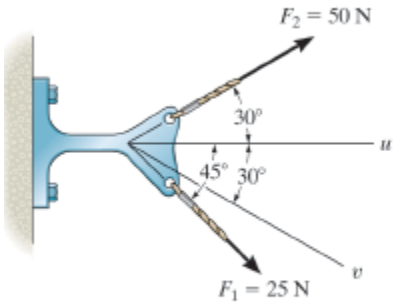
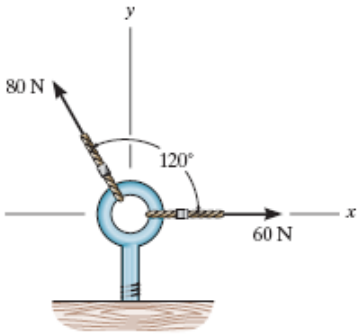
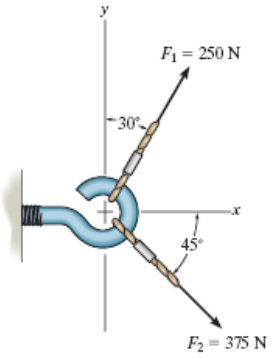
Al-Azhar University.
Faculty of Engineering.

Engineering Mechanics.
Prep. Year Students.
Sheet No. (1).

[1]. In each of the following figures, determine the magnitude and direction of the resultant of the two forces shown.







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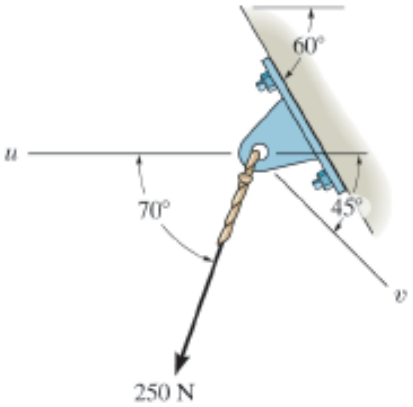
[2]. The force F of magnitude 250 N is to be resolved into two components along the lines *u* and *v*. Determine the components of the **F** force acting along the *u* and *v* axes.



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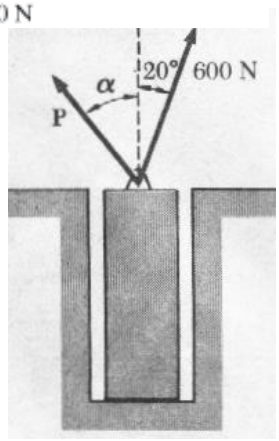
[3]. Knowing that α= 30°, determine the magnitude of the force P so that the resultant force exerted on the cylinder is vertical. What is the corresponding magnitude of the resultant?

[4]. For problem 3, If the tension in one cable is 600 N, determine the magnitude and direction of the force P so that the resultant is a vertical force of 900 N.



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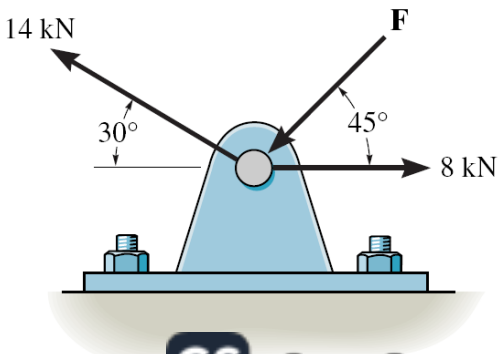
[5]. Determine the magnitude of force F so that the resultant force of the three forces is as small as possible. What is the magnitude of the resultant force?



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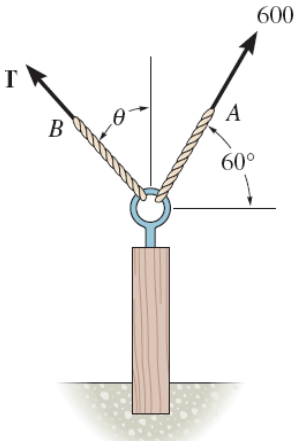
[6]. The post is to be pulled out of the ground using two ropes *A* and *B*. Rope *A* is subjected to force **F** =600N and is directed at angle 60° from the horizontal. If the resultant force acting on the post is to be **1200N**, vertically upward, determine the force *T* in rope *B* and the corresponding angle θ.



