Homework # 1

Topics Vectors and Forces (Chapter 2 in textbook).

Textbook: Engineering Mechanics, by R.C. Hibbeler, Pearson, 12th Edition.

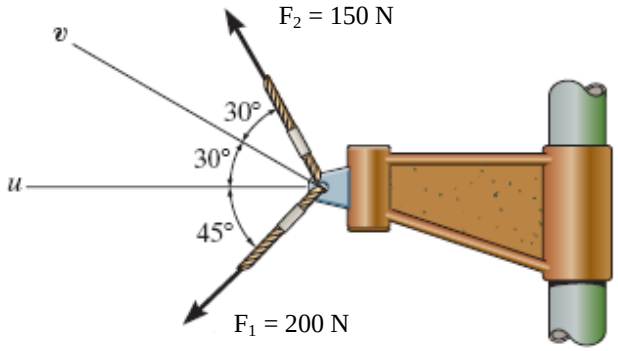
Problems:

Use Parallelogram Law only to solve:
Problems: 2-6 (page 28), and 2-15(page 29).

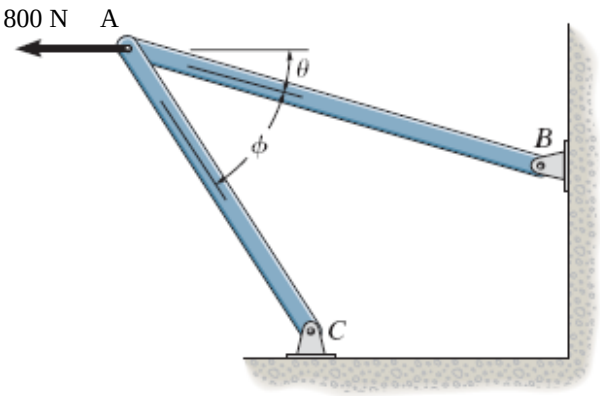
Use 2-D Cartesian Vector Notation (Decomposition/Projection) to solve:
Problems: 2-32(page 39).

Use 3-D Cartesian Vector Notation and Dot Product to solve:
Problems: 2-77(page 54), 2-87(page 64), 2-104(page 67), 2-112(page 75), and 2-121 (page 76).

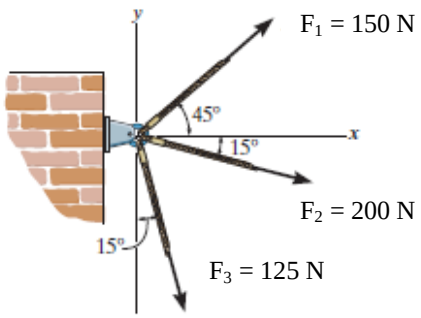
2–6. Resolve F_2 into components along the u and *v* axes, and determine the magnitudes of these components.



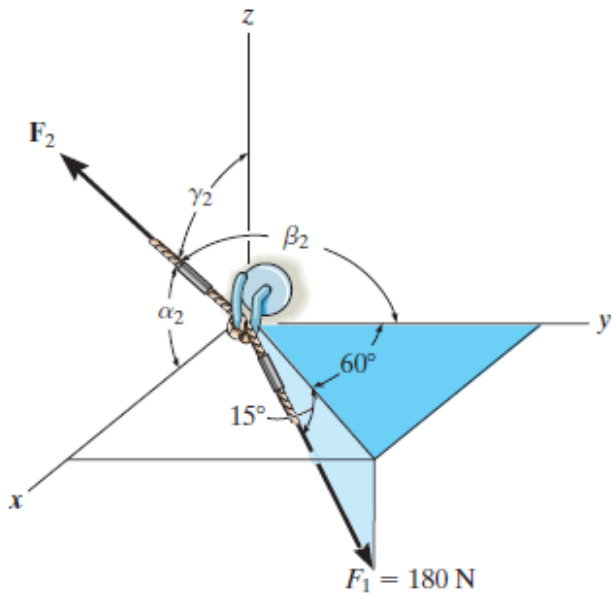
2–15. Determine the design angle between struts AB and AC so that the 800-N horizontal force has a component of 1200-N which acts up to the left, in the same direction as from B towards A. Take $\theta = 30°$.



