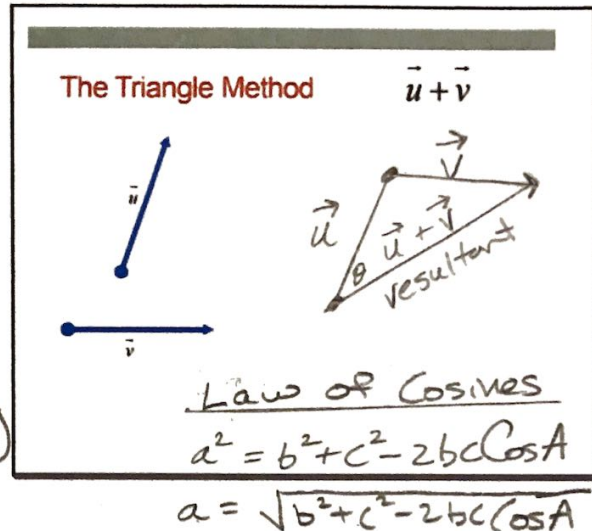
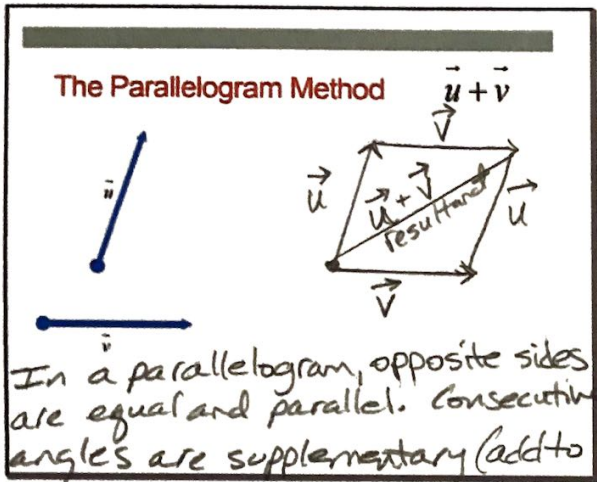


Resultant Vectors

What is a resultant vector? A resultant vector is the result of adding or subtracting two or more vectors.



Example 1:

Given $\|\vec{v}\|=5$ and $\|\vec{w}\|=9$ and the angle between the two vectors is $\theta = 58^\circ$. Find ...

a) the magnitude of the resultant
length

$$\|\vec{r}\| = \sqrt{5^2 + 9^2 - 2(5)(9)\cos 122^\circ}$$

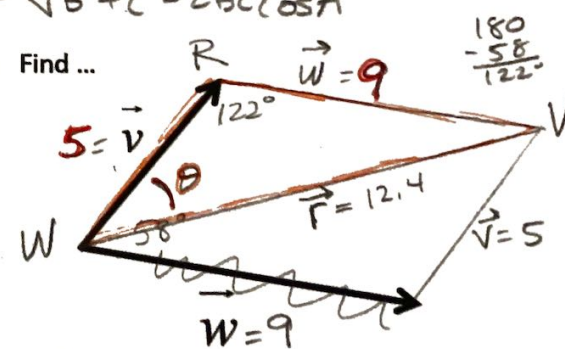
$$\|\vec{r}\| = \sqrt{153.69} = \boxed{12.40}$$

b) the measure of the angle between the resultant and \vec{v} .

$$9^2 = 5^2 + 12.4^2 - 2(5)(12.4)\cos \theta$$

$$-97.76 = -124 \cos \theta$$

$$\theta = \cos^{-1}\left(\frac{97.76}{124}\right)$$



Example 2:

Given $\|\vec{v}\|=3$ and $\|\vec{w}\|=17$ and the angle between the two vectors is $\theta = 132^\circ$. Find ...

a) the magnitude of the resultant

$$\|\vec{r}\| = \sqrt{3^2 + 17^2 - 2(3)(17)\cos 48^\circ}$$

$$= \sqrt{229.7486}$$

$$= \boxed{15.16}$$

b) the measure of the angle between the resultant and \vec{v} .

$$17^2 = 3^2 + 15.16^2 - 2(3)(15.16)\cos \theta$$

$$50.1744 = -90.94 \cos \theta$$

$$\theta = \cos^{-1}\left(\frac{50.1744}{-90.94}\right)$$

$$\theta = \boxed{123.49^\circ}$$

