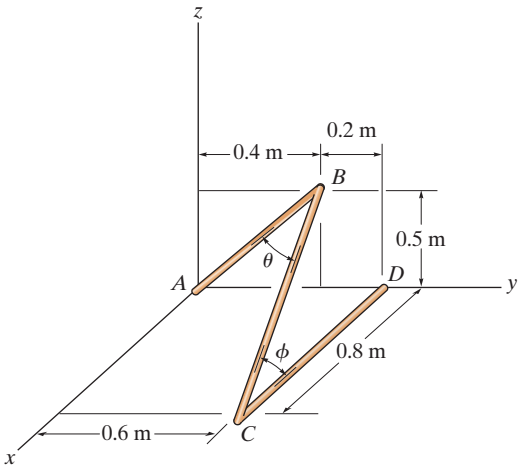
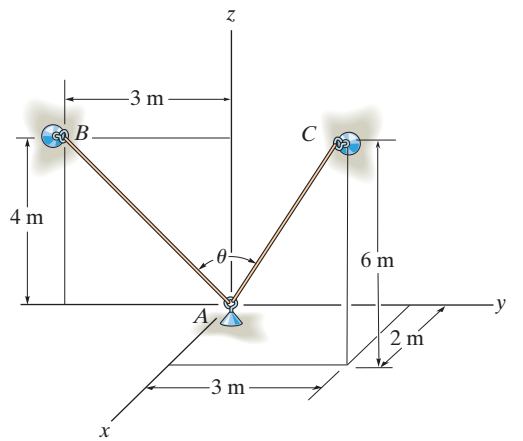
PROBLEMS

2–103. Determine the angles θ and ϕ between the wire segments.



Probs. 2–103/105

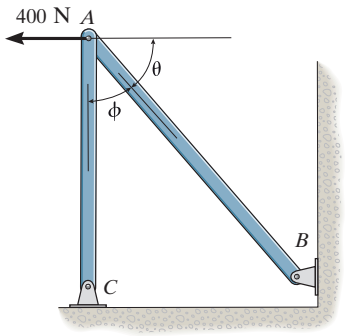
***2–104.** Determine the angle θ between the two cords.



Prob. 2–104

2–105. Given the three vectors **A**, **B**, and **D**, show that $\mathbf{A}\cdot(\mathbf{B}+\mathbf{D}) = (\mathbf{A}\cdot\mathbf{B}) + (\mathbf{A}\cdot\mathbf{D})$.

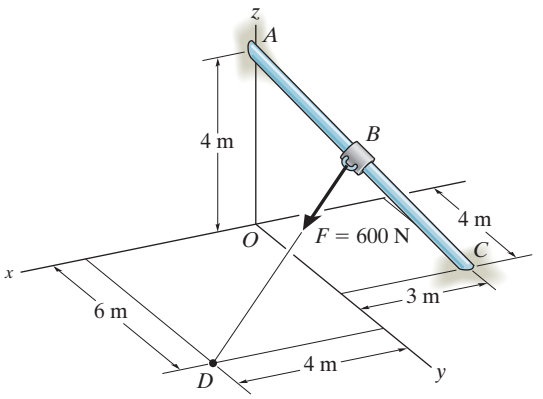
2–106. Determine the design angle θ ($0° \le \theta \le 90°$) for strut AB so that the 400-N horizontal force has a component of 500 N directed from A towards C. What is the component of force acting along member AB? Take $\phi = 40°$.



Prob. 2–106

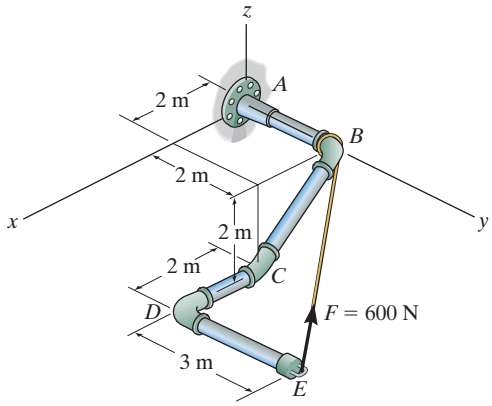
2–107. Determine the components of **F** that act along rod AC and perpendicular to it. Point B is located at the midpoint of the rod.

***2–108.** Determine the components of **F** that act along rod AC and perpendicular to it. Point B is located 3 m along the rod from end C.



