1.

a) $\Sigma F_x = 8.0N - 6.0N = 2.0N$

$\boxed{\vec{F} = 2.0N \text{ @ } 0°}$

b)

$\Sigma F_y = 6N - 4N = 2N$

$\boxed{\vec{F} = 2.0N \text{ @ } 90°}$

c) $\Sigma F_x = 6.0N - 4.0N = 2.0N$

$\Sigma F_y = 3.0N - 3.0N = 0N$

$\boxed{\vec{F} = 2.0N \text{ @ } 0°}$

d)

$\Sigma F_x = (10.0N)\cos 53° - 6.0N = 0.0N$

$\Sigma F_y = (10.0N)\sin 53° - 4.0N = 4.0N$

$\boxed{\vec{F} = 4.0N \text{ @ } 90°}$

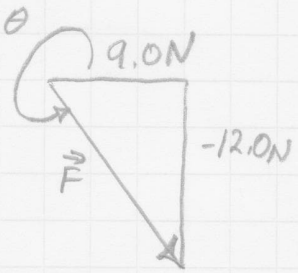
e)

$\Sigma F_x = 2.0N - (15.0N)\cos 37° = -10.0N$

$\Sigma F_y = (15.0N)\sin 37° - 9.0N = 0.0N$

f). The two vectors of 15.0N are in opposite directions. They cancel each other out. So, I don't need to include them.

$F_x = 9.0N \qquad F_y = -12.0N$



$F = \sqrt{(9.0N)^2 + (12.0N)^2} = 15.0N$

$\alpha = \tan^{-1}\left(\frac{-12.0N}{9.0N}\right) = -53.1° \text{ or } 307°$

$\boxed{\vec{F} = 15.0N \text{ @ } 307°}$

g) $\Sigma F_x = (12.0N)\cos 30° + (10.0N)\cos 65° - 15.0N$

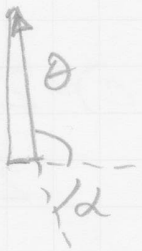
$F_x = -0.38\ N$

$\Sigma F_y = 8.0N + 12.0N \sin 30° - (10.0N)\sin 65°$

$F_y = 4.9\ N$

$F = \sqrt{(-0.38N)^2 + (4.9N)^2} = 4.94\ N$

$\alpha = \tan^{-1}\left(\frac{4.9N}{-0.38N}\right) = -85.6°$



$\theta = 180° - 85.6°$

$\theta = 94.4°$

$\boxed{\vec{F} = 4.94N \text{ @ } 94.4°}$

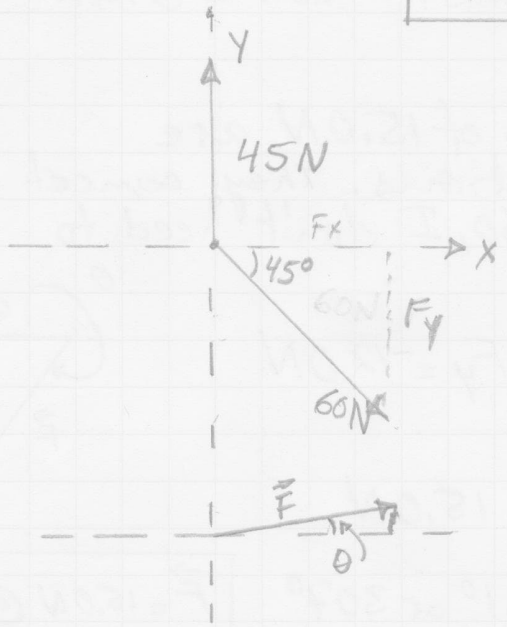
2.

a)

$F = 10N - 8N = 2N$

$\boxed{\vec{F} = 2N \text{ @ } 0°}$

b)



$F_x = 60N\cos 45° = 42.4\ N$

$F_y = 45N - (60N)\sin 45° = 2.57\ N$

$F = \sqrt{(42.4N)^2 + (2.57N)^2} = 45.5\ N$

$\theta = \tan^{-1}\left(\frac{2.57N}{42.4N}\right) = 3.5°$

$\boxed{\vec{F} = 45.5N \text{ @ } 3.5°}$

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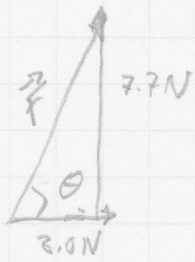
1. h) $\Sigma F_x = (5.0N)\cos 45° - (5.0N)\cos 15° + 3.0N = 3.0N$

