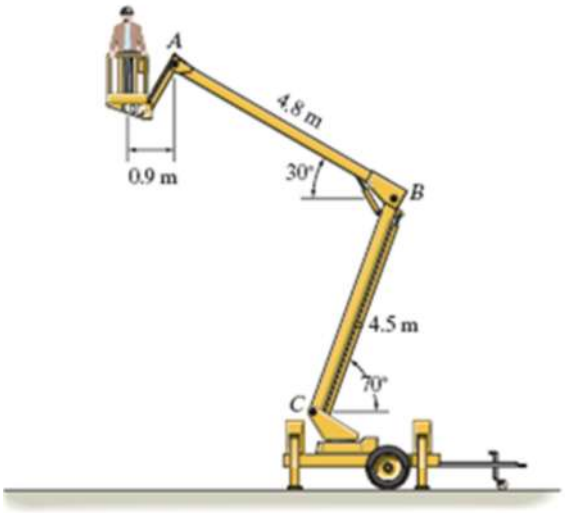
Homework Chapter 3

Problem 3-1: The Snorkel Co. produces the articulating boom platform that can support a weight *W*. If the boom is in the position shown, determine the moment of this force about points *A*, *B*, and *C*.



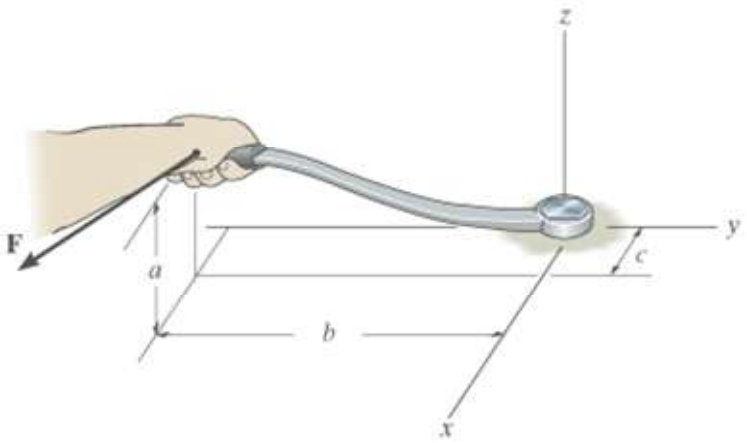
Problem 3-2: The force $\mathbf{F}$ = {40**i**-5**j**+5**k**} N is applied to the handle of the box wrench. Determine the component of the moment of this force about the *z* axis which is effective in loosening the bolt.

Given:

