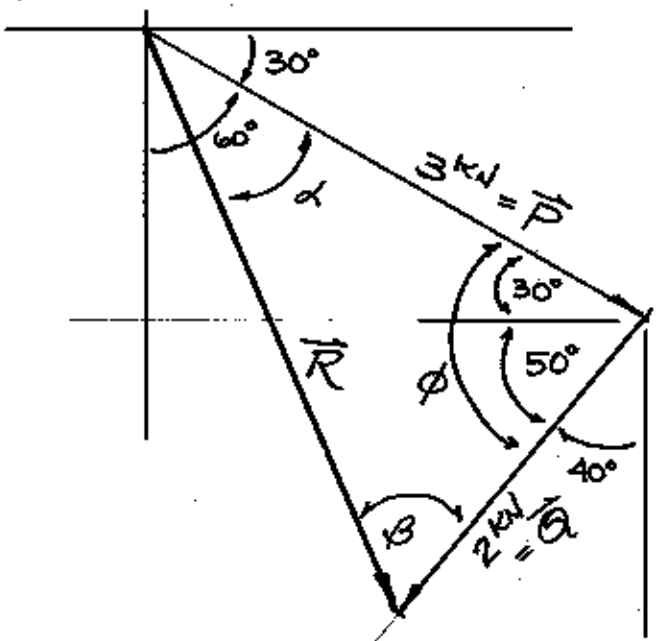
ALTERNATE SOLUTION METHOD not required for this problem.

c.) TRIGONOMETRIC SOLUTION using triangular rule.



RESULTANT is side opp. the interior angle between the two known vectors.

FOR MAGNITUDE, Law of Cosines

$$R^2 = P^2 + Q^2 - 2PQ\cos\phi$$

$$R^2 = (3^{KN})^2 + (2^{KN})^2 - 2(3^{KN})(2^{KN})\cos 80^\circ$$

$$R^2 = 10.916$$

$$R = \sqrt{10.916} = 3.304^{KN}.$$

FOR ORIENTATION, Law of Sines and some geometry.

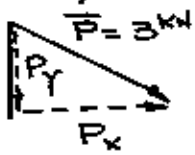
$$\frac{\sin\phi}{|R|} = \frac{\sin\alpha}{|Q|} = \frac{\sin\beta}{|P|} \quad \therefore \frac{\sin 80^\circ}{3.3\ KN} = \frac{\sin\alpha}{2^{KN}}$$

$$\alpha = \sin^{-1}\left[\frac{2^{KN}\sin 80^\circ}{3.3^{KN}}\right] = 36.645^\circ$$

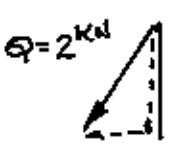
to measure with respect to Horiz., add the 30°
∴ angle = 66.65°

$$\boxed{\vec{R} = 3.3^{KN} \angle 66.6^\circ}$$

d.) ANALYTICAL SOLUTION, $\vec{R} = \vec{P} + \vec{Q}$



$$\vec{P} = 3\sin 60^\circ \uparrow - 3\cos 60^\circ \rightarrow$$
$$= 2.598 \uparrow - 1.5 \rightarrow$$



$$\vec{Q} = -2\sin 40^\circ \uparrow - 2\cos 40^\circ \rightarrow$$
$$= -1.286 \uparrow - 1.532 \rightarrow$$

$$\vec{R} = +1.312 \uparrow - 3.032 \rightarrow$$

$$\text{mag.} = \sqrt{(1.312)^2 + (3.032)^2} = 3.304^{KN}, \quad \theta = \tan^{-1}\frac{-3.032}{+1.312} = -66.6^\circ$$

G. N/LANO