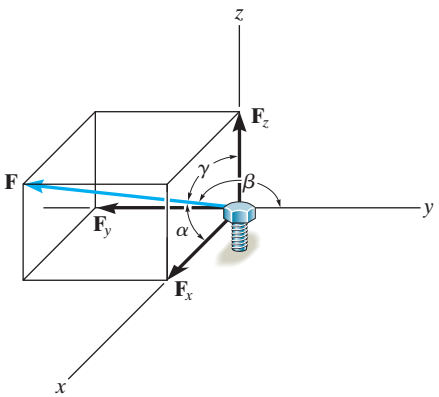
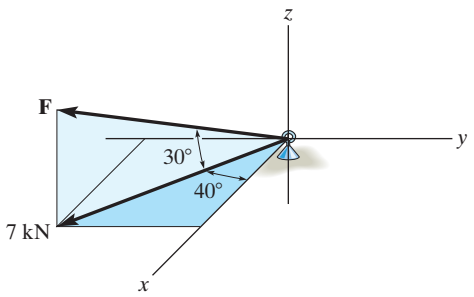
PROBLEMS

***2–60.** The bolt is subjected to the force **F**, which has components acting along the x, y, z axes. If the magnitude of **F** is 80 N, and $\alpha = 60°$ and $\gamma = 45°$, determine the magnitudes of its components.



Prob. 2–60

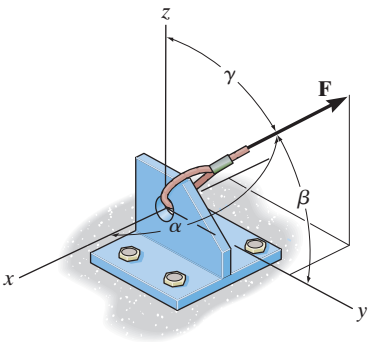
2–61. Determine the magnitude and coordinate direction angles of the force **F** acting on the support. The component of **F** in the x–y plane is 7 kN.



Prob. 2–61

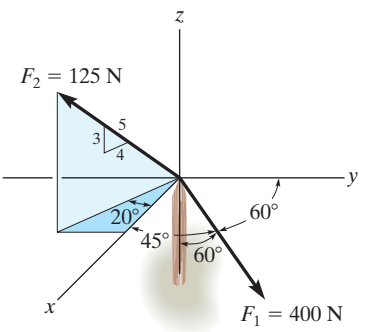
2–62. The force **F** acts on the bracket within the octant shown. If $F = 400$ N, $\beta = 60°$, and $\gamma = 45°$, determine the x, y, z components of **F**.

2–63. The force **F** acts on the bracket within the octant shown. If the magnitudes of the x and z components of **F** are $F_x = 300$ N and $F_z = 600$ N, respectively, and $\beta = 60°$, determine the magnitude of **F** and its y component. Also, find the coordinate direction angles α and γ.



Probs. 2–62/63

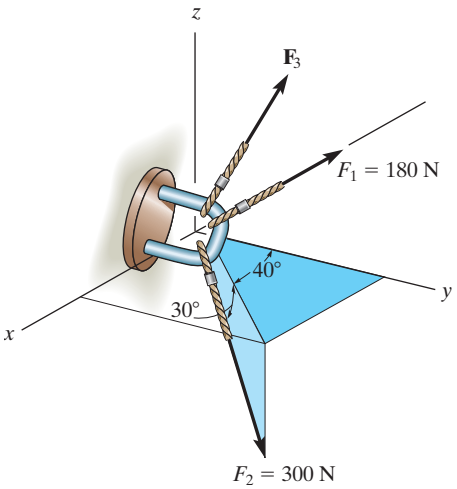
***2–64.** Determine the magnitude and coordinate direction angles of the resultant force, and sketch this vector on the coordinate system.



