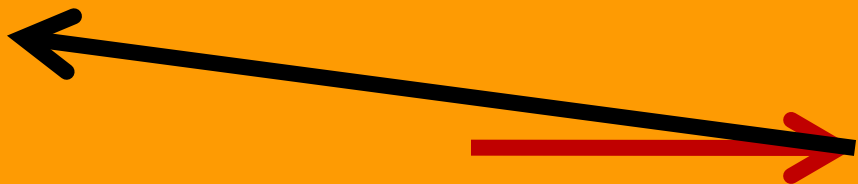
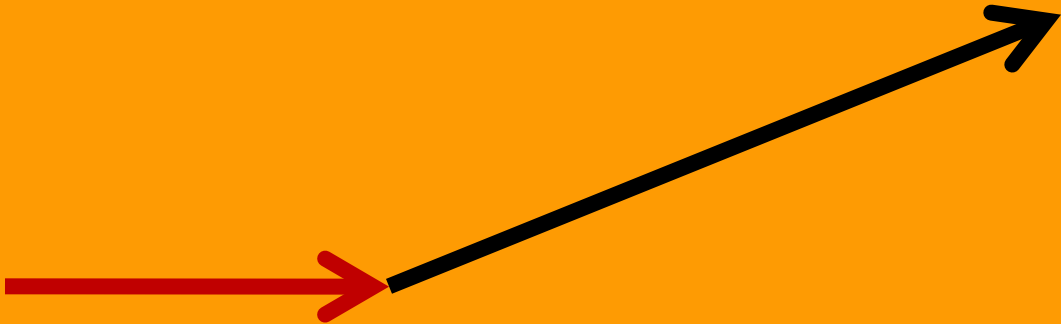


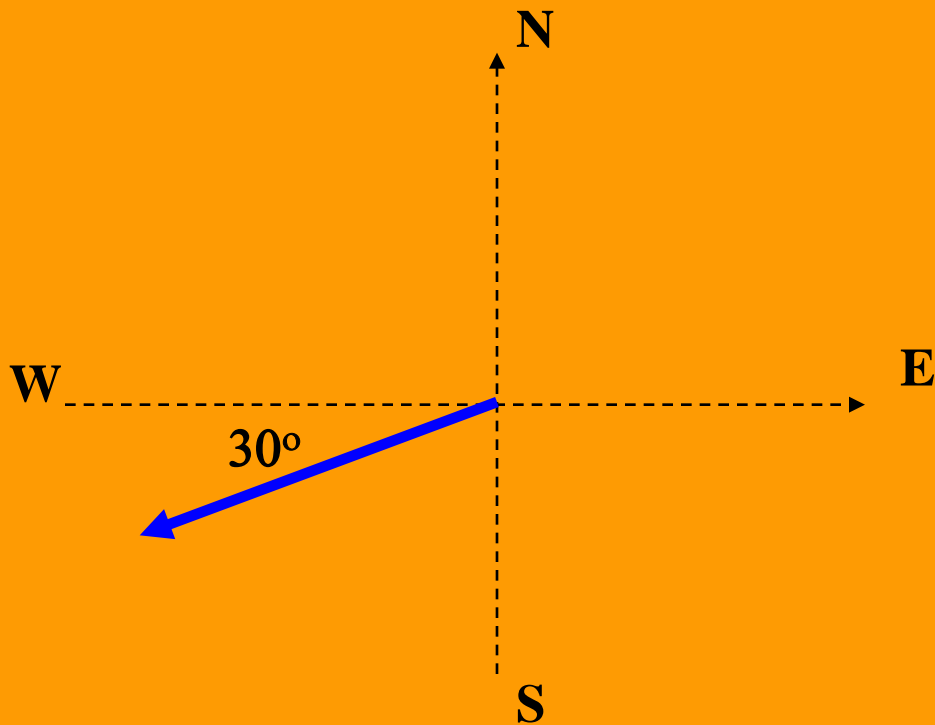
Vectors

The word "Vectors" is rendered in a bold, 3D, sans-serif font. The letters are stacked, giving them a sense of depth and weight. The color of the text transitions from a bright yellow on the left to a vibrant orange and then to a deep red on the right. A thin, curved red line arches over the top of the text. In the bottom right corner, there is a large, curved shape with a gradient from light pink to bright red, partially overlapping the yellow background.

