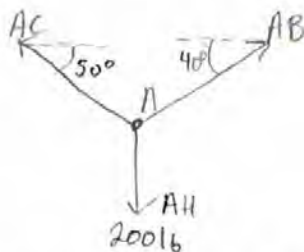


Test # 1

Problem 1

FBD



$$\sum F_x = AB \cos 40 - AC \cos 50 = 0$$

$$\sum F_y = AB \sin 40 + AC \sin 50 - 200 = 0$$

$$\rightarrow AB \cos 40 = AC \cos 50$$

$$AB = \frac{AC \cos 50}{\cos 40}$$

$$\sum F_y = \frac{AC \sin 40 \cos 50}{\cos 40} + AC \sin 50 = 200$$

$$AC (.5393628462) + AC (.766044431) = 200$$

$$AC (1.305407289) = 200$$

$$AC = 153.208886 \text{ lb}$$

$$AB = \frac{153.208... \cos 50}{\cos 40} = 128.5575219 \text{ lb}$$

$AC = 153 \text{ lb}$
$AB = 129 \text{ lb}$

Problem 2

$$\theta = 90 - 40 = 50$$

$$800 \text{ lb Force : } F_x = 800 \cos 50 = 514.2300877$$

$$F_y = 800 \sin 50 = 612.8355545$$

$$500 \text{ lb Force : } F_x = 500 \cos 35 = 409.5760221$$

$$F_y = \ominus 500 \sin 35 = \ominus 286.7882182$$

$$R_x = 514.230... + 409.576... = 923.8061098$$

$$R_y = 612.835... - 286.788... = 326.0473363$$

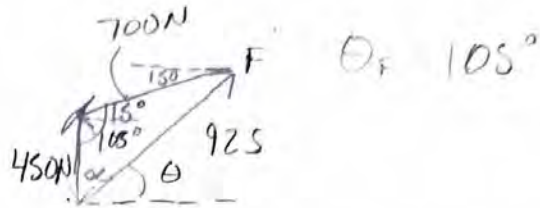
$$R = \sqrt{923.806...^2 + 326.047...^2} = 979.6553445$$

$$\boxed{R = 980 \text{ lb}}$$

$$\theta = \tan^{-1} \left| \frac{326.047...}{923.806...} \right| = \boxed{19.4^\circ}$$

Problem 3

Force triangle



$$F = \sqrt{700^2 + 450^2 - 2(700)(450)\cos 105^\circ}$$

$$F = 924.9627011 \text{ lb}$$

$$F = 925 \text{ lb}$$

$$\frac{\sin 105}{925.962\dots} = \frac{\sin \alpha}{700}$$

$$\alpha = \sin^{-1} \left(\frac{700 \sin 105}{924.962\dots} \right) = 46.97032443^\circ$$

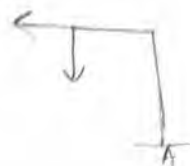
$$\theta = 90 - 46.970\dots = 43.02967557^\circ$$

$$\theta = 43.0^\circ$$

Problem #4

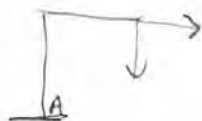
$$F_2: F_x = +\frac{4}{5} 50 = 40 \text{ lb}$$

$$F_y = +\frac{3}{5} 50 = 30 \text{ lb}$$



$$F_3: F_x = 0.200 \cos 45 = 0.848.5281374 \text{ lb}$$

$$F_y = 0.200 \sin 45 = 0.848.5281374 \text{ lb}$$



$$M_A = \underset{F_x}{800} \underset{dy}{(4)} + \underset{F_x}{40} \underset{dy}{(4)} + \underset{F_y}{30} \underset{dx}{(2.5)} - \underset{F_x}{848.5...} \underset{dy}{(6)} - \underset{F_y}{848.5...} \underset{dx}{(3)}$$

$$= -4201.753237 \text{ lb}$$

$$M_A = -4200 \text{ lb} \quad \text{or} \quad 4200 \text{ lb} \curvearrowright$$