Probs. 2–64

2–65. Determine the magnitude and coordinate direction angles of $\mathbf{F}_3$ so that the resultant of the three forces acts along the positive y axis and has a magnitude of 600 N.

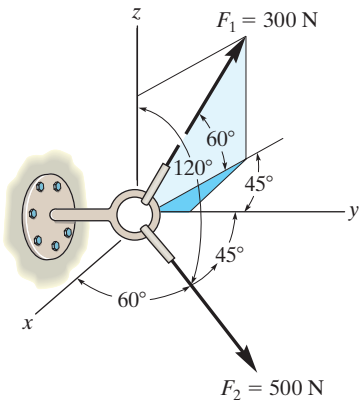
2–66. Determine the magnitude and coordinate direction angles of $\mathbf{F}_3$ so that the resultant of the three forces is zero.



Probs. 2–65/66

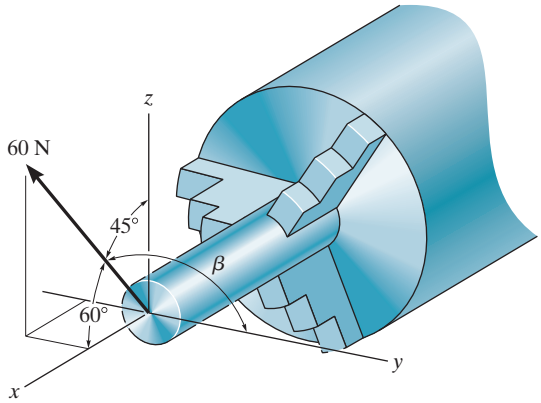
2–67. Express each force in Cartesian vector form and then determine the resultant force. Find the magnitude and coordinate direction angles of the resultant force.

***2–68.** Determine the coordinate direction angles of $\mathbf{F}_1$.



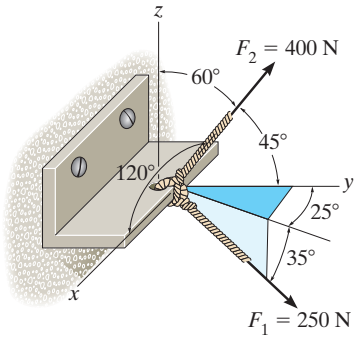
Probs. 2–67/68

2–69. The stock mounted on the lathe is subjected to a force of 60 N. Determine the coordinate direction angle β and express the force as a Cartesian vector.



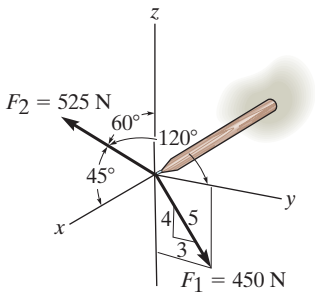
Probs. 2–69

2–70. The bracket is subjected to the two forces shown. Express each force in Cartesian vector form and then determine the resultant force $\mathbf{F}_R$. Find the magnitude and coordinate direction angles of the resultant force.



Prob. 2–70

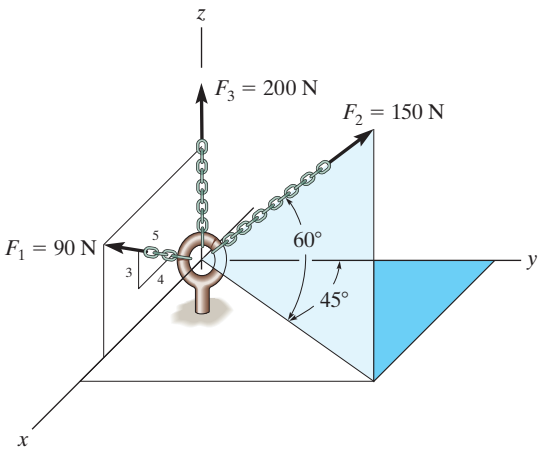
2–71. Determine the magnitude and coordinate direction angles of the resultant force, and sketch this vector on the coordinate system.



