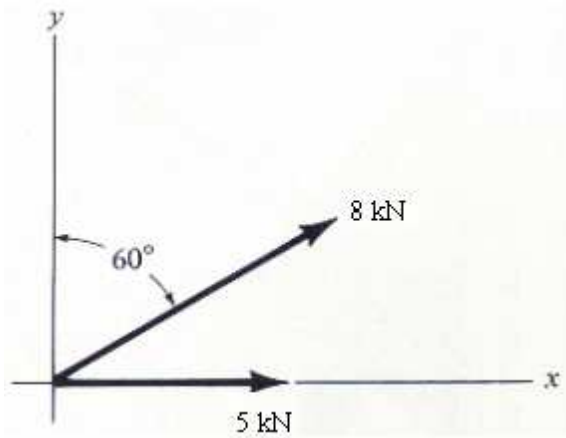


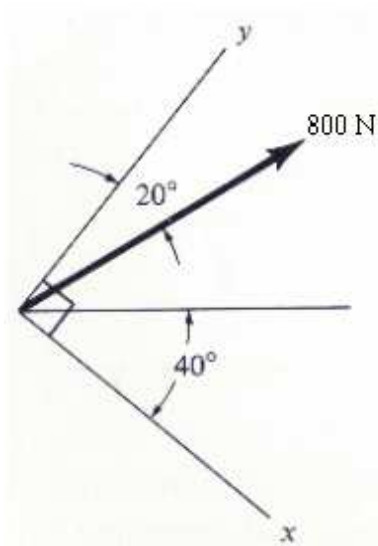
Engineering Statics Homework 1

1. Determine the magnitude of the resultant force and its direction measured from the positive x axis.



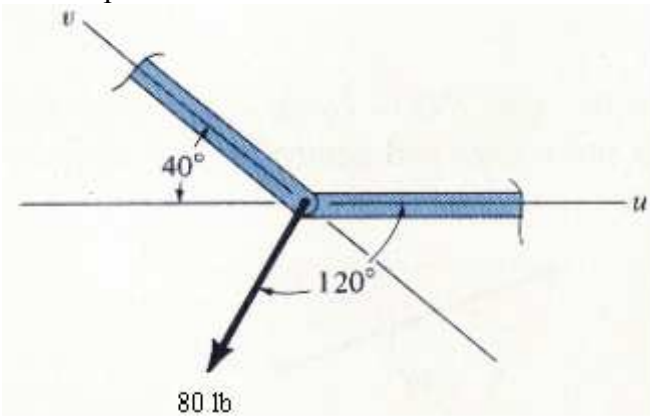
- (a) What is the magnitude of the resultant force? _____
- (b) What is the angle α , in degrees, between the resultant force and the positive x axis?

2. Determine the x and y components of the 800-N force.



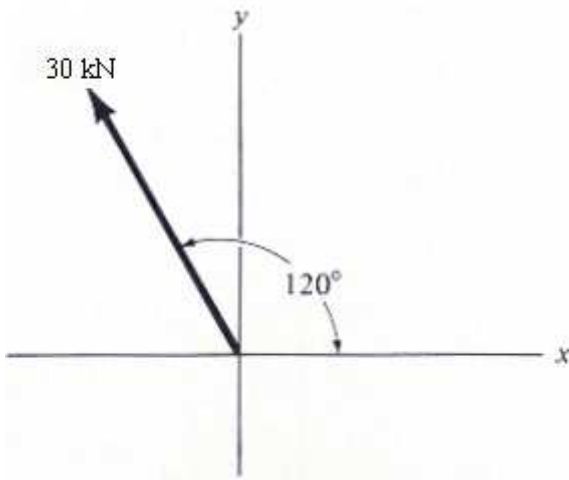
- (a) What is the x component of the force?
- (b) What is the y component of the force?

3. Resolve the 80-lb force into components acting along the u and v axes and determine the magnitudes of the components.



- (a) What is the u component of the force?
(b) What is the v component of the force?

