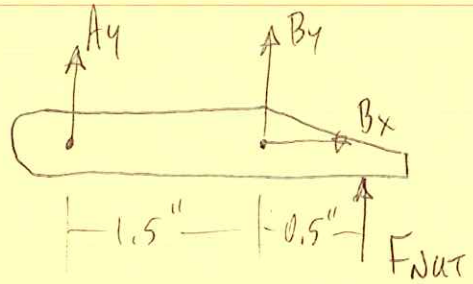
EXAMPLE PROB. 6.146

FIND GRIPPING FORCE ON NUT.

FBD OF UPPER JAW:



$\Sigma F_x = 0$: $B_x = 0$

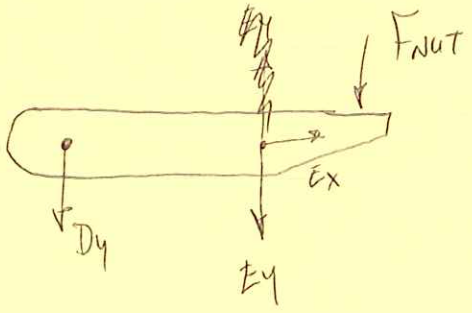
$\Sigma F_y = 0$: $A_y + B_y + F_{NUT} = 0$

$\Sigma M_B = 0$ $+\circlearrowleft$: $-(1.5\,in)A_y + (0.5\,in)F_{NUT} = 0$

$A_y = \frac{1}{3} F_{NUT}$

$B_y = -F_{NUT} - \frac{1}{3} F_{NUT} = -\frac{4}{3} F_N$

FBD OF LOWER JAW:



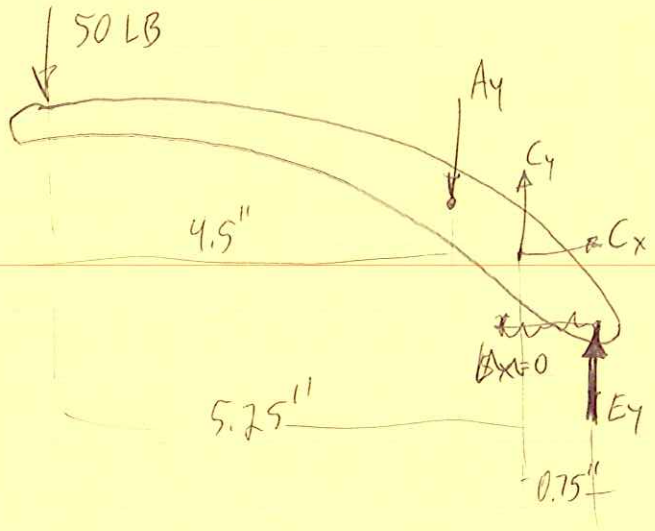
BY SYMMETRY,

$E_y = -\frac{4}{3} F_N$

$E_x = 0$

PROB. 6.146

FBD OF HANDLE:



$A_y = \frac{1}{3} F_{NUT}$

$E_y = -\frac{4}{3} F_{NUT}$

$\Sigma M_C = 0 \quad +\circlearrowleft :$

$(5.25\ \text{IN})(50\ \text{LB}) + (0.75\ \text{IN})\left(\frac{1}{3} F_{NUT}\right) + (0.75\ \text{IN})\left(-\frac{4}{3} F_{NUT}\right) = 0$

$262.5 - 0.75\, F_{NUT} = 0$

$\boxed{F_{NUT} = 350\ \text{LB}}$