Prob. 2–71

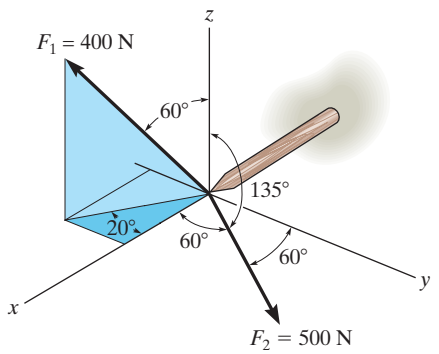
***2–72.** Express each force as a Cartesian vector.

2–73. Determine the magnitude and coordinate direction angles of the resultant force, and sketch this vector on the coordinate system.



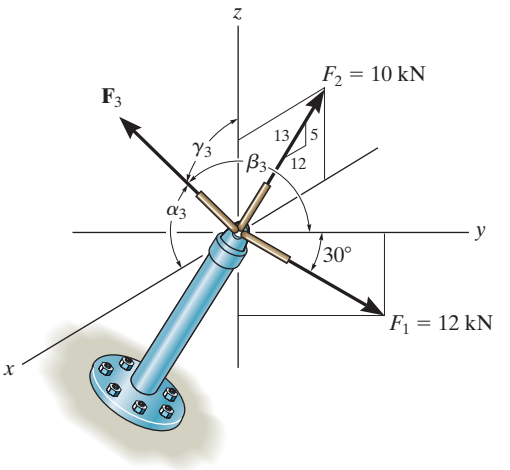
Probs. 2–72/73

2–74. Determine the magnitude and coordinate direction angles of the resultant force, and sketch this vector on the coordinate system.



Probs. 2–74

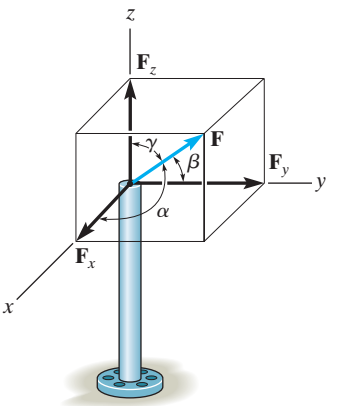
2–75. Specify the magnitude F_3 and directions α_3, β_3, and γ_3 so that the resultant force of the three forces is $\mathbf{F}_R = \{9\mathbf{j}\}$ kN.



Prob. 2–75

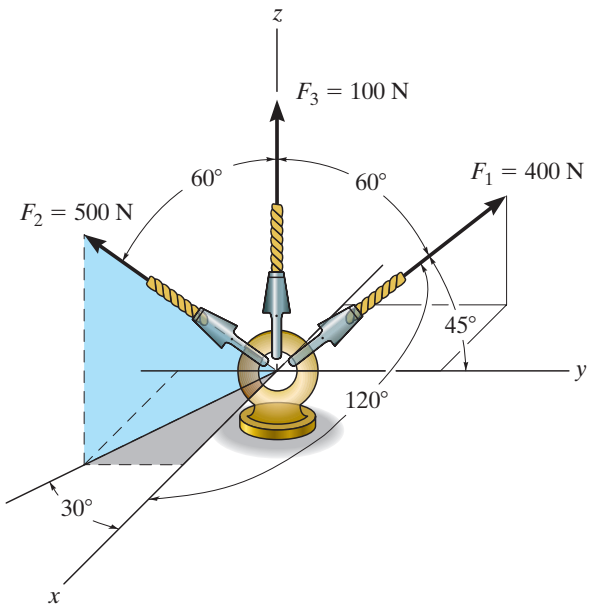
***2–76.** The pole is subjected to the force $\mathbf{F}$, which has components acting along the x, y, z axes as shown. If the magnitude of $\mathbf{F}$ is 3 kN, $\beta = 30°$, and $\gamma = 75°$, determine the magnitudes of its three components.