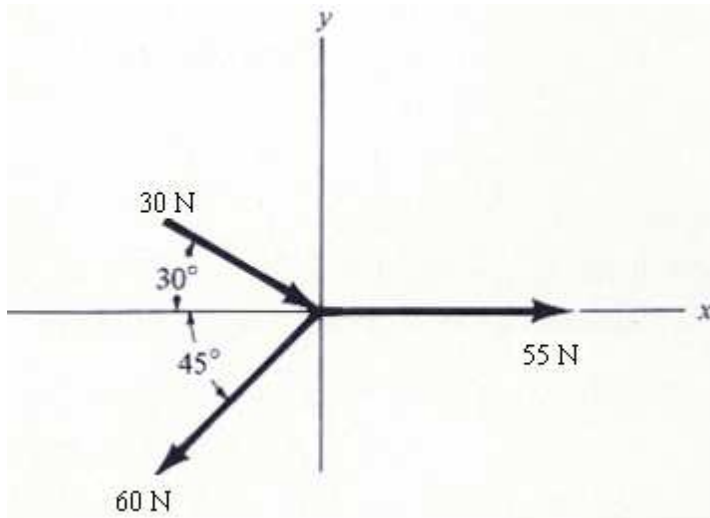
4. Determine the x and y components of the 30-kN force.



- (a) What is the x component of the force?
(b) What is the y component of the force?

5.

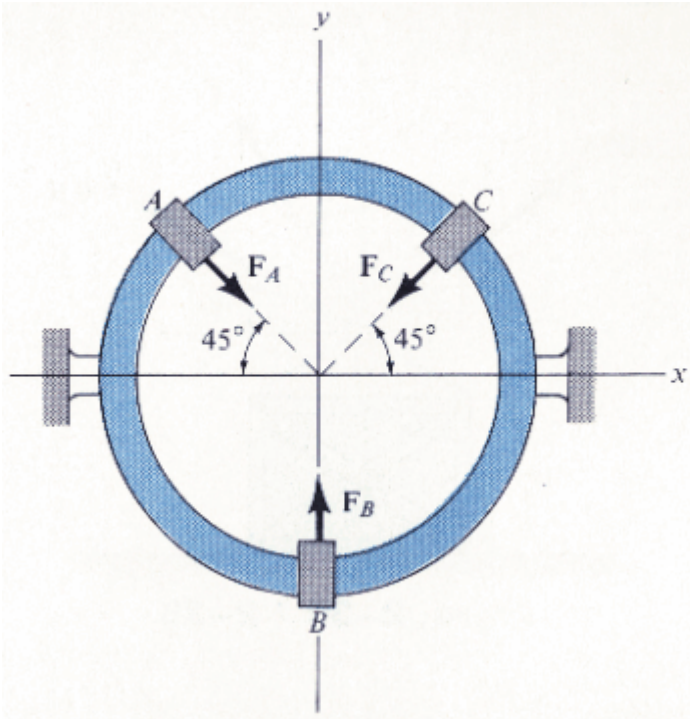
Determine the magnitude of the resultant force and its direction measured from the positive x axis.



- (a) What is the magnitude of the resultant force?
- (b) What is the angle, in degrees, between the resultant force and the positive x axis?

6.

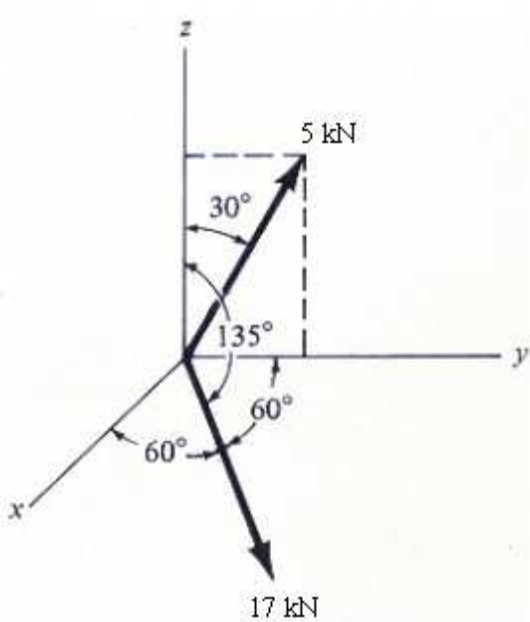
Three concurrent forces act on the ring as shown. If each has a magnitude of 65N, find the resultant force.



