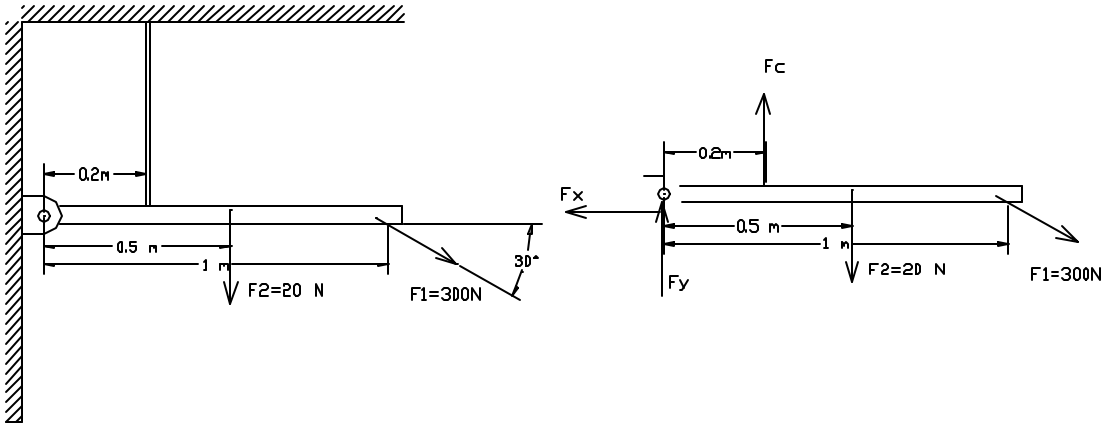
Home work on biomechanics
Due October 8, 2007

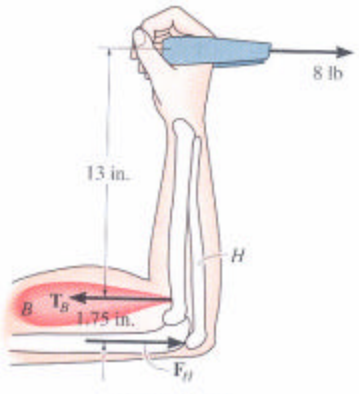
1. Three forces F_1, F_2, and F_3 of magnitude 40N, 100N and 20N are acting on a point. The directions of the forces are 0, -30 and +120 degrees from the positive X axis. Determine the magnitude and direction of the resultant force.

2. The applied force F1 and F2 are acting as shown below.
   (a)What is the magnitude of Fc?
   (b) What are the magnitudes of Fx and Fy at the hinge?



3.

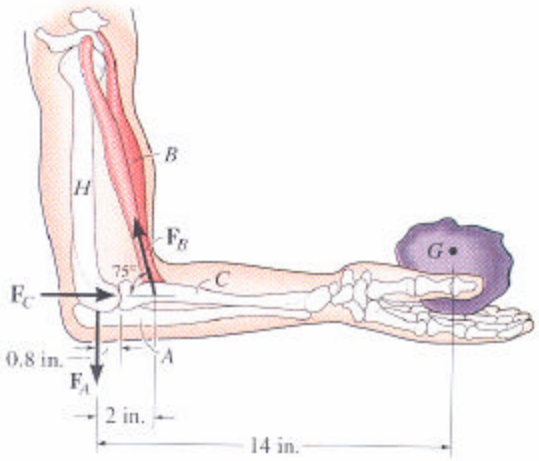
5–23. The man is pulling a load of 8 lb with one arm held as shown. Determine the force $\mathbf{F}_H$ this exerts on the humerus bone H, and the tension developed in the biceps muscle B. Neglect the weight of the man's arm.



Prob. 5–23

4.

*5–20. When holding the 5-lb stone in equilibrium, the humerus H, assumed to be smooth, exerts normal forces $\mathbf{F}_C$ and $\mathbf{F}_A$ on the radius C and ulna A as shown. Determine these forces and the force $\mathbf{F}_B$ that the biceps B exerts on the radius for equilibrium. The stone has a center of mass at G. Neglect the weight of the arm.



Prob. 5–20

5. Download and use 3DSSPP biomechanical model and replicate the upper body posture of the 2D back model solved in the class. Use the same hand force and then compare the model output to the calculated value in the class for L4/L5 compressive force and shear force. Attach the screen shot of your solution. Discuss what you believe are the reasons for any discrepancy between the model output and the calculated value.