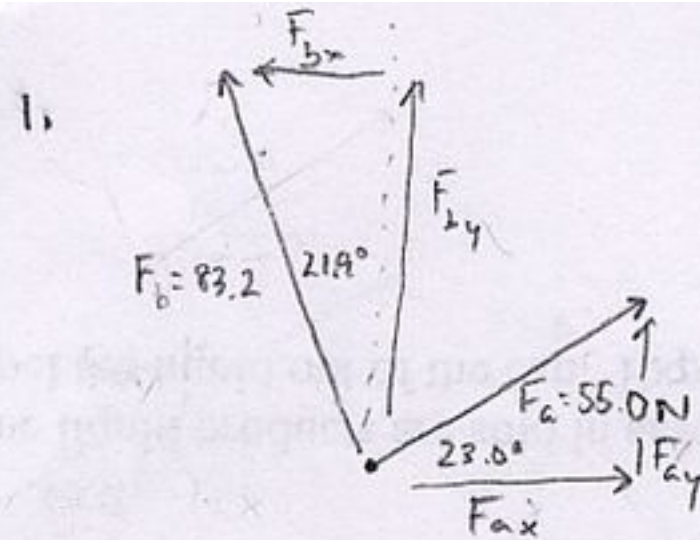
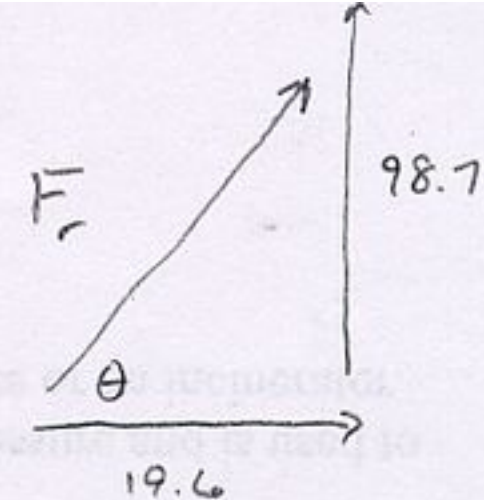




|         | X     | Y    |
|---------|-------|------|
| $F_a$   | 50.6  | 21.5 |
| $+ F_b$ | -31.0 | 77.2 |
|         | 19.6  | 98.7 |



$$F_{bx} = 83.2 \sin 21.9^\circ = -31.0$$

$$F_{by} = 83.2 \cos 21.9^\circ = 77.2$$

$$F_{ax} = 55.0 \cos 23.0^\circ = 50.6$$

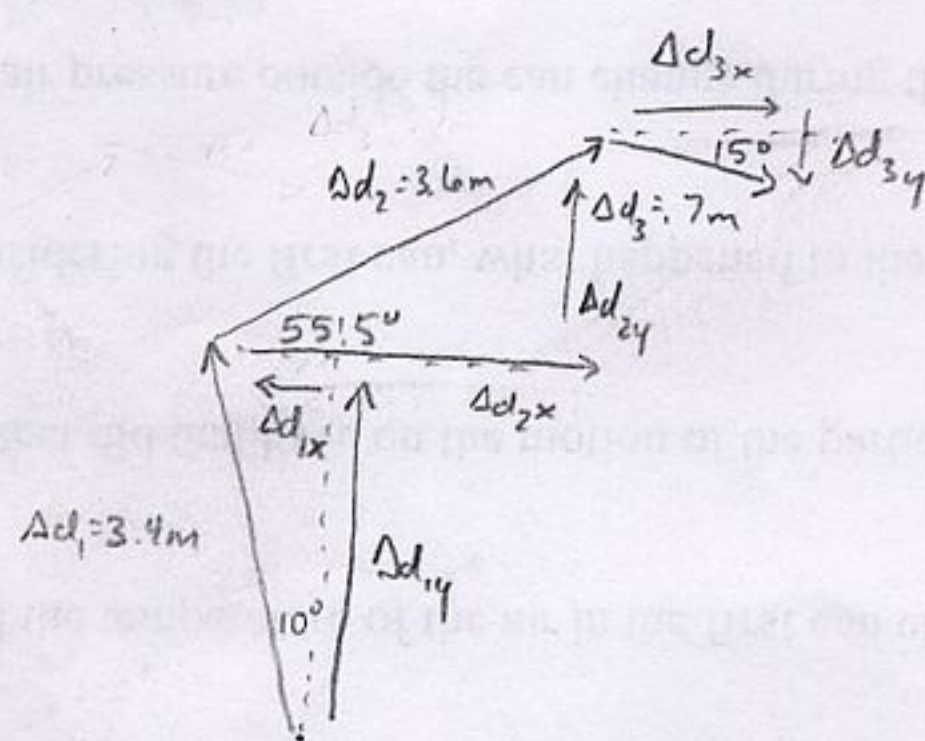
$$F_{ay} = 55.0 \sin 23.0^\circ = 21.5$$