- (a) What is the magnitude of the resultant force?
- (b) What is the direction of the resultant force? (select one)
- pointing downward along the y axis
 - pointing outward perpendicular to the x - y plane
 - pointing inward perpendicular to the x - y plane
 - pointing upward along the y axis

7.

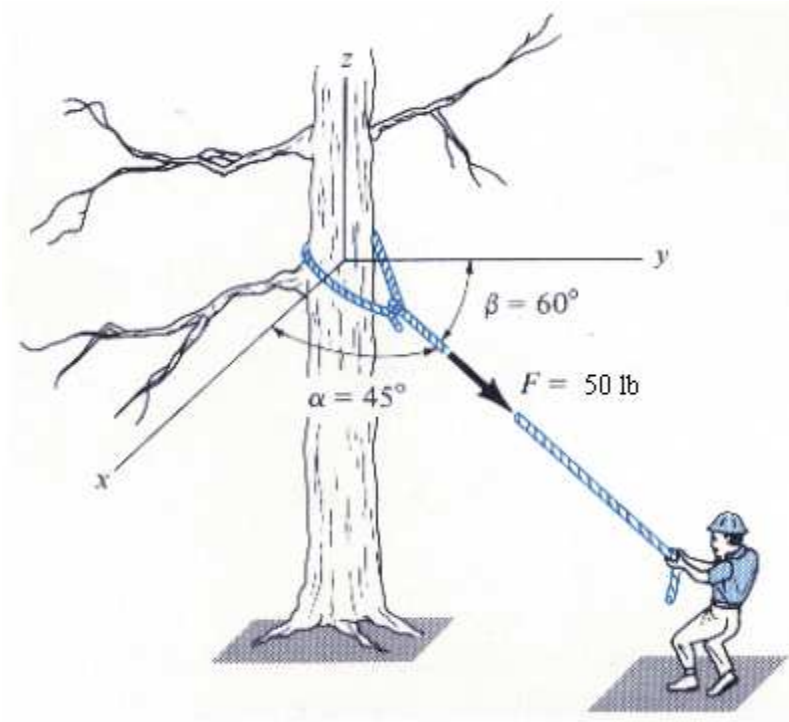
Determine the magnitude and coordinate direction angles of the resultant force.



- (a) What is the magnitude of the resultant force?
- (b) What is the angle α , in degrees, between the resultant force and the x axis?
- (c) What is the angle β , in degrees, between the resultant force and the y axis?
- (d) What is the angle γ , in degrees, between the resultant force and the z axis?

8.

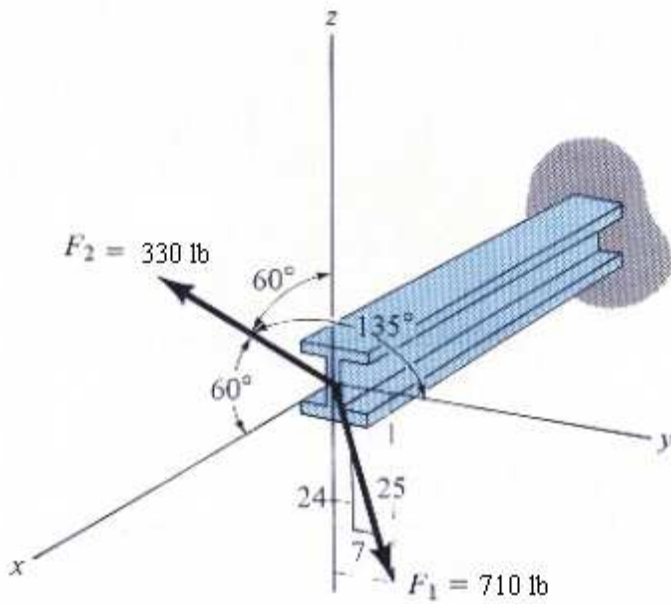
The man pulls on the rope with a force of 50 lb. If F acts within the octant shown, such that $\alpha = 45^\circ$, $\beta = 60^\circ$, determine the x , y , z components of F .



