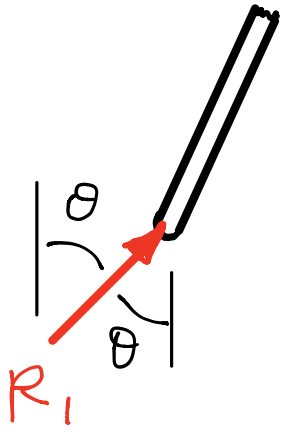
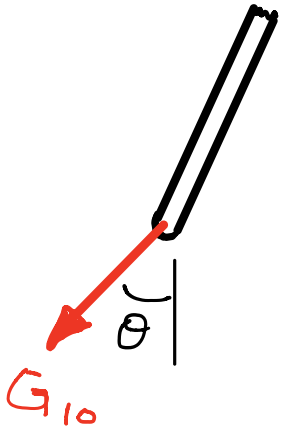
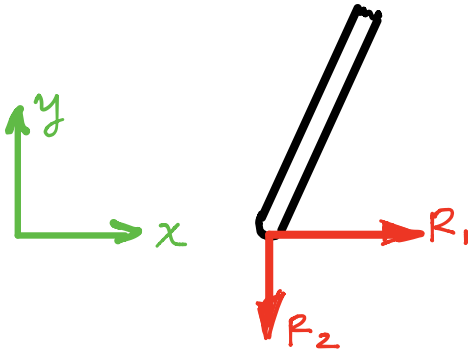
Types of Connection	Reaction	Number of Unknowns
(3) roller		One unknown. The reaction is a force which acts perpendicular to the surface at the point of contact.

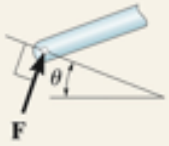


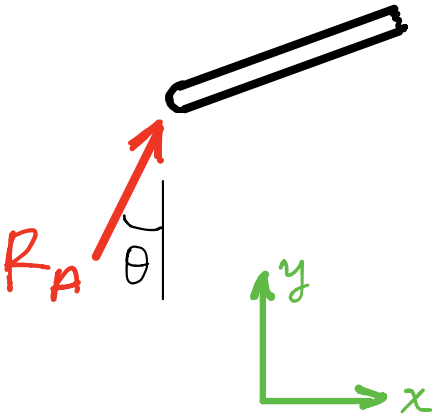


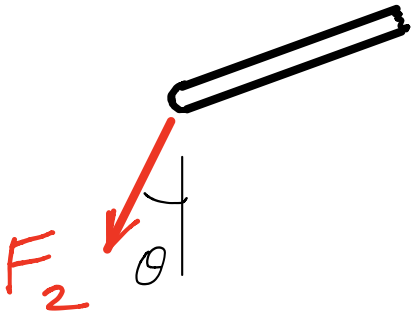


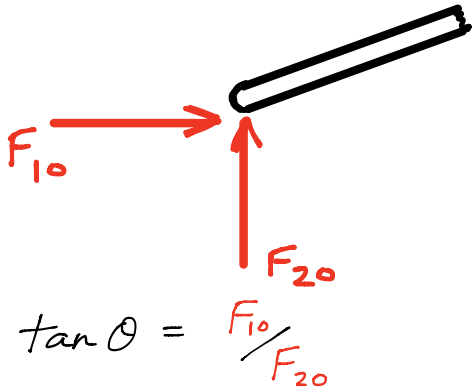
$$\tan\theta = R_1 / R_2$$

$$R_1 = R_2 \tan\theta$$

Types of Connection	Reaction	Number of Unknowns
(4) rocker		One unknown. The reaction is a force which acts perpendicular to the surface at the point of contact.



