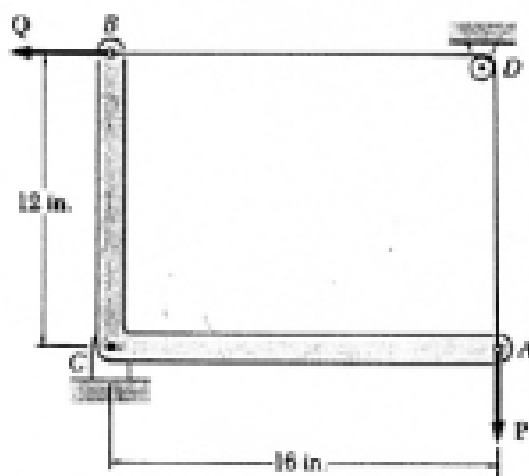


Learning Exercise 5c: FBDs in 2-D and 3-D, Support Reactions

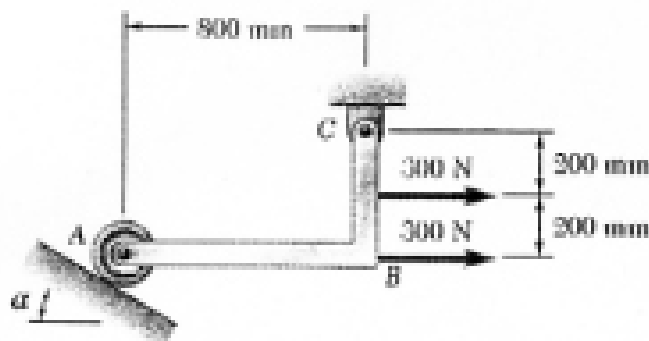
Objective: To be able to interpret the symbols we use for support conditions and to translate this information to FBDs in 2-D and 3-D.

Problem 1 For each of the following three cases, draw one free-body diagram that can be used to determine the requested information. You are not requested to determine this information. Present your free-body diagram in the space provided to the right of each figure. Your free-body diagram must include all the information required to determine the unknown forces using just the equations of equilibrium.

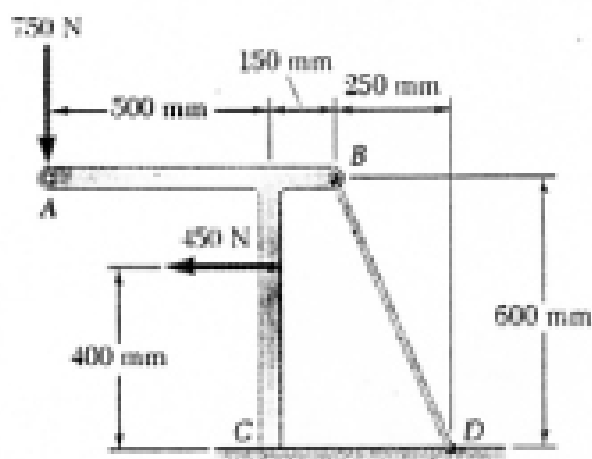
case 1) The reaction at C knowing that $Q=20\text{lb}$ and that $P=20\text{lb}$. Neglect friction and the weight of the L-shaped bar. (10%)

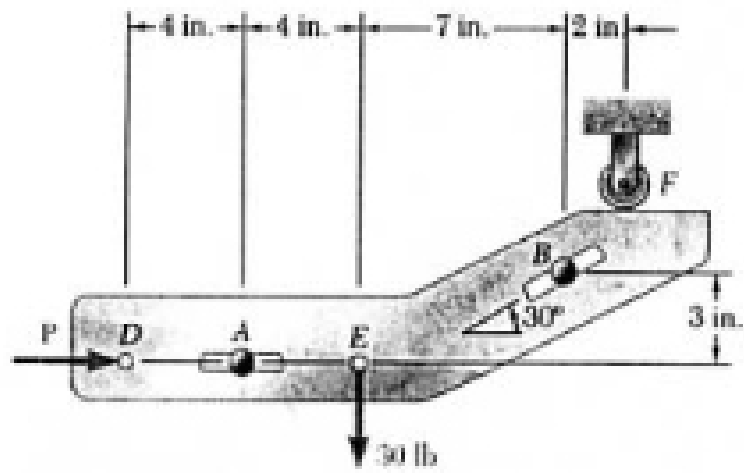


case 2) The reaction at C knowing that $\alpha=30^\circ$. Neglect friction and the weight of the bar. (10%)

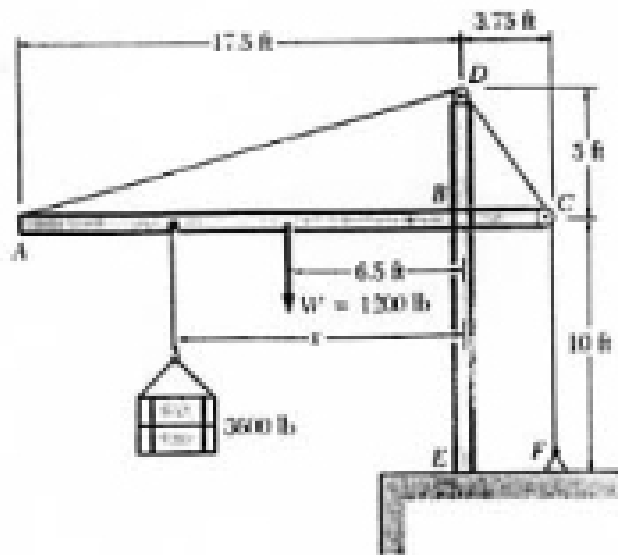


case 3) The reaction at C knowing the tension in cable BD is 1130N. Neglect the weight of the bar. (10%)

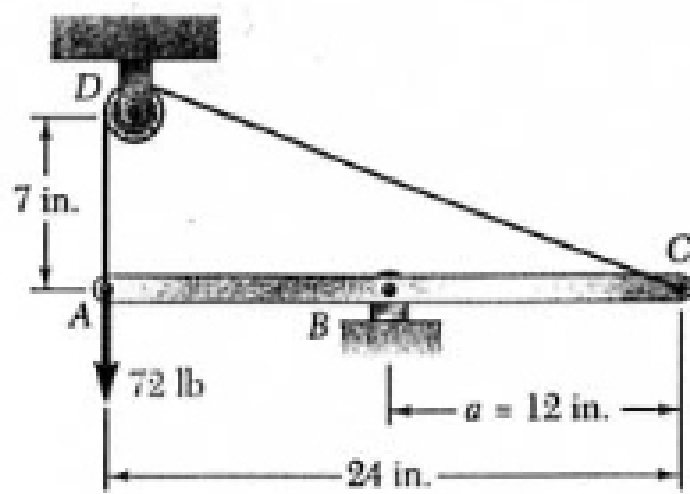




case 2) Reaction at E knowing the tension in the cable is 4000 lb and $x=12$ ft.



case 3) The reaction at B and the tension in cable ADC. Neglect friction.



Problem #2. Three rods are welded together to form a "corner" which is supported by three eyebolts. Neglecting friction, determine the reactions at A, B, and C when $P = 240\text{ N}$, $M = 6\text{ N}\cdot\text{m}$, $a = 120\text{ mm}$, $b = 80\text{ mm}$, and $c = 100\text{ mm}$. 20%