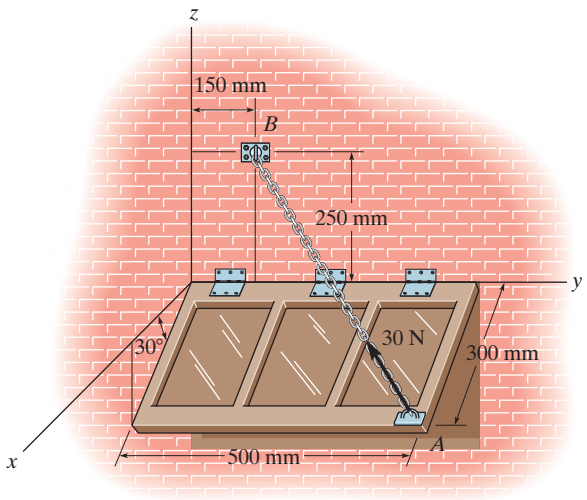
Probs. 2–107/108

2–109. Determine the magnitudes of the components of $F = 600$ N acting along and perpendicular to segment DE of the pipe assembly.



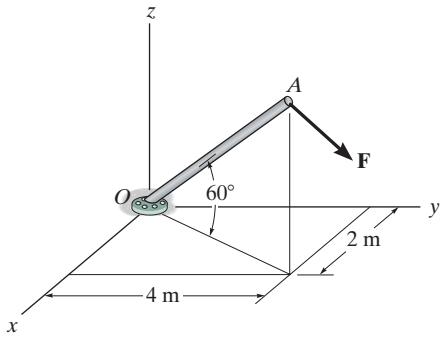
Prob. 2–109

2–110. The window is held open by cable AB. Determine the length of the cable and express the 30-N force acting at A along the cable as a Cartesian vector.



Prob. 2–110

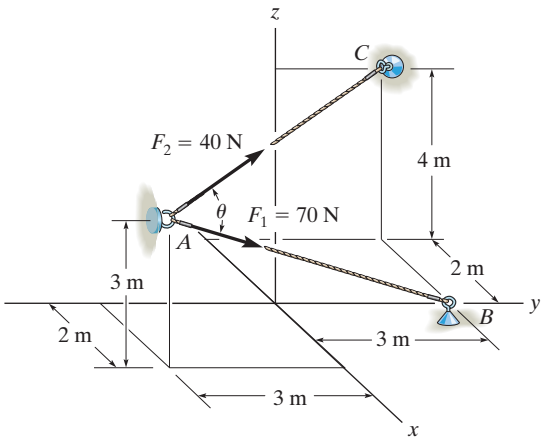
2–111. If $\mathbf{F} = \{16\mathbf{i} + 10\mathbf{j} - 14\mathbf{k}\}$ N, determine the magnitude of the projection of $\mathbf{F}$ along the axis of the pole and perpendicular to it.



Prob. 2–111

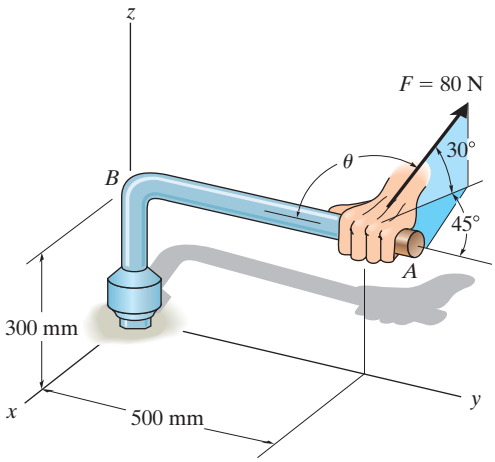
*2–112. Determine the angle θ between the two cables.

2–113. Determine the magnitude of the projection of the force $\mathbf{F}_1$ along cable AC.



Probs. 2–112/113

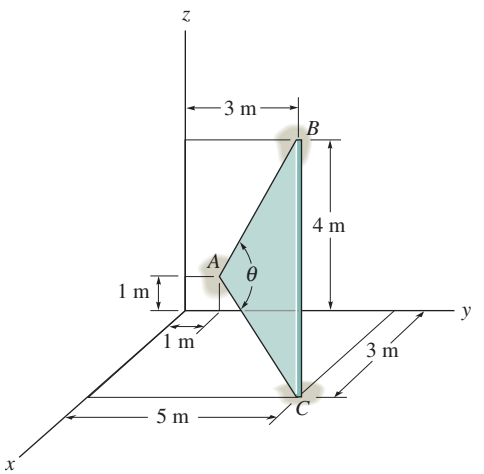
2–114. A force of $F = 80$ N is applied to the handle of the wrench. Determine the angle θ between the tail of the force and the handle AB.



Probs. 2–114

2–115. Determine the angle θ between the sides of the triangular plate.