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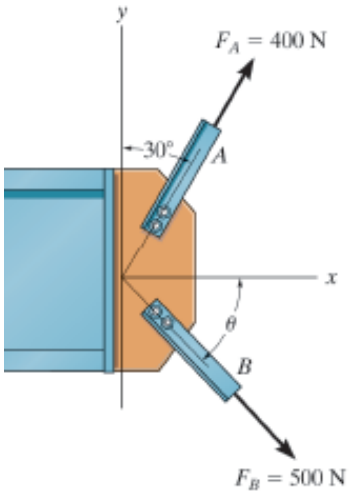
[7]. The plate is subjected to the forces acting on members *A* and *B* as shown. Determine the magnitude of the resultant of these forces and its direction measured clockwise from the positive *x* axis (θ = 60°).

[8]. Determine the angle θ for connecting member *B* to the plate so that the resultant of $\mathbf{F}_A$ and $\mathbf{F}_B$ is directed along the positive *x* axis. What is the magnitude of the resultant force?



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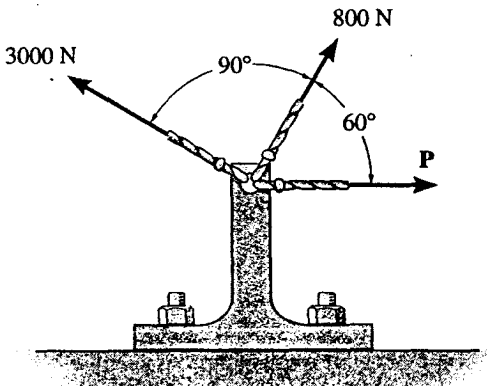
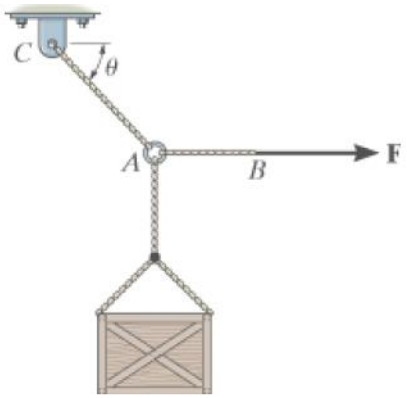
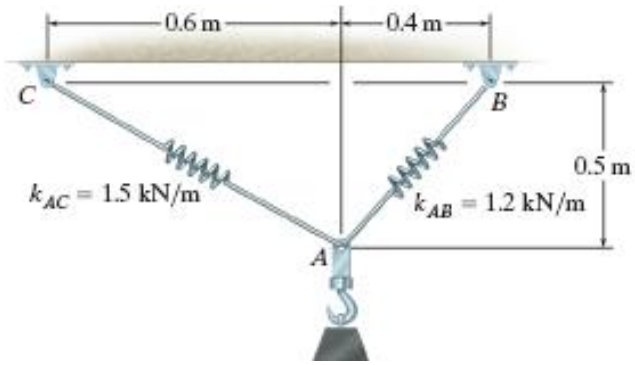
[9]. The three forces are applied to the bracket. Determine the range of values for the magnitude of force **P** so that the resultant of the three forces does not exceed 2400 N.

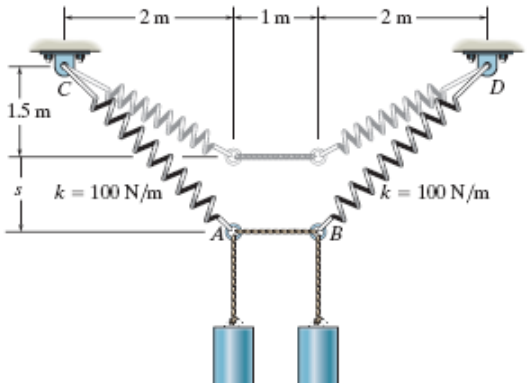


[10]. The crate of weight *W* is hoisted using the ropes *AB* and *AC*. Each rope can withstand a maximum tension *T* before it breaks. If *AB* always remains horizontal, determine the smallest angle θ to which the crate can be hoisted.





[11].The block of mass *M* is supported by two springs having the stiffness shown. Determine the unstretched length of each spring.



[12].Determine the mass of each of the two cylinders if they cause a sag of distance *0.5m* when suspended from the rings at *A* and *B*. Note that *s* = 0 when the cylinders are removed.

[13].The springs on the rope assembly are originally stretched 1 ft when θ = 0°. Determine the vertical force F that must be applied so that θ = 30º.