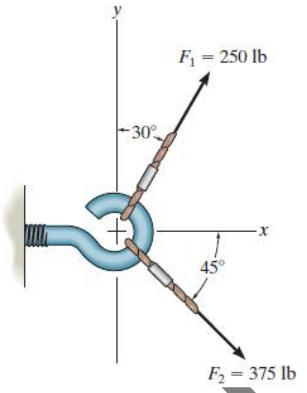
Damietta university
Faculty of engineering
Mechanics sheets

FACULTY OF ENGINEERING
DAMIETTA UNIVERSITY
كلية الهندسة-جامعة دمياط

Sheet No (1)

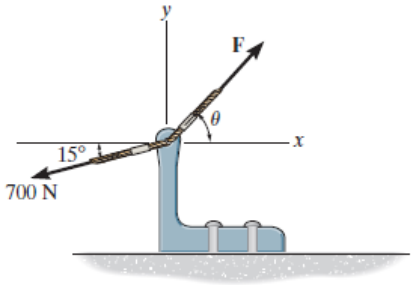
PROBLEMS

1- Determine the magnitude of the resultant force $\mathbf{F}_R = \mathbf{F}_1 + \mathbf{F}_2$ and its direction, measured counterclockwise from the positive *x* axis.



2- If Θ = 60º and F = 450 N, determine the magnitude of the resultant force and its direction, measured counterclockwise from the positive x axis.

3- If the magnitude of the resultant force is to be 500 N, directed along the positive y axis, determine the magnitude of force F and its direction Θ.



Prob. 2& 3

4- Determine the magnitude of the resultant force $F_R = F_1 + F_2$ and its direction, measured clockwise from the positive Θ axis.

5- Resolve the force F_1 into components acting along the *u* and *v* axes and determine the magnitudes of the components.

6- Resolve the force F_2 into components acting along the *u* and *v* axes and determine the magnitudes of the components.

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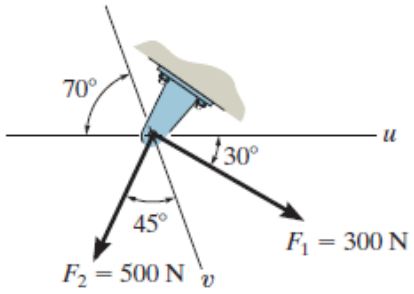
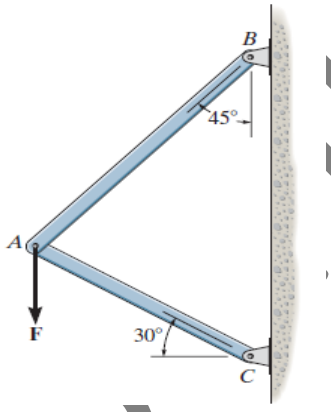
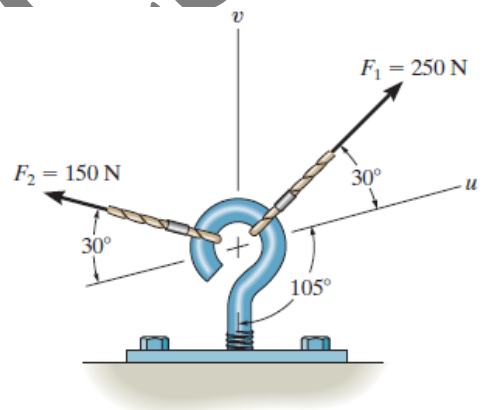


Prob. 5& 6

7- The vertical force F acts downward at A on the two membered frame. Determine the magnitudes of the two components of F directed along the axes of AB and AC. Set F = 500 N.



8- Resolve F_1 into components along the u and v axes and determine the magnitudes of these components.



9- The force acting on the gear tooth is F = 20 lb. Resolve this force into two components acting along the lines aa and bb.

10- The component of force F acting along line aa is required to be 30 lb. Determine the magnitude of F and its component along line bb.

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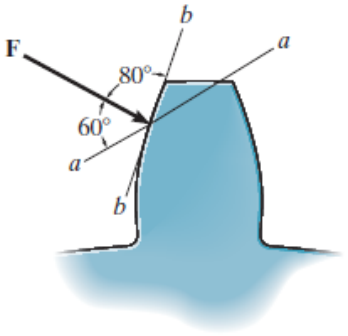
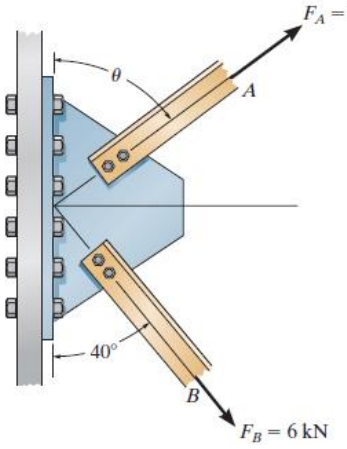


Prob. 9& 10

11- The plate is subjected to the two forces at A and B as shown. If u = 60º, determine the magnitude of the resultant of these two forces and its direction measured clockwise from the horizontal.

12- Determine the angle Θ for connecting member A to the plate so that the resultant force of F_A and F_B is directed horizontally to the right. Also, what is the magnitude of the resultant force?



Prob. 11& 12

13- Determine the design angle Θ (0º ≤ Θ ≤ 90º) for strut AB so that the 400-lb horizontal force has a component of 500 lb directed from A towards C. What is the component of force acting along member AB? Take ϕ = 40º.