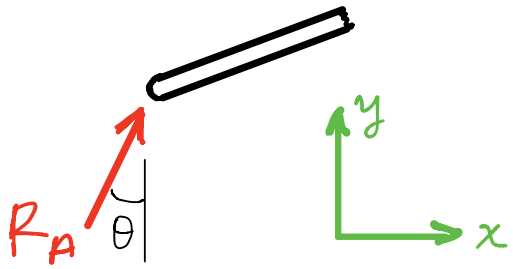


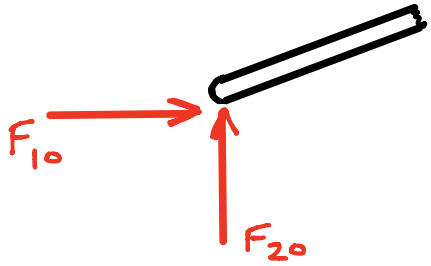


$$\tan\theta = F_{10} / F_{20}$$

$$F_{10} = F_{20} \tan\theta$$

Types of Connection	Reaction	Number of Unknowns
(5) smooth contacting surface		One unknown. The reaction is a force which acts perpendicular to the surface at the point of contact.

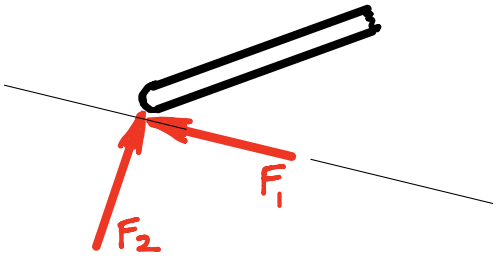


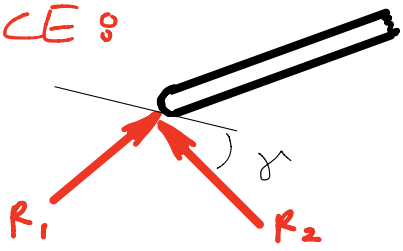


$$\tan\theta = F_{10}/F_{20}$$

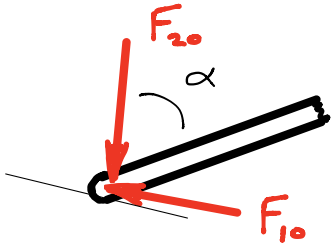
$$F_{10} = F_{20}\tan\theta$$

ROUGH SURFACE'S



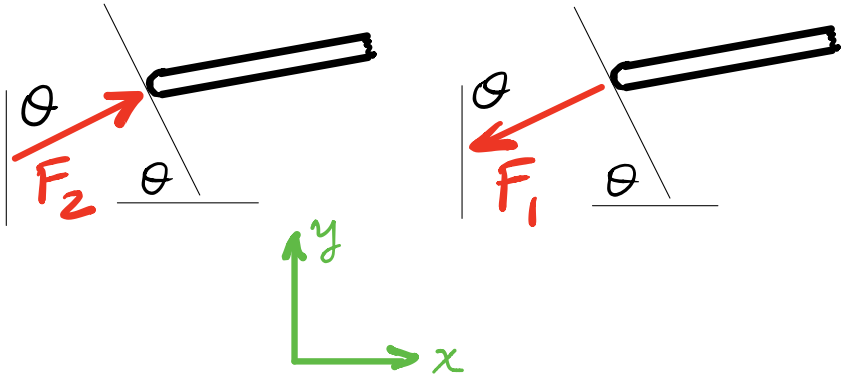


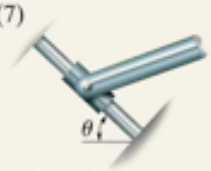
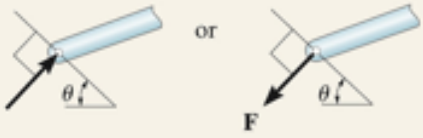
$0° < \gamma < 90°$