2–77. The pole is subjected to the force $\mathbf{F}$ which has components $F_x = 1.5$ kN and $F_z = 1.25$ kN. If $\beta = 75°$, determine the magnitudes of $\mathbf{F}$ and $\mathbf{F}_y$.



Probs. 2–76/77

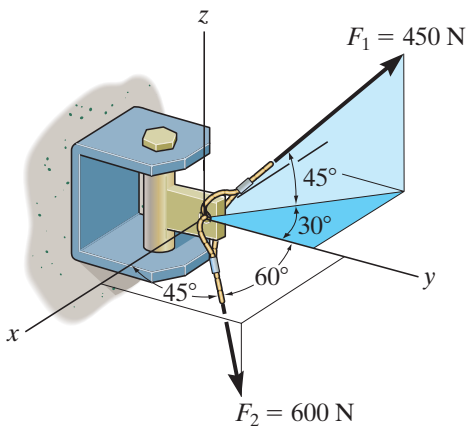
2–78. Three forces act on the ring. Determine the magnitude and coordinate direction angles of the resultant force.



Prob. 2–78

2–79. Determine the coordinate angle γ for $\mathbf{F}_2$ and then express each force acting on the bracket as a Cartesian vector.

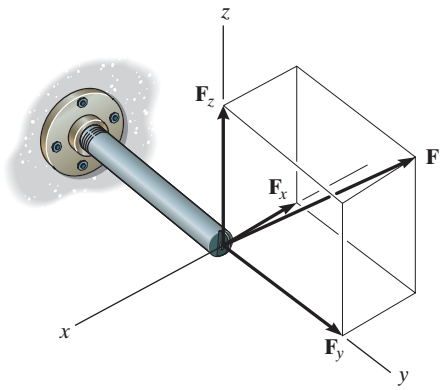
***2–80.** Determine the magnitude and coordinate direction angles of the resultant force acting on the bracket.



Probs. 2–79/80

2–81. The pipe is subjected to the force $\mathbf{F}$, which has components acting along the x, y, z axes. If the magnitude of $\mathbf{F}$ is 12 kN, and $\alpha = 120°$ and $\gamma = 45°$, determine the magnitudes of its three components.

2–82. The pipe is subjected to the force $\mathbf{F}$, which has components $F_x = 1.5$ kN and $F_z = 1.25$ kN. If $\beta = 75°$, determine the magnitude of $\mathbf{F}$ and $\mathbf{F}_y$.

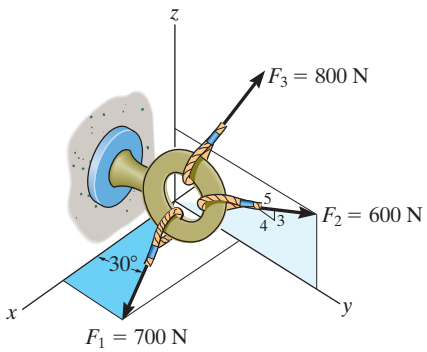


Probs. 2–81/82

2–83. If the coordinate direction angles for $\mathbf{F}_3$ are $\alpha_3 = 120°, \beta_3 = 60°$, and $\gamma_3 = 45°$, determine the magnitude and coordinate direction angles of the resultant force acting on the eyebolt.

***2–84.** If the coordinate direction angles for $\mathbf{F}_3$ are $\alpha_3 = 120°, \beta_3 = 45°$, and $\gamma_3 = 60°$, determine the magnitude and coordinate direction angles of the resultant force acting on the eyebolt.

2–85. If the direction of the resultant force acting on the eyebolt is defined by the unit vector $\mathbf{u}_{F_R} = \cos 30°\mathbf{j} + \sin 30°\mathbf{k}$, determine the coordinate direction angles of $\mathbf{F}_3$ and the magnitude of $\mathbf{F}_R$.



Probs. 2–83/84/85