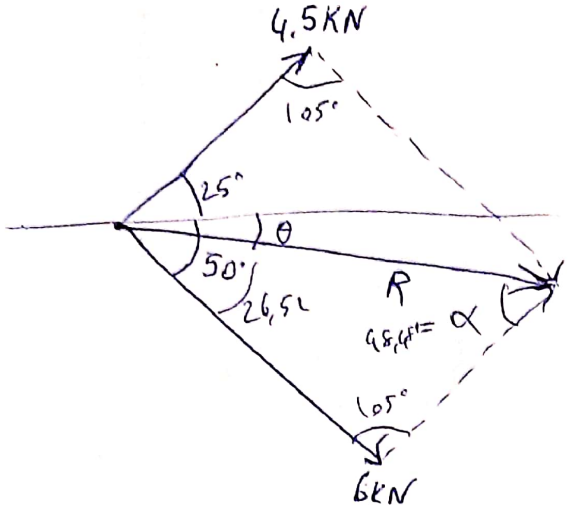
Q1 a) Parallelogram law



Law of cosine

$R = \sqrt{(4,5)^2 + 6^2 - 2.4,5.6.\cos 105°}$

$= 6,85$

Law of sine

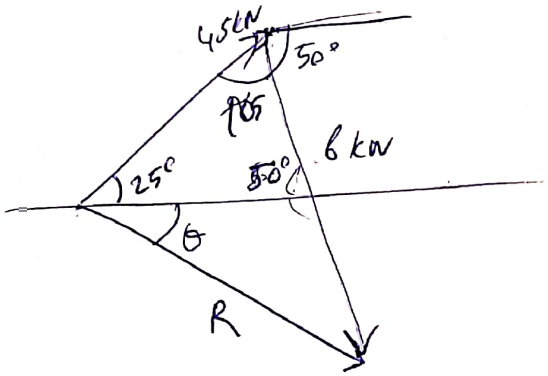
$\frac{6,85}{\sin 105°} = \frac{6}{\sin \alpha}$

$\sin \alpha = \frac{6.\sin 105}{6,85} = 0,85$

$\alpha = 48,48°$

$\theta = 23,5$

b)



Law of cosine:

$R = \sqrt{(4,5)^2 + 6^2 - 2.4,5.6.\cos 105°}$

$= 6,85$

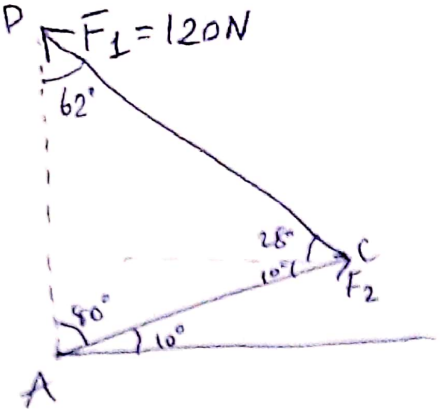
Law of sine:

$\frac{4,5}{\sin 50°} = \frac{6,85}{\sin 105} = \frac{6\,kN}{\sin(25+\theta)}$

$\sin(25+\theta) = \frac{6.\sin 50}{4,5\,kN}$

$\theta = 23,5$

(92)



apply the law of sines

a.) $\frac{120}{\sin 80^\circ} = \frac{F_2}{\sin 62^\circ} = \frac{R}{\sin 38^\circ}$

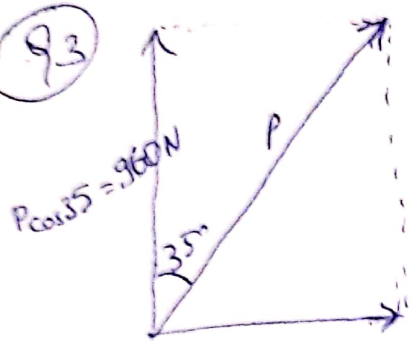
$F_2 = \frac{120 \sin 62^\circ}{\sin 80^\circ}$

$\boxed{F_2 = 107,6\ N}$

$R = \frac{120 . \sin 38}{\sin 80^\circ}$

b) $\boxed{R = 75\ N}$

(93)



a.) $P . \cos 35^\circ = 960N$

$P = \frac{960}{\cos 35^\circ} = \boxed{1171,94\ N}$

b.) $P_x = P . \sin 35$

$= 1171,94 \times \sin 35^\circ$

$= \boxed{672,2\ N}$

(94) For 100lb force (-) sign signifies its direction

$F_x = (3/5)100 = -60lb$

$F_y = (4/5)100 = -80lb$

For 156lb force

$F_x = (12/13)156 = 144lb$

$F_y = (5/13)\ 156 = -60lb$

For 145lb force

$F_x = (84/116) . 145 = -105lb$

$F_y = (80/116)\ 145 = 100lb$

Sum all of them

$F_x = -60 + 144 - 105 = -21lb$

$F_y = -80 - 60 + 100 = -40lb$

resultant $= \sqrt{(-21)^2 + (-40)^2} = 45,21lb$

$\theta = \arctan(40/21) = 62.3$ degree