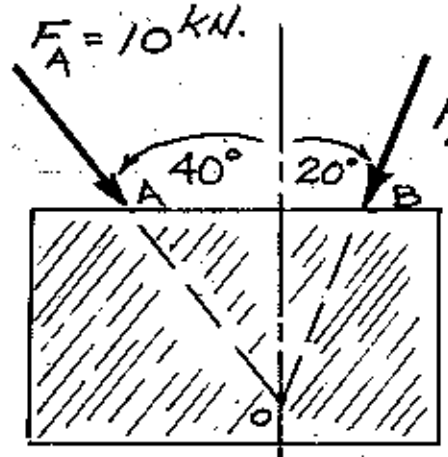


FIND: $\vec{R} = \vec{F}_A + \vec{F}_B$

$\vec{R} = R_H \hat{i} + R_V \hat{j}$

$\therefore$ HORIZONTAL COMPONENTS

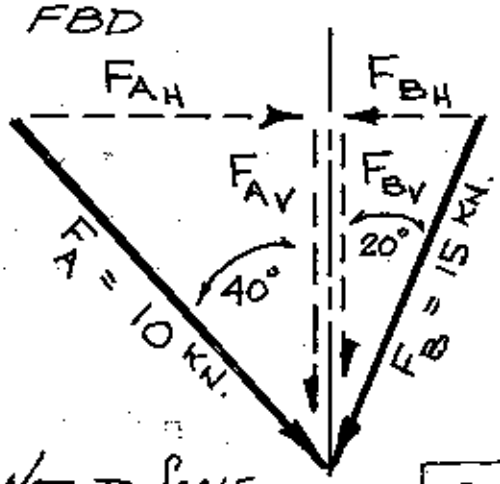
$R_H = F_{A_H} + F_{B_H}$

VERTICAL COMPONENTS

$R_V = F_{A_V} + F_{B_V}$

FOR F.B.D., EXTEND FORCE VECTORS ALONG THEIR LINE OF ACTION TO PT. O

FBD



NOT TO SCALE

HORIZ.

$F_{AH} = F_A \sin 40° = 10 \sin 40° = 6.43 \hat{i}$

$F_{BH} = -F_B \sin 20° = -15 \sin 20° = -5.13 \hat{i}$

$R_H = 1.3 \hat{i}$

VERT.

$F_{AV} = -F_A \cos 40° = -10 \cos 40° = -7.66 \hat{j}$

$F_{BV} = -F_B \cos 20° = -15 \cos 20° = -14.1 \hat{j}$

$R_V = -21.76 \hat{j}$

$$\boxed{\vec{R} = 1.3 \hat{i} - 21.76 \hat{j}}$$

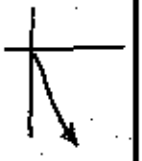
MAGNITUDE $|\vec{R}| = \sqrt{(1.3)^2 + (-21.76)^2} = 21.8^{KN.}$

DIRECTION

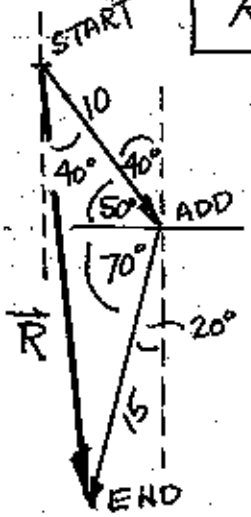
$\theta = \arctan \frac{R_V}{R_H} = \tan^{-1}\left[\frac{-21.76}{+1.3}\right] = -86.6°$

$+360$

$\theta = 273.4°$



$$\boxed{\vec{R} = 21.8^{KN.} \angle 273.4°}$$



POLYGON, $\vec{R} = \vec{F}_A + \vec{F}_B$ where $\vec{R}$ is opp. $\angle 120°$

LAW of COSINES

$R^2 = F_A^2 + F_B^2 - 2(F_A)(F_B) \cos 120°$

$R^2 = 10^2 + 15^2 - 2(10)(15) \cos 120° = 475$

$\therefore$ $R = 21.79$ KN

Then LAW of SINES for INTERIOR ANGLE + 50° = θ

$\frac{21.79}{\sin 120°} = \frac{15}{\sin \alpha} \Rightarrow \alpha = 36.6° + 50 = 86.6° = \theta$