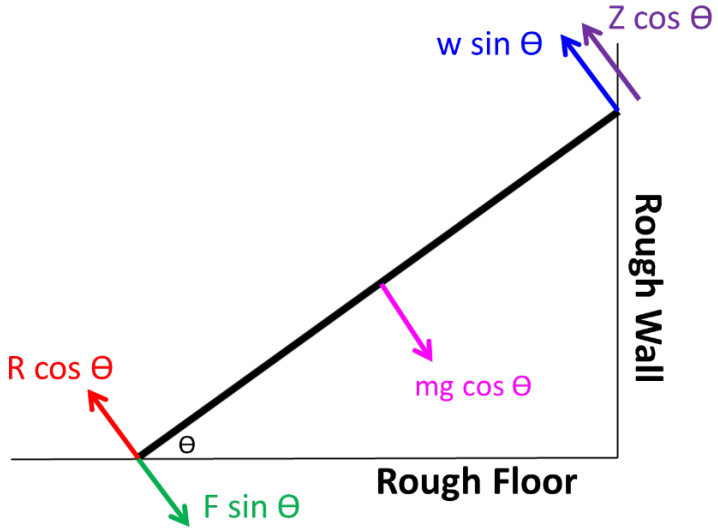
Vertical Forces



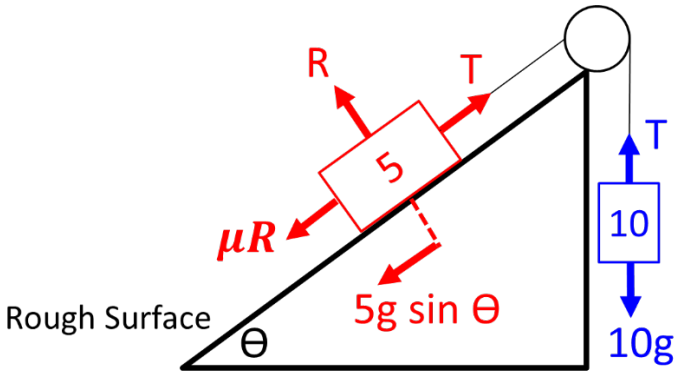
Horizontial Forces



Moments



Connected Particles



Write an **F = ma** equation for each practical.

Then solve simultaneously.

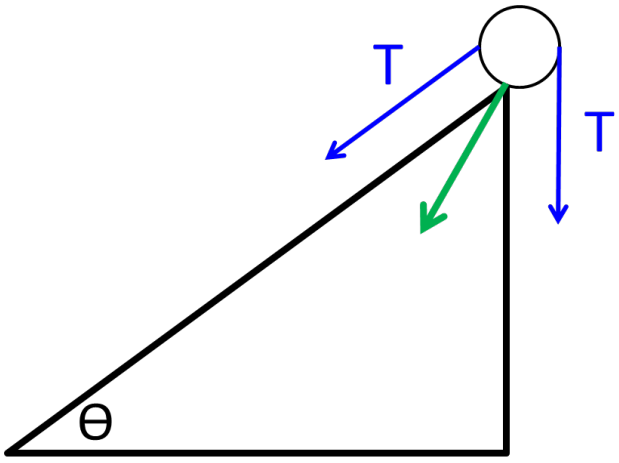
F = ma

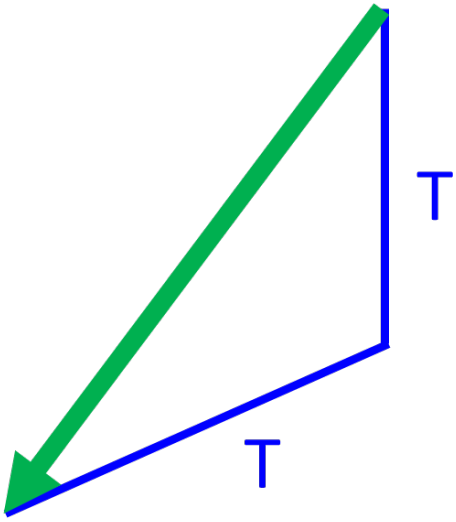
T – μR – 5g sin Θ = 5a

F = ma

10g – T = 10a

Force Exerted on a Pully





Force Exerted on Pully

$= 2T \cos\left(\frac{90 - \Theta}{2}\right)$