$$F_r = \sqrt{19.6^2 + 98.7^2} = 101 \text{ N}$$

$$\theta = \tan^{-1} \frac{98.7}{19.6} = 78.8^\circ$$

$$\boxed{101 \text{ N @ } 78.8^\circ}$$

3.



|                | X     | Y   |
|----------------|-------|-----|
| $\Delta d_1$   | -0.59 | 3.3 |
| $\Delta d_2$   | 2.0   | 2.9 |
| $+ \Delta d_3$ | .7    | -.2 |
|                | 2.1   | 6   |

$$\Delta d_{1x} = 3.4 \sin 10^\circ = -0.59$$

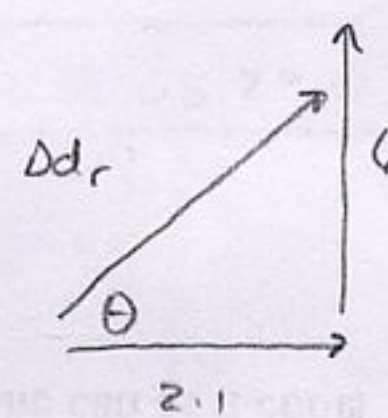
$$\Delta d_{1y} = 3.4 \cos 10^\circ = 3.3$$

$$\Delta d_{2x} = 3.6 \cos 55.5^\circ = 2.0$$

$$\Delta d_{2y} = 3.6 \sin 55.5^\circ = 2.9$$