$\Sigma F_y = (5.0N)\sin 45° + (5.0N)\sin 45°$

$= 7.07N$

$F = \sqrt{F_x^2 + F_y^2} = \sqrt{(3.0N)^2 + (7.07N)^2}$

$F = 7.68N$



$\theta = \tan^{-1}\left(\frac{7.07N}{3.0N}\right) = 67°$

$\boxed{\vec{F} = 7.68N @ 67°}$

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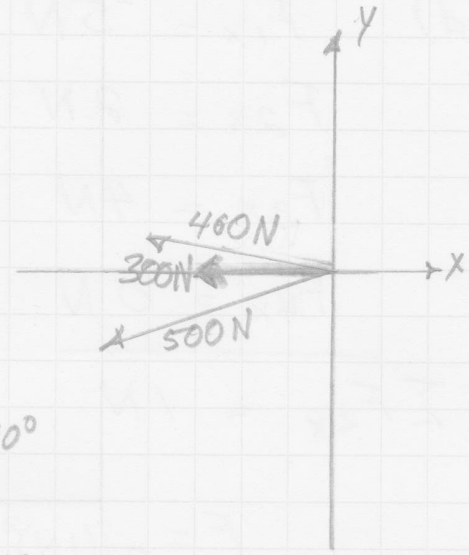
2) (cont'd)

c)



$F_{1x} = -(300\,N)$ $\quad F_{1y} = 0N$

$F_{2x} = (500N)\cos 200°$ $\quad F_{2y} = (500N)\sin 200°$

$F_{2x} = -470N$ $\quad F_{2y} = -171N$

$F_{3x} = (400N)\cos 170°$ $\quad F_{2y} = (400N)\cos 170°$

$F_{3x} = -394N$ $\quad F_{3y} = 69.5N$

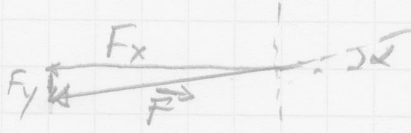
$$\Sigma F_{xi} = F_{1x} + F_{2x} + F_{3x} = -300N - 470N - 394N = -1164N$$

$$F_x = -1146N$$

$$\Sigma F_{yi} = F_{1y} + F_{2y} + F_{3y} = 0N - 171N + 69.5N = -101.5N$$

$$F_y = -101.5N$$

$$F = \sqrt{F_x^2 + F_y^2} = \sqrt{(-1146N)^2 + (-101.5N)^2} = 1150N$$



$$\alpha = \tan^{-1}\left(\frac{-101.5N}{-1146N}\right)$$

$$\alpha = 5.06°$$

$$\theta = 180° + 5.06°$$

$$\theta = 185.1°$$

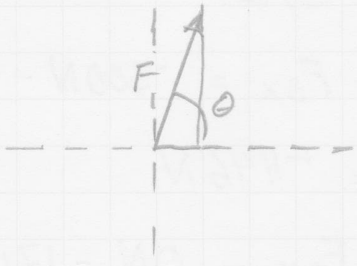
$$\boxed{\vec{F} = 1150N \text{ @ } 185°}$$

2. (cont'd)

d)

$F_{1x} = -5N$	$F_{1y} = 6N$
$F_{2x} = 2N$	$F_{2y} = 4N$
$F_{3x} = 4N$	$F_{3y} = -3N$
$F_{4x} = 0N$	$F_{4y} = -4N$
$\Sigma F_{\ell x} = 1N$	$\Sigma F_{\ell y} = 3N$

$$F = \sqrt{(1N)^2 + (3N)^2} = 3.16N$$



$$\theta = \tan^{-1}\left(\frac{3N}{1N}\right)$$

$$\theta = 71.6^\circ$$

$$\boxed{\vec{F} = 3.16N @ 71.6^\circ}$$