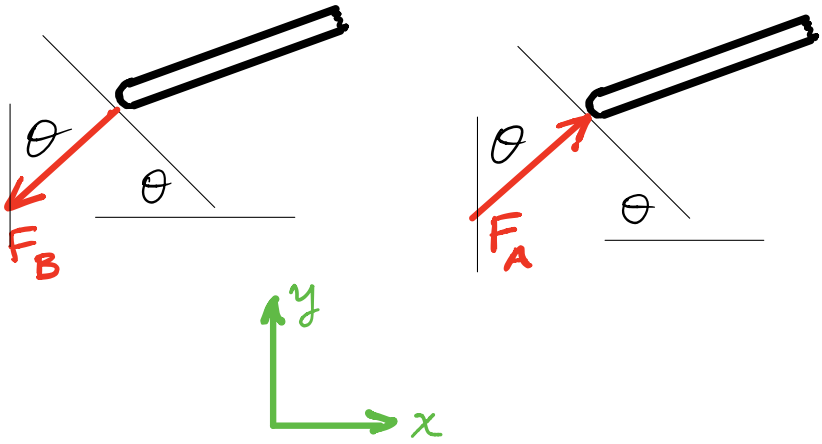


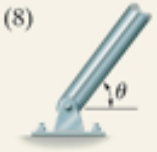
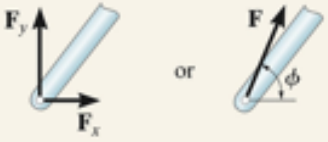
$0° < \alpha < 90°$

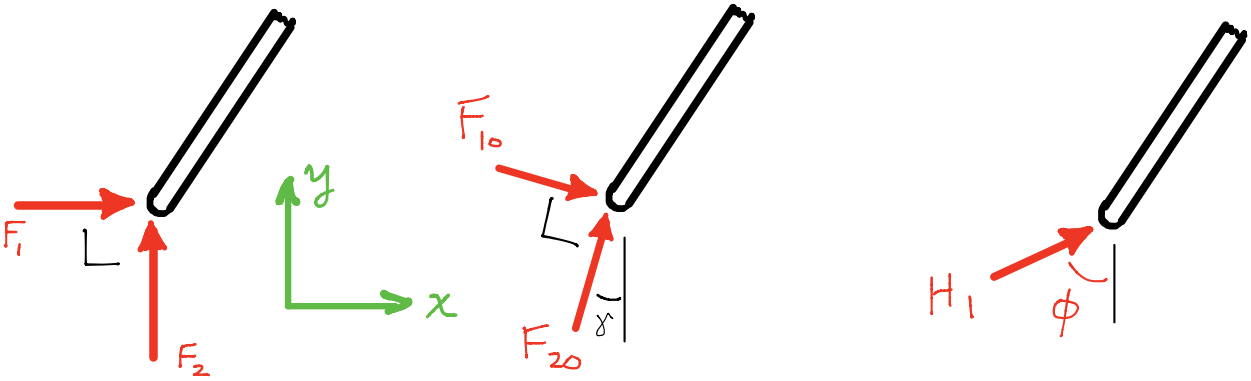
Types of Connection	Reaction	Number of Unknowns
(6) roller or pin in confined smooth slot		One unknown. The reaction is a force which acts perpendicular to the slot.



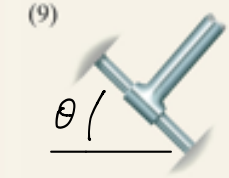
Types of Connection	Reaction	Number of Unknowns
(7)  member pin connected to collar on smooth rod		One unknown. The reaction is a force which acts perpendicular to the rod.