$$\Delta d_{3x} = .7 \cos 15^\circ = .7$$

$$\Delta d_{3y} = .7 \sin 15^\circ = -.2$$

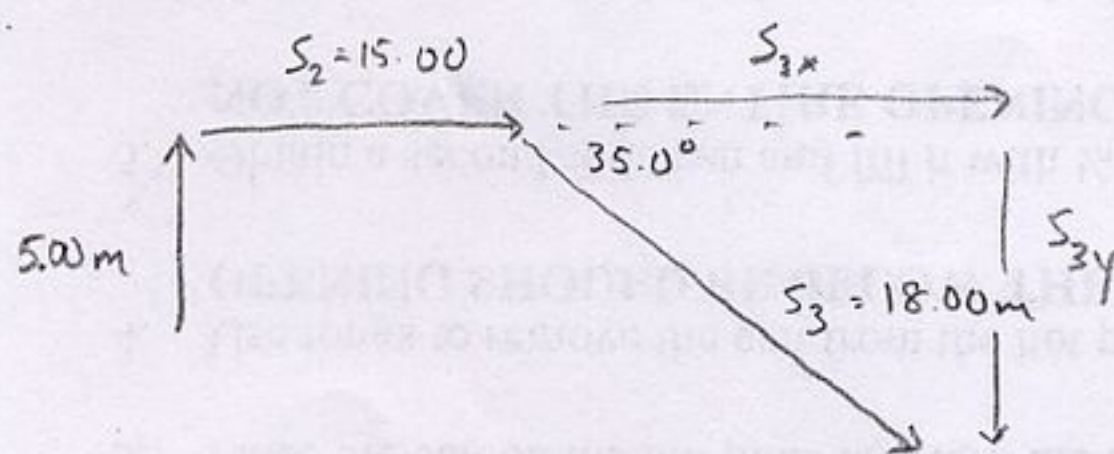


$$\Delta d_r = \sqrt{2.1^2 + 6^2} = 6.4 \text{ m}$$

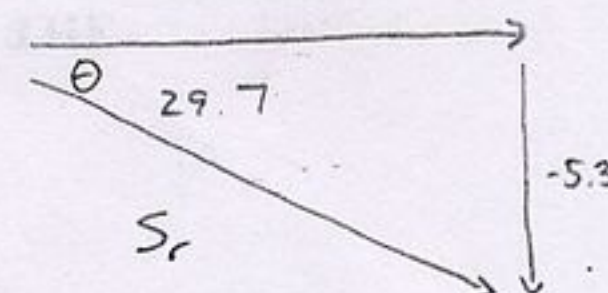
$$\theta = 71^\circ$$

$$\boxed{6.4 \text{ m @ } 71^\circ}$$

4.



|         | X     | Y     |
|---------|-------|-------|
| $S_1$   | 0     | 5.00  |
| $S_2$   | 15.00 | 0     |
| $+ S_3$ | 14.7  | -10.3 |
|         | 29.7  | -5.3  |



$$S_{3x} = 18.00 \cos 35.0^\circ = 14.7$$

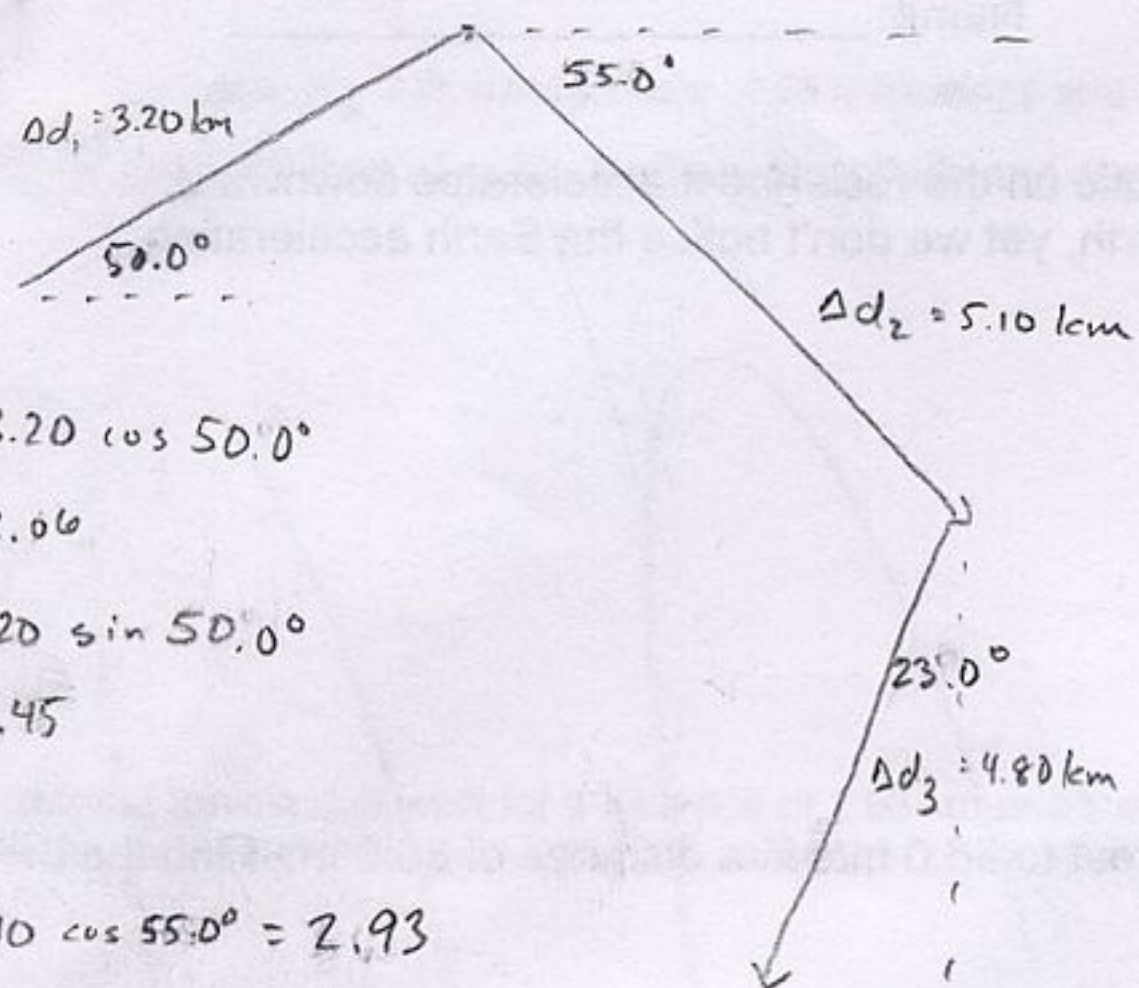
$$S_{3y} = 18.00 \sin 35.0^\circ = -10.3$$