- (a) What is the x component of F ?
- (b) What is the y component of F ?
- (c) What is the z component of F ?

9.

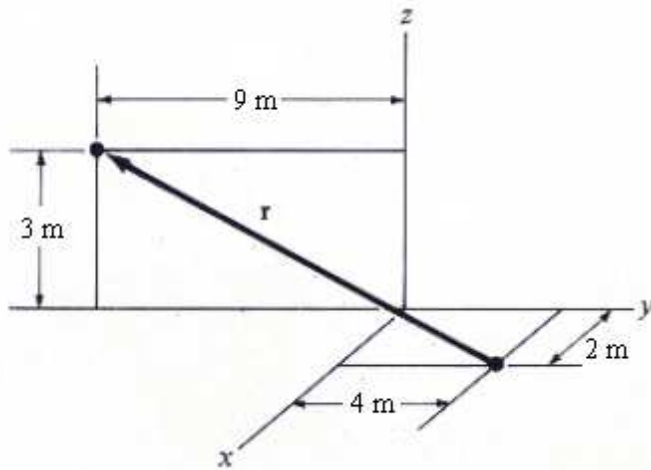
The beam is subjected to the two forces shown. Express each force in Cartesian vector form and determine the magnitude and coordinate direction angles of the resultant force.



- (a) What is F_1 in Cartesian vector form?
- (b) What is F_2 in Cartesian vector form?
- (c) What is the magnitude of the resultant force?
- (d) What is the angle, in degrees, between the resultant force and the x axis?
- (e) What is the angle, in degrees, between the resultant force and the y axis?
- (f) What is the angle, in degrees, between the resultant force and the z axis?

10.

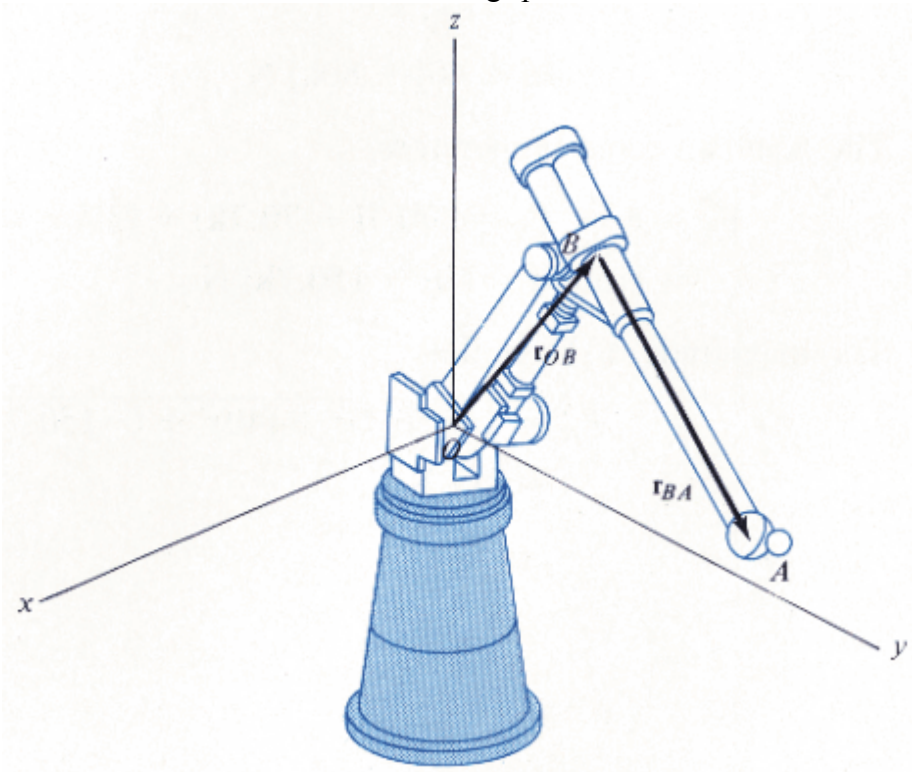
Express the position vector r in Cartesian vector form; then determine its magnitude and coordinate direction angles.



