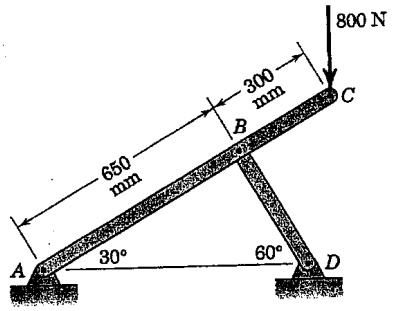
HW #5

4/65 Determine the magnitudes of all pin reactions for the frame loaded as shown.

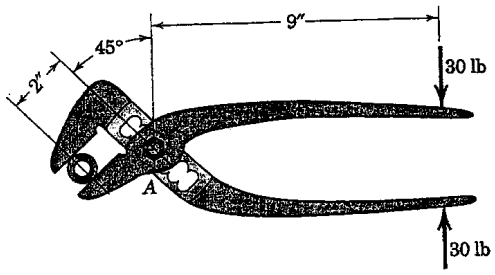
Ans. $A = 512$ N, $B = D = 1013$ N



Problem 4/65

4/67 Compute the force supported by the pin at A for the slip-joint pliers under a grip of 30 lb.

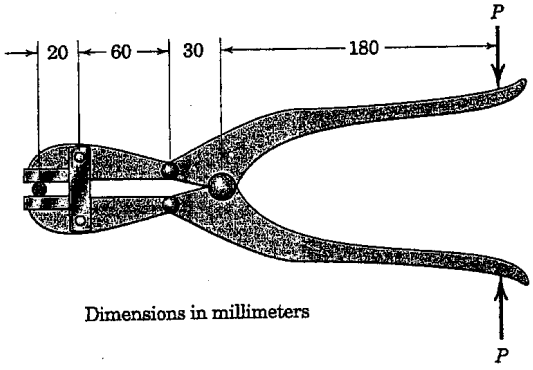
Ans. $A = 157.6$ lb



Problem 4/67

4/81 A small bolt cutter operated by hand for cutting small bolts and rods is shown in the sketch. For a hand grip $P = 150$ N, determine the force Q developed by each jaw on the rod to be cut.

Ans. $Q = 2.7$ kN



Problem 4/81

4/91 Determine the x- and y-components of all forces acting on each member of the loaded frame for the conditions (*a*) $\theta = 0$ and (*b*) $\theta = 30°$. Force P is applied to the midpoint of member BC.

Ans. (*a*) $A_x = B_x = C_x = D_x = \frac{P}{2}$

$A_y = B_y = C_y = D_y = 0.289P$

$E_x = E_y = 0$

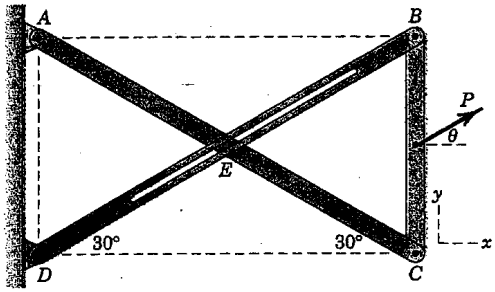
(*b*) $A_x = B_x = C_x = 0.433P$

$A_y = C_y = 0.75P$, $B_y = 1.25P$

$D_x = 1.299P$, $D_y = 0.25P$, $E_x = 0.866P$

$E_y = 1.5P$

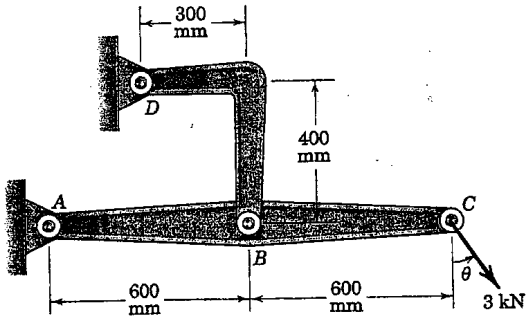
(force magnitudes only)



Problem 4/91

***4/143** The structural members support the 3-kN load which may be applied at any angle θ from essentially $-90°$ to $+90°$. The pin at A must be designed to support the maximum force transmitted to it. Plot the force F_A at A as a function of θ and determine its maximum value and the corresponding angle θ.

Ans. $F_{A_{max}} = 6$ kN at $\theta = -26.6°$



Problem 4/143