$$S_r = \sqrt{29.7^2 + 5.3^2} = 30 \text{ m}$$

$$\theta = \tan^{-1} \frac{5.3}{29.7} = 10^\circ$$

$$\boxed{30 \text{ m @ } 10^\circ \text{ S of E}}$$

5.



$$\Delta d_{1x} = 3.20 \cos 50.0^\circ$$

$$= 2.06$$

$$\Delta d_{1y} = 3.20 \sin 50.0^\circ$$

$$= 2.45$$

$$\Delta d_{2x} = 5.10 \cos 55.0^\circ = 2.93$$

$$\Delta d_{2y} = 5.10 \sin 55.0^\circ = -4.18$$

$$\Delta d_{3x} = 4.80 \sin 23^\circ$$

$$= -1.88$$

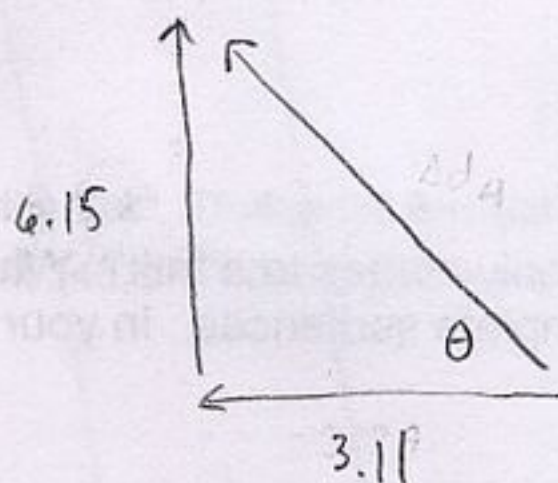
$$\Delta d_{3y} = 4.80 \cos 23^\circ$$

$$= -4.42$$

$$\Delta d_{\text{resultant } x} = 0$$

$$\Delta d_{\text{resultant } y} = 0$$

|                | x     | y     |
|----------------|-------|-------|
| $\Delta d_1$   | 2.06  | 2.45  |
| $\Delta d_2$   | 2.93  | -4.18 |
| + $\Delta d_3$ | -1.88 | -4.42 |
| $\Delta d_r$   | 3.11  | -6.15 |
| $\Delta d_4$   | -3.11 | 6.15  |



$$\Delta d_4 = \sqrt{3.11^2 + 6.15^2}$$

$$= 6.89 \text{ km}$$

$$\theta = \tan^{-1} \frac{6.15}{3.11} = 63.2^\circ$$

$$\boxed{6.89 \text{ km @ } 63.2^\circ \text{ N of W}}$$