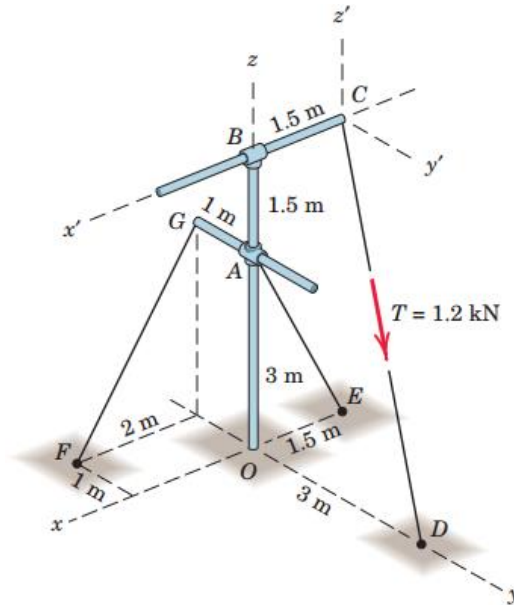**Problem 1.** The rigid pole and cross-arm assembly is supported by the three cables shown. A turnbuckle at D is tightened until it induces a tension T in CD of 1.2 kN. Express T as a vector. Does it make any difference in the result which coordinate system is used?


Problem 2. Determine the x-, y-, and z-components of force F which acts on the tetrahedron as shown. The quantities a, b, c, and F are known, and M is the midpoint of edge AB.
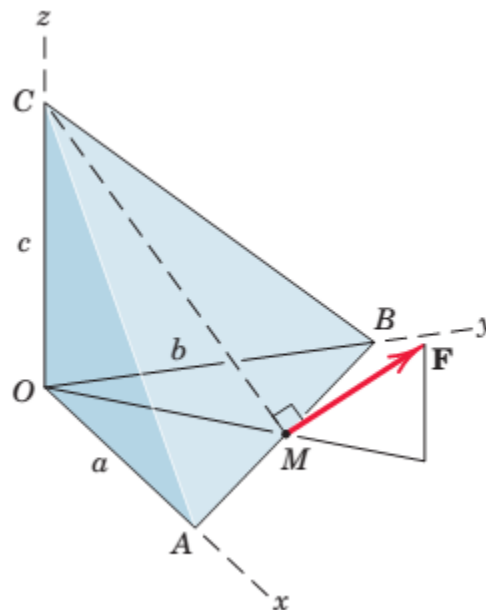
Problem 3. Two forces are applied to the construction bracket as shown. Determine the angle θ which makes the resultant of the two forces vertical. Determine the magnitude R of the resultant.

$F_1 = 800$ lb

$F_2 = 425$ lb

70°

θ
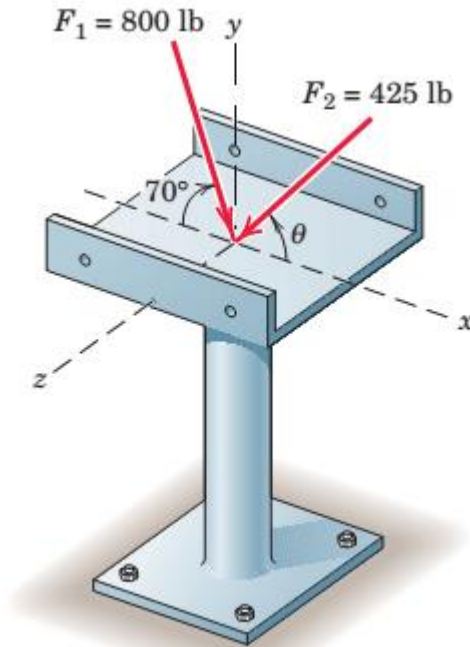
Problem 4. Determine the resultant R of the three forces acting on the simple truss. Specify the points on the x- and y- axes through which R must pass.

30°

20 kN

25 kN

5 m

3 m   6 m   3 m

30 kN
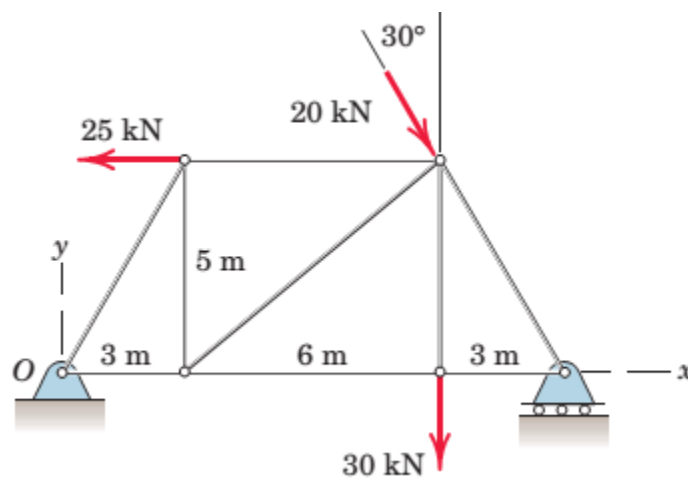
Problem 5. The thin rectangular plate is subjected to the four forces shown. Determine the equivalent force–couple system at O.