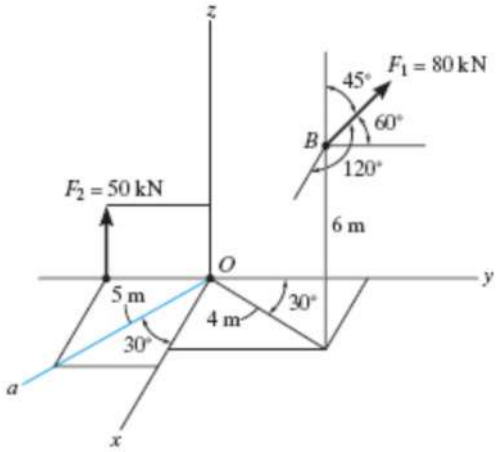
$a = 75$ mm

$b = 200$ mm

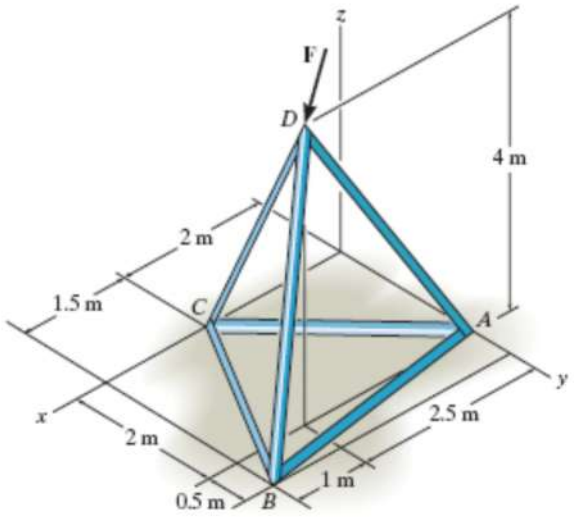
$c = 50$ mm



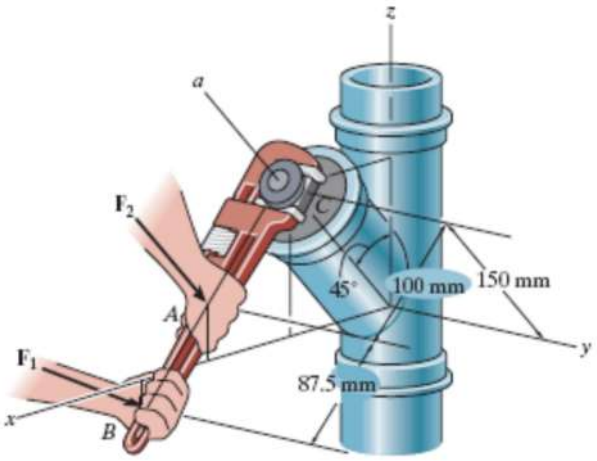
Problem 3-3: Determine the resultant moment of the two forces about the *Oa* axis. Express the result as a Cartesian vector.



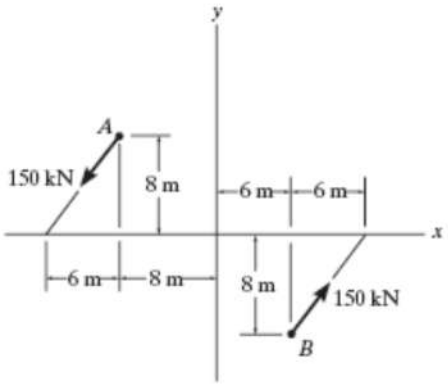
Problem 3-4: Determine the magnitude of the moment of the force **F** = {50**i**-20**j**-80**k**} N about the base line *CA* of the tripod.



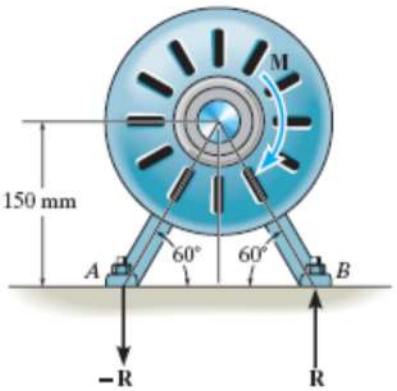
Problem 3-5: Determine the moment of each force acting on the handle of the wrench about the *a* axis. Take $\mathbf{F}_1 = \{-10\mathbf{i}+20\mathbf{j}-40\mathbf{k}\}$ N, $\mathbf{F}_2 = \{15\mathbf{i}+10\mathbf{j}-30\mathbf{k}\}$ N.



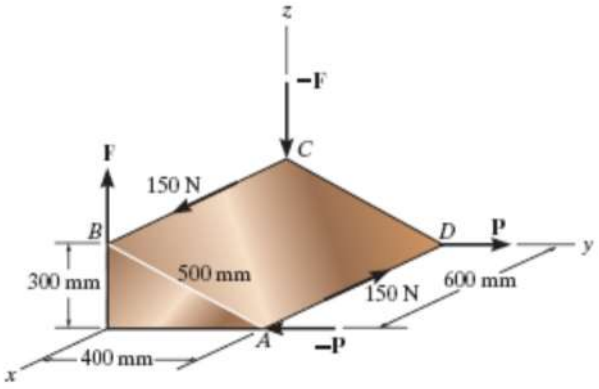
Problem 3-6: Determine the magnitude and sense of the couple moment.



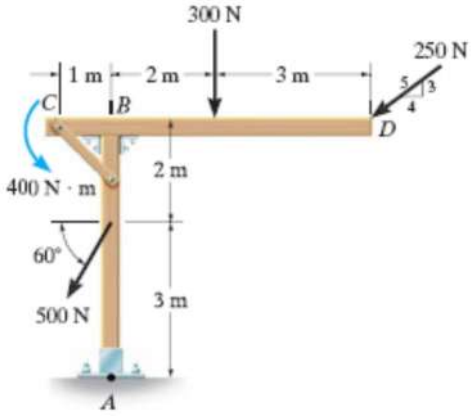
Problem 3-7: A clockwise couple M = 5 N.m is resisted by the shift of the electric motor. Determine the magnitude of the reactive forces and R which act at supports A and B so that the resultant of the two couples is zero.



Problem 3-8: If the resultant couple of the three couples acting on the triangular block is to be zero, determine the magnitude of forces **F** and **P**.



Problem 3-9: Replace the loading on the frame by a single resultant force. Specify where its line of action intersects member CD, measured from end C.



Problem 3-10: Handle forces $\mathbf{F}_1$ and $\mathbf{F}_2$ are applied to the electric drill. Replace this system by an equivalent resultant force and couple moment acting at point *O*. Express the results in Cartesian vector form.