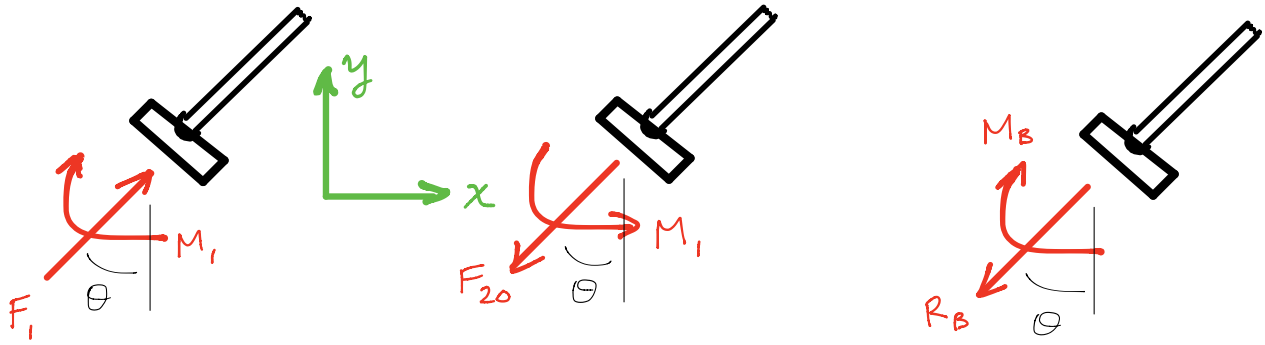


Types of Connection	Reaction	Number of Unknowns
(8)  smooth pin or hinge		Two unknowns. The reactions are two components of force, or the magnitude and direction ϕ of the resultant force. Note that ϕ and θ are not necessarily equal [usually not, unless the rod shown is a link as in (2)].



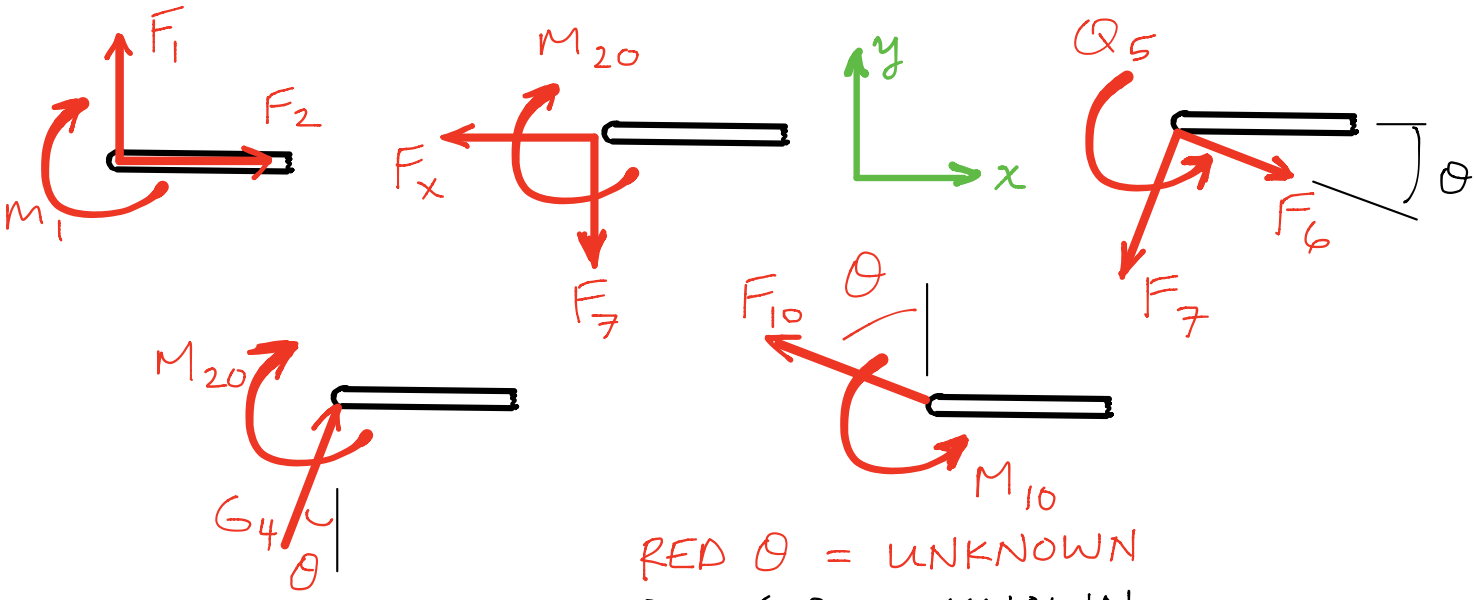
$0° < \gamma < 90°$

Types of Connection	Reaction	Number of Unknowns
(9)  member fixed connected to collar on smooth rod		Two unknowns. The reactions are the couple moment and the force which acts perpendicular to the rod.



θ KNOWN

Types of Connection	Reaction	Number of Unknowns
(10) fixed support		Three unknowns. The reactions are the couple moment and the two force components, or the couple moment and the magnitude and direction ϕ of the resultant force.



RED θ = UNKNOWN

BLACK θ = KNOWN