14- Determine the design angle Θ (0º ≤ ϕ ≤ 90º) between struts AB and AC so that the 400-lb horizontal force has a component of 600 lb which acts up to the left, in the same direction as from B towards A . Take Θ = 30º.

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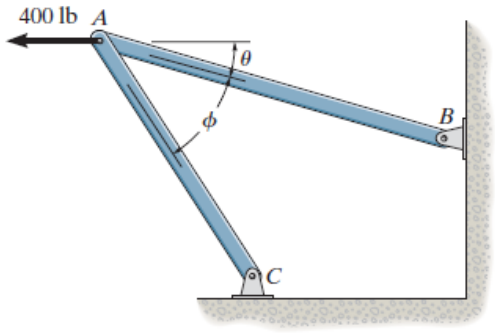
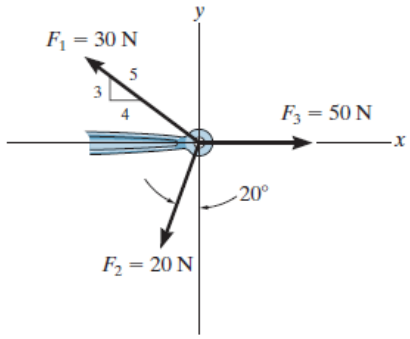


Prob. 13& 14

15- Determine the magnitude and direction of the resultant $F_R = F_1 + F_2 + F_3$ of the three forces by first finding the resultant $F` = F_1 + F_2$ and then forming $F_R = F` + F_3$.

16- Determine the magnitude and direction of the resultant $F_R = F_1 + F_2 + F_3$ of the three forces by first finding the resultant $F` = F_2 + F_3$ and then forming $F_R = F` + F_1$.



Prob. 15& 16

17- Two forces act on the screw eye. If F = 600 N, determine the magnitude of the resultant force and the angle Θ if the resultant force is directed vertically upward.

18- Two forces are applied at the end of a screw eye in order to remove the post. Determine the angle Θ ($0^o \leq \Theta \leq 90^o$) and the magnitude of force F so that the resultant force acting on the post is directed vertically upward and has a magnitude of 750 N.

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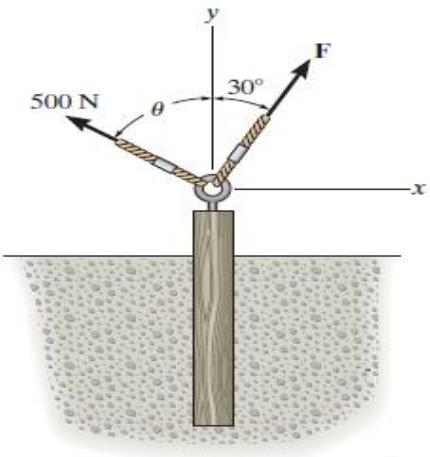
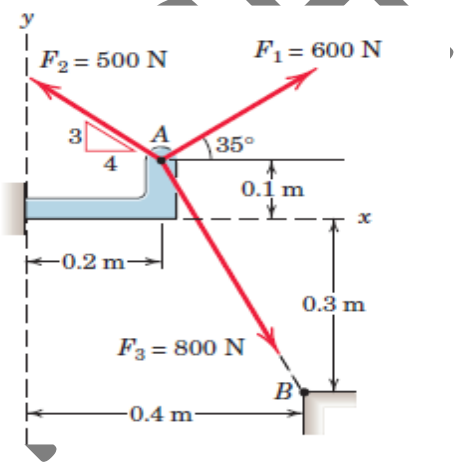
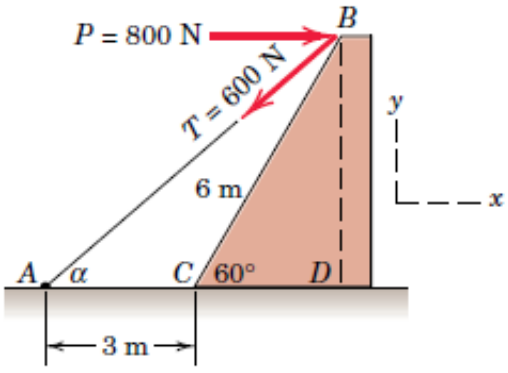


Prob. 17& 18

19- The forces **F**1, **F**2, and **F**3, all of which act on point *A* of the bracket, are specified in three different ways. Determine the *x* and *y* scalar components of each of the three forces.



20- Combine the two forces **P** and **T**, which act on the fixed structure at *B*, into a single equivalent force **R**.



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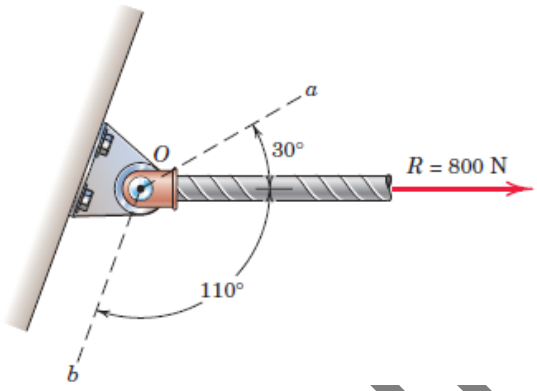
Sheet No (1)

21- Determine the scalar components R_a and R_b of the force R along the nonrectangular axes a and b. Also determine the orthogonal projection P_a of R onto axis a.



23- Determine the resultant R of the two forces shown by (a) applying the parallelogram rule for vector addition and (b) summing scalar components.