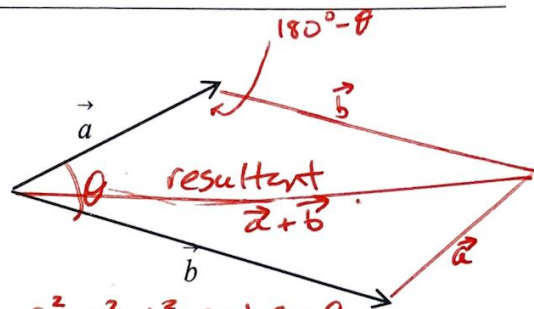


Use the figure to the right.  $\theta$  is the angle formed by the two vectors.

Find: (a) the magnitude of the resultant

(b) the measure of the angle that the resultant make with  $\vec{a}$



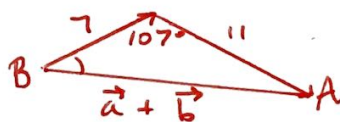
Round answers to the nearest hundredth. Law of Cosines  $c^2 = a^2 + b^2 - 2ab \cos C$

$$\|\vec{a}\| = 7 \text{ cm}$$

$$1. \quad \|\vec{b}\| = 11 \text{ cm}$$

$$\theta = 73^\circ$$

$$180^\circ - 73^\circ = 107^\circ$$



$$(a) \|\vec{a} + \vec{b}\| = \sqrt{7^2 + 11^2 - 2 \cdot 7 \cdot 11 \cdot \cos 107^\circ}$$

$$= \boxed{14.66 \text{ cm}}$$

$$(b) 11^2 = 7^2 + 14.66^2 - 2 \cdot 7 \cdot 14.66 \cos B$$

$$121 = 263.9156 - 205.24 \cos B$$

$$-142.9156 = -205.24 \cos B$$

$$B = \cos^{-1} \left( \frac{142.9156}{205.24} \right)$$

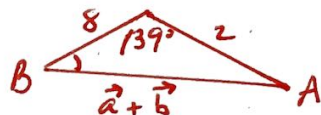
$$\boxed{B = 45.87^\circ}$$

$$\|\vec{a}\| = 8 \text{ ft}$$

$$2. \quad \|\vec{b}\| = 2 \text{ ft}$$

$$\theta = 41^\circ$$

$$180^\circ - 41^\circ = 139^\circ$$



$$(a) \|\vec{a} + \vec{b}\| = \sqrt{8^2 + 2^2 - 2 \cdot 8 \cdot 2 \cdot \cos 139^\circ}$$

$$= \boxed{9.6 \text{ ft.}}$$

$$(b) 2^2 = 8^2 + 9.6^2 - 2 \cdot 8 \cdot 9.6 \cos B$$

$$4 = 156.16 - 153.6 \cos B$$

$$-152.16 = -153.6 \cos B$$

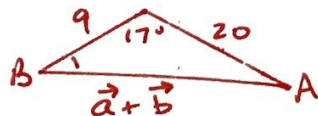
$$B = \cos^{-1} \left( \frac{152.16}{153.6} \right) \quad \boxed{B = 7.85^\circ}$$

$$\|\vec{a}\| = 9 \text{ in}$$

$$3. \quad \|\vec{b}\| = 20 \text{ in}$$

$$\theta = 163^\circ$$

$$180^\circ - 163^\circ = 17^\circ$$



$$(a) \|\vec{a} + \vec{b}\| = \sqrt{9^2 + 20^2 - 2 \cdot 9 \cdot 20 \cos 17^\circ}$$

$$= \boxed{11.69 \text{ in.}}$$

$$(b) 20^2 = 9^2 + 11.69^2 - 2 \cdot 9 \cdot 11.69 \cos B$$

$$400 = 217.6561 - 210.42 \cos B$$

$$182.3439 = -210.42 \cos B$$

$$B = \cos^{-1} \left( \frac{182.3439}{-210.42} \right) \quad \boxed{B = 150.06^\circ}$$

answers:

$$1) \|\vec{a} + \vec{b}\| = 14.66 \text{ cm}; B = 45.87^\circ$$

$$2) \|\vec{a} + \vec{b}\| = 9.6 \text{ ft}; B = 7.85^\circ$$

$$3) \|\vec{a} + \vec{b}\| = 11.69 \text{ in}; B = 150.06^\circ$$