- (a) What is the position vector r , in meters?
- (b) What is the magnitude of r , in meters? _____ m
- (c) What is the angle between r and the x axis? _____
- (d) What is the angle between r and the y axis? _____
- (e) What is the angle between r and the z axis? _____

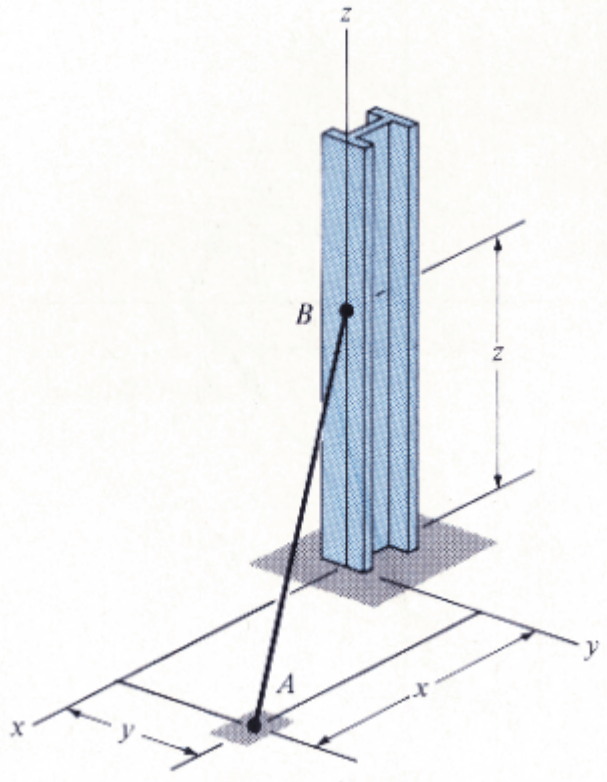
11.

At the instant shown, position vectors along the robotic arm from O to B and B to A are $\mathbf{r}_{OB} = \{85\mathbf{i} + 315\mathbf{j} + 400\mathbf{k}\}$ mm and $\mathbf{r}_{BA} = \{350\mathbf{i} + 225\mathbf{j} - 640\mathbf{k}\}$ mm, respectively. Determine the distance from O to the grip at A .



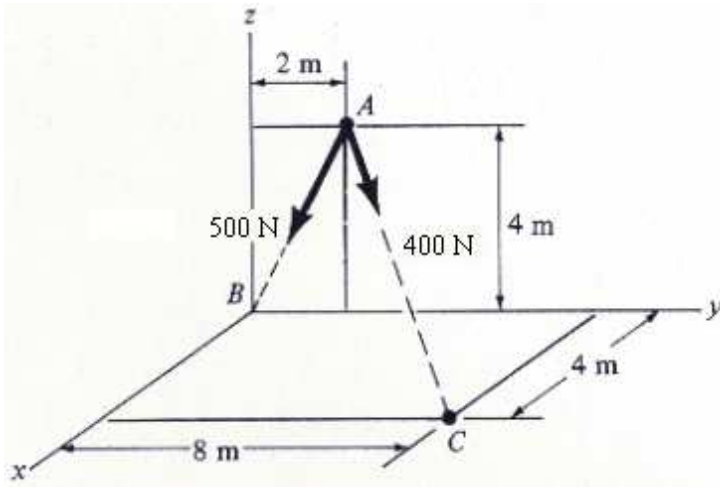
12.

The 14-m-long cable is anchored to the ground at A . If $x = 6$ m and $y = 4$ m, determine the coordinate z to the highest point of attachment along the column.



