

1: Sabiendo que $F_1 = 10 \text{ cm}$ $\alpha = 50^\circ$, $F_2 = 15 \text{ cm}$ $\alpha = 90^\circ$, $F_3 = 9 \text{ cm}$ $\alpha = 160^\circ$
 $F_4 = 10 \text{ cm}$ $\alpha = 250^\circ$, calcula: $F_R = F_1 + F_2 + F_3 + F_4$.

Desarrollo

• Encontrar F_x y F_y

$$F_{1x} = 10 \cos 50^\circ = 6.4279 \text{ cm}$$

$$F_{2x} = 15 \cos 90^\circ = 0 \text{ cm}$$

$$F_{3x} = 9 \cos 160^\circ = -8.4572 \text{ cm}$$

$$F_{4x} = 10 \cos 250^\circ = -3.4202 \text{ cm}$$

$$F_{1y} = 10 \sin 50^\circ = 7.6604 \text{ cm}$$

$$F_{2y} = 15 \sin 90^\circ = 15 \text{ cm}$$

$$F_{3y} = 9 \sin 160^\circ = 3.0781 \text{ cm}$$

$$F_{4y} = 10 \sin 250^\circ = -9.3969 \text{ cm}$$

$$\Sigma F_x = F_{1x} + F_{2x} + F_{3x} + F_{4x} = -5.4495 \text{ cm}$$

$$\Sigma F_y = F_{1y} + F_{2y} + F_{3y} + F_{4y} = 16.3416 \text{ cm}$$

• Encontrar F_R

$$F_R = \sqrt{F_x^2 + F_y^2} = \sqrt{(-5.4495)^2 + (16.3416)^2}$$

$$F_R = \sqrt{29.697 + 267.0479} = \sqrt{296.745}$$

$$F_R = 17.2263 \text{ cm}$$

2: Dados los vectores $V_1 = 5 \text{ cm}$ $\alpha = 30^\circ$ $V_2 = 6 \text{ cm}$ $\alpha = 60^\circ$ $V_3 = 2 \text{ cm}$
 $\alpha = 100^\circ$ $V_4 = 7 \text{ cm}$ $\alpha = 150^\circ$. Encuentra el vector resultante
 y su ángulo

• Encontrar V_x y V_y

$$V_{1x} = 5 \cos 30^\circ = 4.3301$$

$$V_{1y} = 5 \sin 30^\circ = 2.5$$

$$V_{2x} = 6 \cos 60^\circ = 3$$

$$V_{2y} = 6 \sin 60^\circ = 5.1962$$

$$V_{3x} = 2 \cos 100^\circ = 0.3473$$

$$V_{3y} = 2 \sin 100^\circ = 1.9696$$

$$V_{4x} = 7 \cos 150^\circ = 6.0622$$

$$V_{4y} = 7 \sin 150^\circ = 3.5$$

$$\Sigma V_x = V_{1x} + V_{2x} + V_{3x} + V_{4x}$$

$$\Sigma V_y = V_{1y} + V_{2y} + V_{3y} + V_{4y}$$

$$\Sigma V_x = 0.9206 \text{ cm}$$

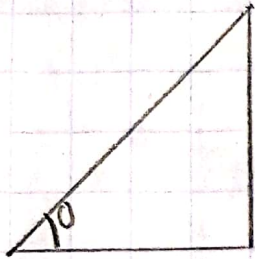
$$\Sigma V_y = 13.1658 \text{ cm}$$

- Encontrar VR

$$VR = \sqrt{V_x^2 + V_y^2} = \sqrt{(0.9206)^2 + (13.1658)^2} = \sqrt{0.8475 + 173.3383}$$

$$VR = \sqrt{174.1858} = 13.1980 \text{ cm}$$

- Encontrar Angulo



$$V_x = 0.9206$$

$$V_y = 13.1658$$

$$\tan \theta = \frac{V_y}{V_x} = \frac{13.1658}{0.9206} = 14.3013$$

$$\tan \theta = 14.3013$$

$$\theta = \arctan(14.3013)$$

$$\theta = 86^\circ$$

- 3: Del problema anterior encuentra la solución $VR = V_1 + V_2$

Desarrollo:

Datos

$$V_1 = 7 \text{ cm a } 150^\circ$$

$$V_2 = 6 \text{ cm a } 60^\circ$$

$$V_{2x} = 6 \cos 60^\circ = 3 \text{ cm}$$

$$V_{1x} = 7 \cos 150^\circ = -6.0622 \text{ cm}$$

$$V_{2y} = 6 \sin 60^\circ = 5.1962 \text{ cm}$$

$$V_{1y} = 7 \sin 150^\circ = 3.5$$

$$\Sigma V_x = V_{2x} + V_{1x} = -3.0622 \text{ cm}$$

$$\Sigma V_y = V_{2y} + V_{1y} = 8.6962 \text{ cm}$$

Encontrar VR

$$VR = \sqrt{V_x^2 + V_y^2} = \sqrt{(-3.0622)^2 + (8.6962)^2} = \sqrt{9.3771 + 75.6239}$$

$$VR = \sqrt{85.001} = 9.2196 \text{ cm}$$

- 4: Calcula la Fuerza resultante de un sistema en el cual actúan las Fuerzas: $F_1 = 1500 \text{ nw}$ a 95° y $F_2 = 2500 \text{ nw}$ a 120° , así como el ángulo de acción.

Desarrollo

- Encontrar F_x y F_y

$$F_{1x} = 1500 \cos 95^\circ = 1060.6602 \text{ nw}$$

$$F_{1y} = 1500 \sin(95^\circ) = 1060.6602 \text{ nw}$$

$$F_{2x} = 2500 \cos 120^\circ = -1250 \text{ nw}$$

$$F_{2y} = 2500 \sin(120^\circ) = 2165.0635 \text{ nw}$$

$$\Sigma F_x = 189.3398 \text{ nw}$$

$$\Sigma F_y = 3.225.7237 \text{ nw}$$

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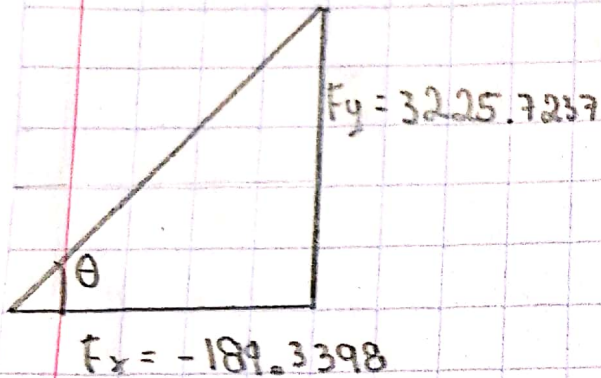
• Encuentra F_R

$$F_R = \sqrt{F_x^2 + F_y^2} = \sqrt{(-189.3398)^2 + (3225.7237)^2}$$

$$F_R = \sqrt{35849.5599 + 10405293.3888}$$

$$F_R = \sqrt{10441142.9487} = 3231.2758 \text{ Nw}$$

• Encuentra ángulo



$$\tan \theta = \frac{F_y}{F_x} = \frac{3225.7237}{-189.3398} = -17.0367$$

$$\theta = \arctan(-17.0367)$$

$$\theta = -86.69^\circ$$

$$180^\circ + \theta = 93.36^\circ$$

$$\theta = 93.69^\circ$$