

Vectors in Physics



$$\vec{V} = \vec{V}_x + \vec{V}_y$$



$$\vec{F} = \vec{F}_x + \vec{F}_y$$



Pythagorean's Theorem

$$V^2 = V_x^2 + V_y^2$$

magnitude of resultant

$$V = \sqrt{V_x^2 + V_y^2}$$

direction of resultant

$$\theta = \tan^{-1}\left(\frac{y}{x}\right)$$

Random Vectors

$$\vec{A} = 7.7\hat{x} + 4.5\hat{y}$$

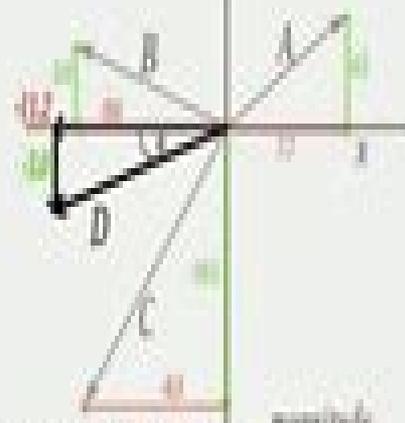
$$\vec{B} = -9.6\hat{x} + 3.0\hat{y}$$

$$\vec{C} = -9.3\hat{x} + -10.5\hat{y}$$

using a ruler and a protractor
place the vectors
"head-to-tail"



Analytical



Component Addition

$$\vec{A} = 7.7\hat{x} + 4.5\hat{y}$$

$$\vec{B} = -9.6\hat{x} + 3.0\hat{y}$$

$$\vec{C} = -9.3\hat{x} + -10.5\hat{y}$$

$$\vec{D} = -11.2\hat{x} + -3.0\hat{y}$$

$$|\vec{D}| = \sqrt{(-11.2)^2 + (-3.0)^2} = 11.6$$

magnitude

$$\text{direction } \theta = \tan^{-1}\left(\frac{-3.0}{-11.2}\right) = 15^\circ$$

TRIGONOMETRY

$\sin(\theta) = \frac{a}{c}$

$\cos(\theta) = \frac{b}{c}$

"sohcahtoa"

$\tan(\theta) = \frac{a}{b}$

Vector Analysis In Chemistry

Mark Steyvers

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