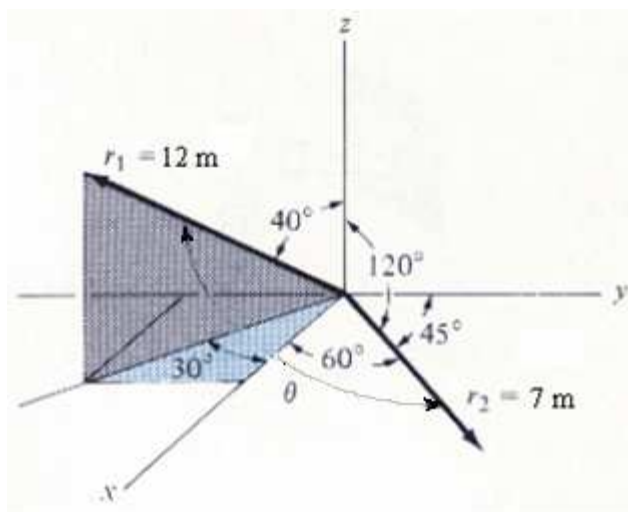
13.

Determine the magnitude and coordinate direction angles of the resultant force.



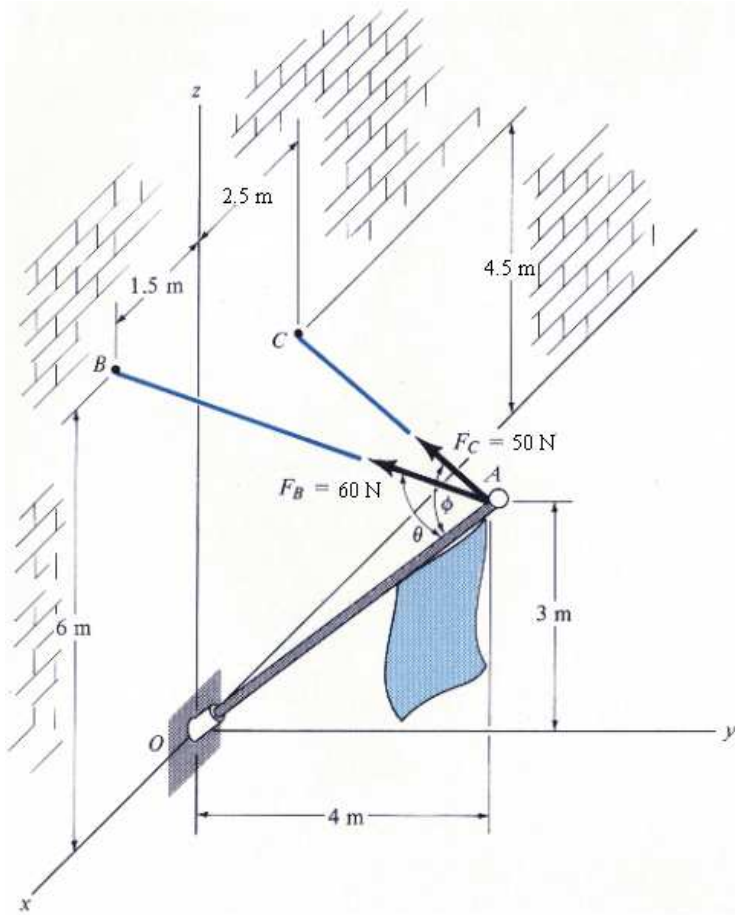
- (a) What is the magnitude of the resultant force?
- (b) What is the angle, in degrees, between the resultant force and the x axis?
- (c) What is the angle, in degrees, between the resultant force and the y axis?
- (d) What is the angle, in degrees, between the resultant force and the z axis?

14.
Determine the angle θ , in degrees, between the tails of the two vectors.



15.

Determine the angles θ and ϕ made between the axis OA of the flag pole and each cable, AB and AC .



- (a) What is θ , in degrees?
- (b) What is ϕ , in degrees?