***2–116** Determine the length of side BC of the triangular plate. Solve the problem by finding the magnitude of $\mathbf{r}_{BC}$; then check the result by first finding θ, r_{AB}, and r_{AC} and then using the cosine law.

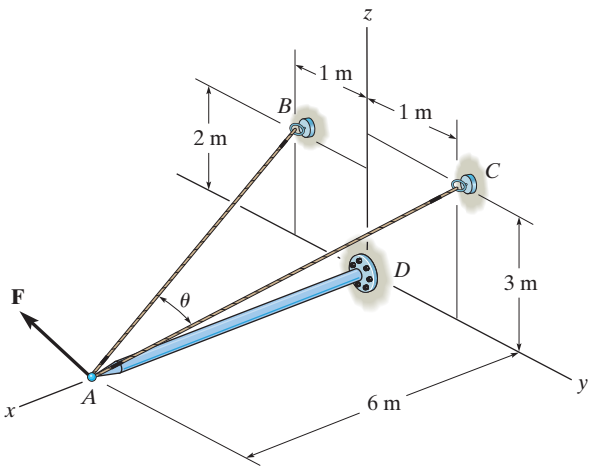


Probs. 2–115/116

2–117. Determine the angle θ between the cables AB and AC.

2–118. Determine the magnitude of the projection of the force $\mathbf{F} = \{400\mathbf{i} - 200\mathbf{j} + 500\mathbf{k}\}$ N acting along the cable BA.

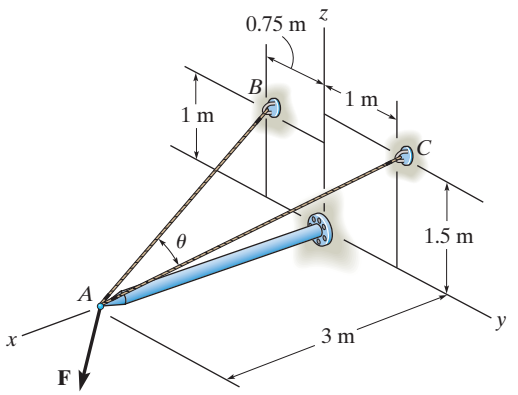
2–119. Determine the magnitude of the projection of the force $\mathbf{F} = \{400\mathbf{i} - 200\mathbf{j} + 500\mathbf{k}\}$ N acting along the cable CA.



Probs. 2–117/118/119

***2–120.** Determine the magnitudes of the projected components of the force $\mathbf{F} = [60\mathbf{i} + 12\mathbf{j} - 40\mathbf{k}]$ N along the cables AB and AC.

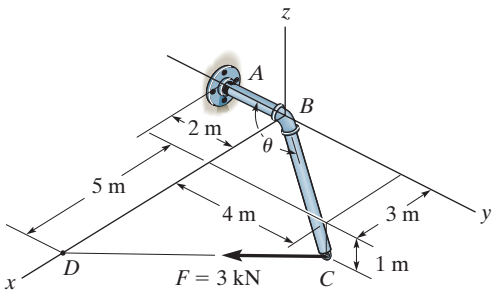
2–121. Determine the angle θ between cables AB and AC.



Probs. 2–120/121

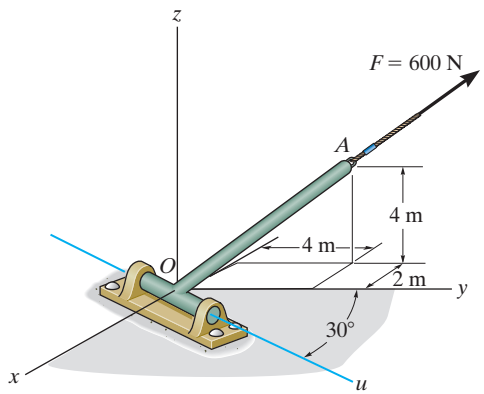
2–122. Determine the angle θ between BA and BC.

2–123. Determine the magnitude of the projected component of the 3 kN force acting along the axis BC of the pipe.



