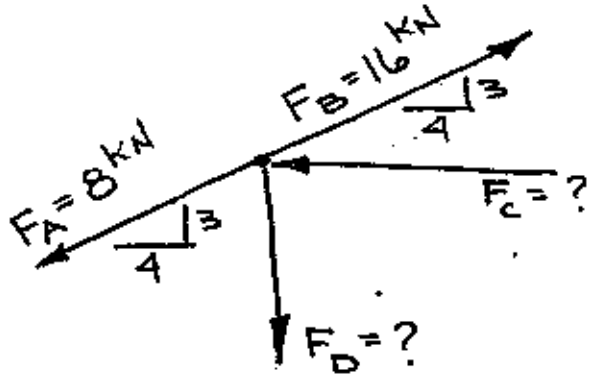
PROB 2.49 p.42

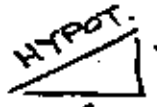
MECH 234 + 235

FOUR FORCES IN EQUILIBRIUM



$$\Sigma F_{HORIZ.} = 0$$

$$\Sigma F_{VERT.} = 0$$



HYPOTENUSE $= \sqrt{3^2+4^2} = 5$

HORIZ. COMP $= \frac{4}{5} = .8$

VERT. COMP $= \frac{3}{5} = .6$

NEED HORIZ. + VERT. COMP. OF F_A + F_B

$$\vec{F}_A = F_{Ax}\hat{\imath} + F_{Ay}\hat{\jmath} = -\frac{4}{5}(8^{KN})\hat{\imath} - \frac{3}{5}(8^{KN})\hat{\jmath}$$

$$= -6.4\hat{\imath} - 4.8\hat{\jmath}$$

$$\vec{F}_B = F_{Bx}\hat{\imath} + F_{By}\hat{\jmath} = +\frac{4}{5}(16^{KN})\hat{\imath} + \frac{3}{5}(16^{KN})\hat{\jmath}$$

$$= +12.8\hat{\imath} + 9.6\hat{\jmath}$$

$$\Sigma F_{HORIZ.} = \Sigma F_x = 0 = F_{Ax} + F_{Bx} + F_{Cx} + F_{Dx}$$

$$-6.4 + 12.8 - F_C = 0$$

$$6.4 = F_C \quad \therefore \boxed{\vec{F}_C = 6.4\hat{\imath}}$$

$$\Sigma F_{VERT.} = \Sigma F_y = 0 = F_{Ay} + F_{By} + F_{Cy} + F_{Dy}$$

$$-4.8\hat{\jmath} + 9.6 - F_D = 0$$

$$4.8 = F_D \quad \therefore \boxed{\vec{F}_D = 4.8\hat{\jmath}}$$

$F_C = 6.4^{KN}$ TO LEFT

$F_D = 4.8^{KN}$ DOWN

POSITIVE ANSWERS MEAN ASSUMED DIR. WAS CORRECT.