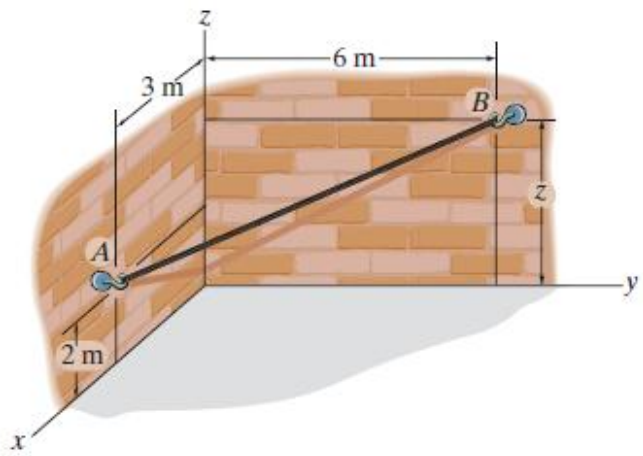
2–32. Determine the magnitude of the resultant force acting on the pin and its direction measured clockwise from the positive *x* axis.



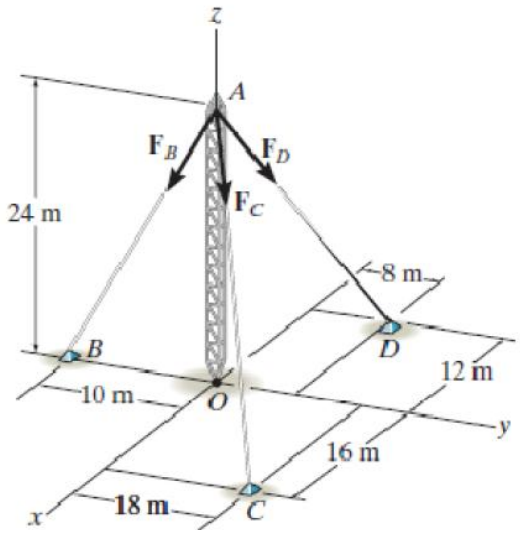
2–77. Determine the magnitude and coordinate direction angles of $\mathbf{F}_2$ so that the resultant of the two forces is zero.



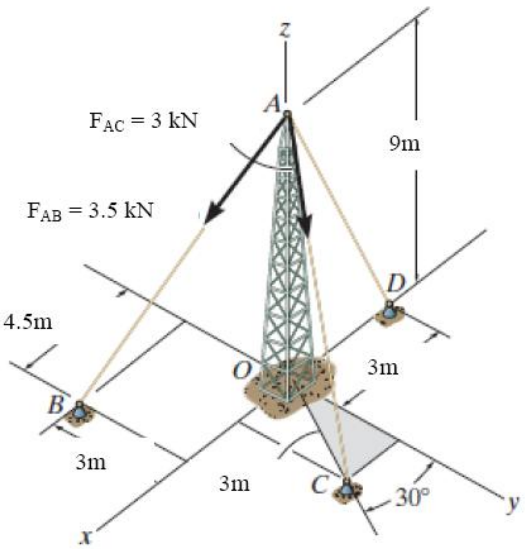
2–87. If the cord *AB* is 7.5 m long, determine the coordinate position +*z* of point *B*.



2–104. The antenna tower is supported by three cables. If the forces of these cables acting on the antenna are $\mathbf{F_B} = 520$ N, $\mathbf{F_C} = 680$ N, and $\mathbf{F_D} = 560$ N, determine the magnitude and coordinate direction angles of the resultant force acting at *A*.



2–121. Determine the magnitude of the projected component of force $\mathbf{F}_{AC}$ acting along the *z* axis.



2–112. Determine the projected component of the force. $\mathbf{F}_{AB} = 560$ N acting along cable *AC*. Express the result as a Cartesian vector