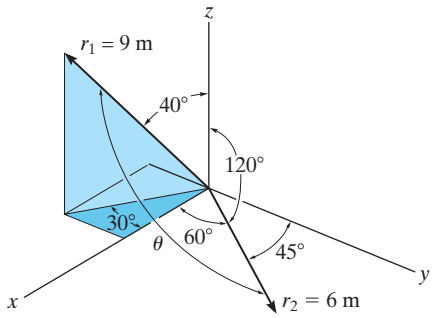
Prob. 2–122/123

***2–124.** Determine the magnitude of the projection of force $F = 600$ N along the u axis.



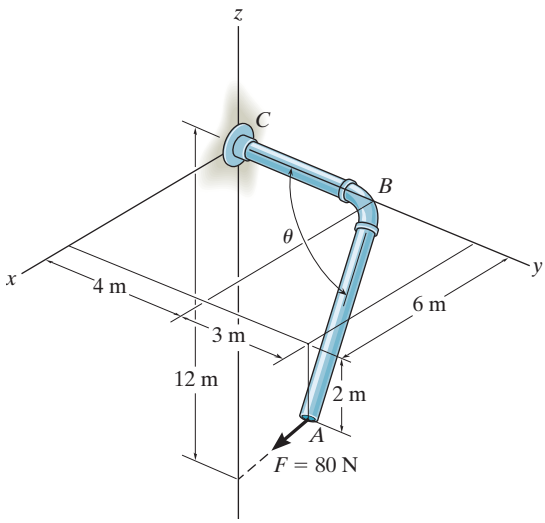
Prob. 2–124

2–125. Determine the magnitude of the projected component of $\mathbf{r}_1$ along $\mathbf{r}_2$, and the projection of $\mathbf{r}_2$ along $\mathbf{r}_1$.



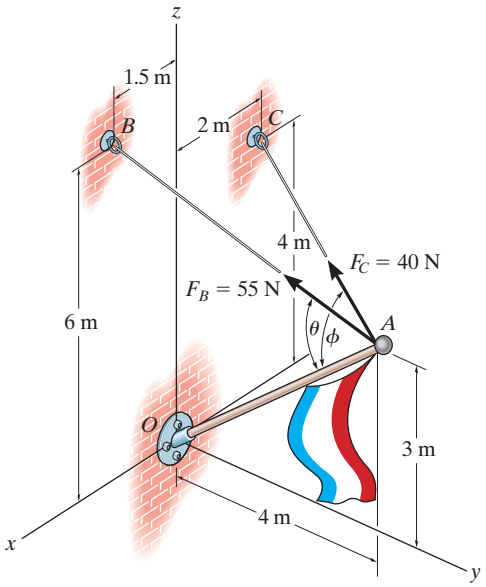
Prob. 2–125

2–126. Determine the projected component of the 80-N force acting along the axis AB of the pipe.



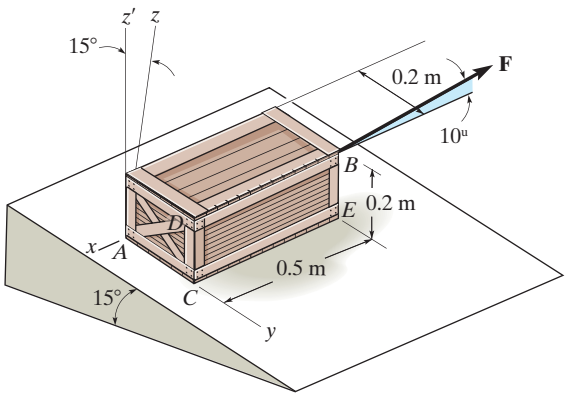
Prob. 2–126

2–127. Determine the angles θ and ϕ made between the axes OA of the flag pole and AB and AC, respectively, of each cable.



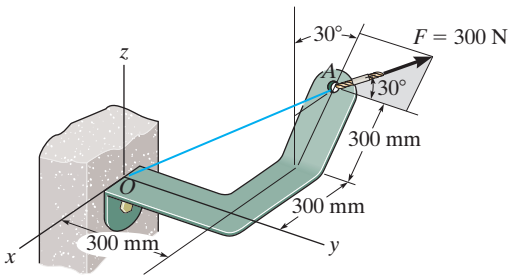
Prob. 2–127

***2–128.** If the force $F = 100$ N lies in the plane $DBEC$, which is parallel to the $x-z$ plane, and makes an angle of 10° with the extended line DB as shown, determine the angle that **F** makes with the diagonal AB of the crate.



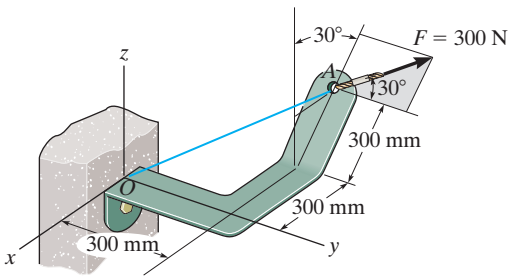
Prob. 2–128

2–129. Determine the magnitudes of the projection of the force acting along the x and y axes.



Prob. 2–129

2–130. Determine the magnitude of the projection of the force acting along line OA.



Prob. 2–130