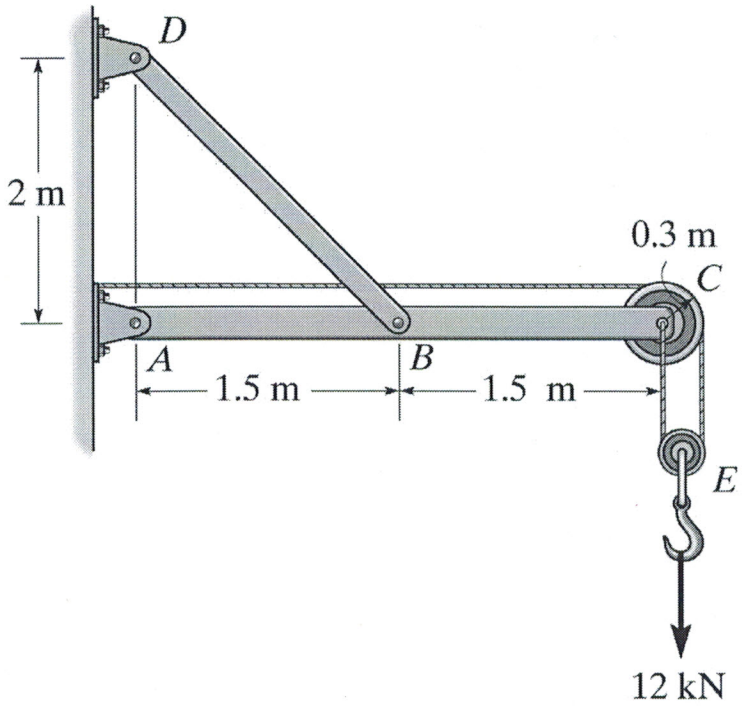
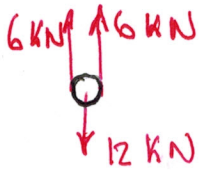
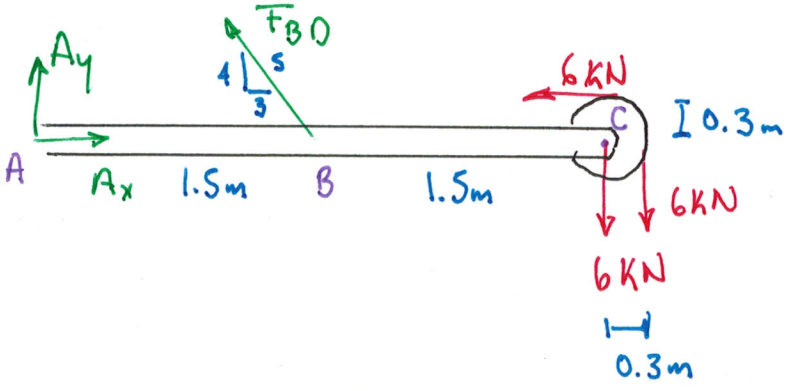
Determine the horizontal and vertical components of force at pins *A* and *D*.



pulley at E





$\Sigma M_A = 0$

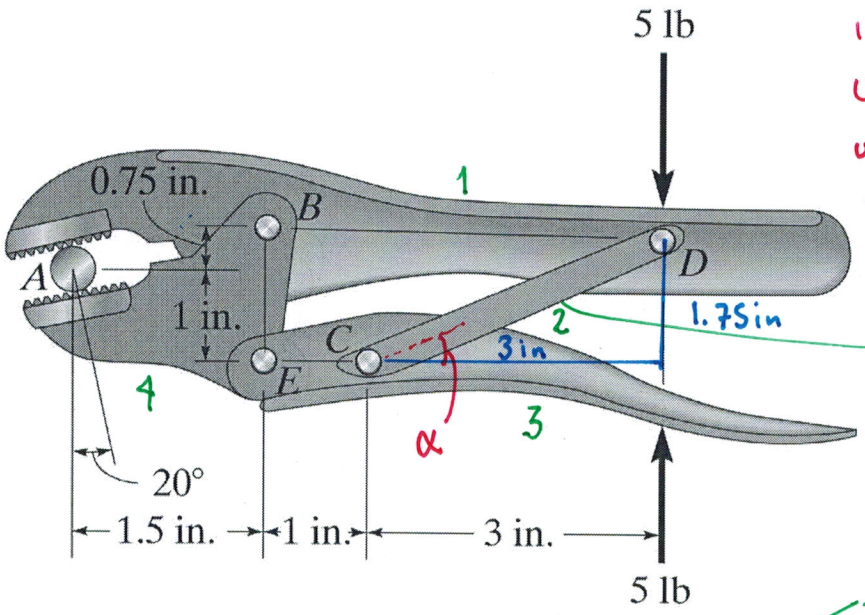
$\left(\frac{4}{5}\right) F_{BD}(1.5) - 6(3) - 6(3.3) + 6(0.3) = 0$ $\quad F_{BD} = 30$ KN

$\Sigma F_x = 0$

$A_x - \left(\frac{3}{5}\right) F_{BD} - 6 = 0$ $\quad A_x = 24$ KN

$\Sigma F_y = 0$ $\quad A_y + \left(\frac{4}{5}\right) F_{BD} - 6 - 6 = 0$ $\quad A_y = -12$ KN

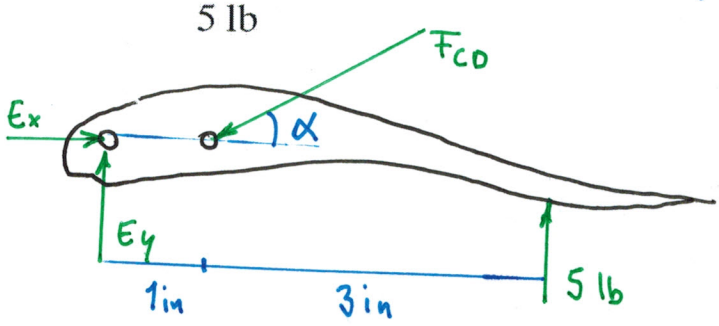
A 5-lb force is applied to the handles of the vise grip. Determine the compressive force developed on the smooth bolt shank *A* at the jaws.



Inspect pathway:
Upper handle contains four unknowns, this is unsolvable.
Bottom handle contains three unknowns.

Two force member

$$\alpha = \operatorname{atan}\left(\frac{1.75}{3}\right) = 30.26°$$

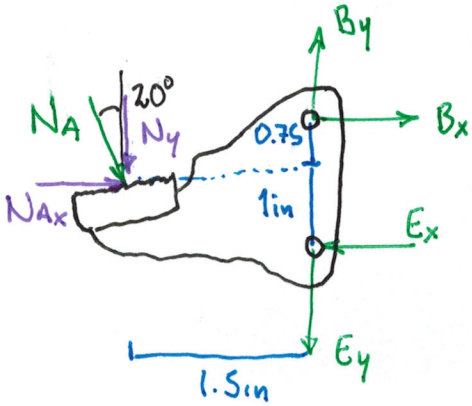


$$\Sigma M_E = 0$$

$$5(4) - F_{CD}\sin\alpha\,(1) = 0$$

$$F_{CD} = \frac{20}{\sin(30.26)} = 39.7 \text{ lb}$$

$$\Sigma F_x = 0 \qquad E_x - 39.7\cos(30.26) = 0 \qquad E_x = 34.29 \text{ lb}$$



$$\Sigma M_B = 0$$

$$-34.29(1.75) + N_A\sin(20)(0.75) + N_A\cos(20)(1.5) = 0$$

$$N_A = 36.0 \text{ lb}$$