$$3 + 5 \stackrel{?}{=} 8$$

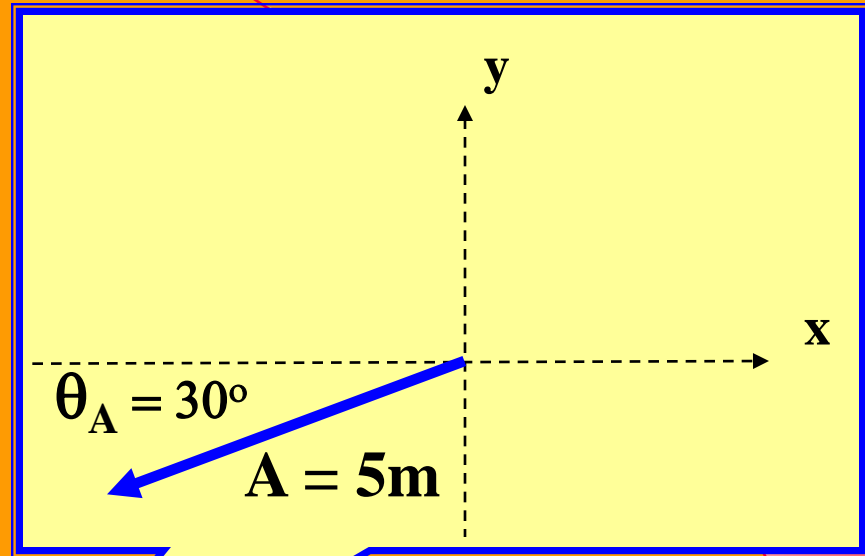
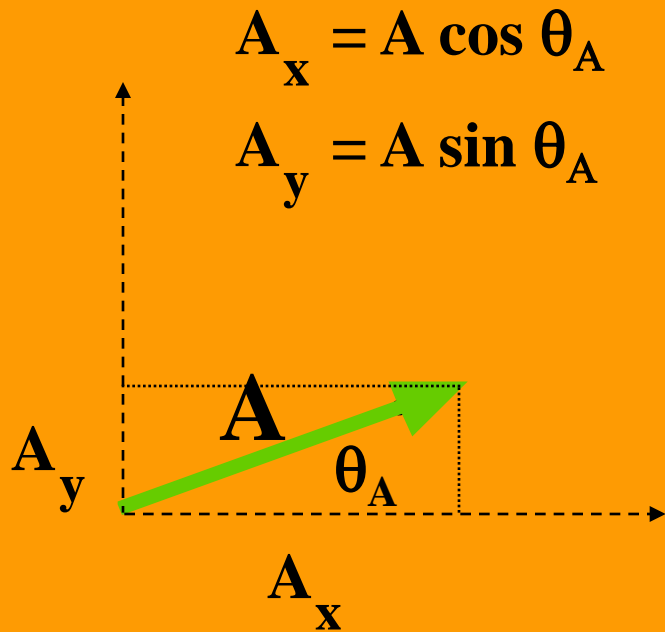


Define the angle below



210°
 30° S of W
 60° W of S
 -150°

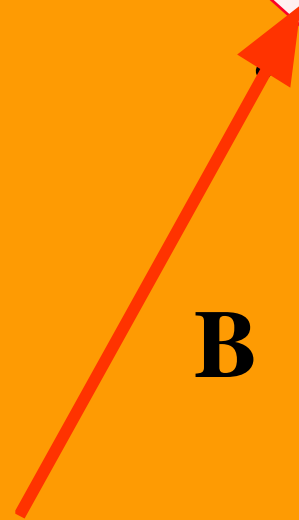
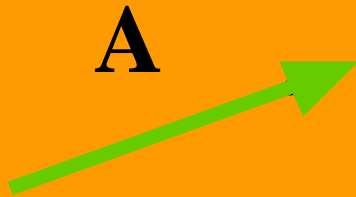
Vector Components



$$A_x = -5\text{m} \cos 30^\circ = -4.33\text{ m}$$

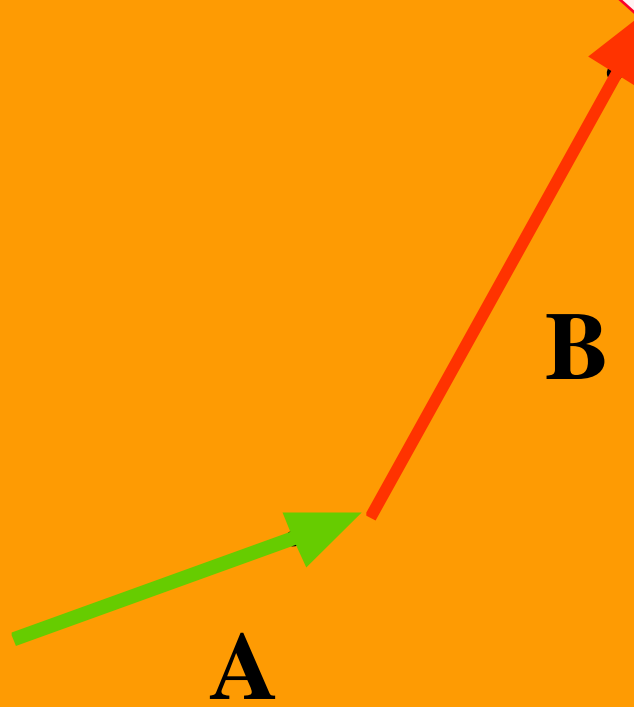
$$A_y = -5\text{m} \sin 30^\circ = -2.5\text{ m}$$

Vector Addition



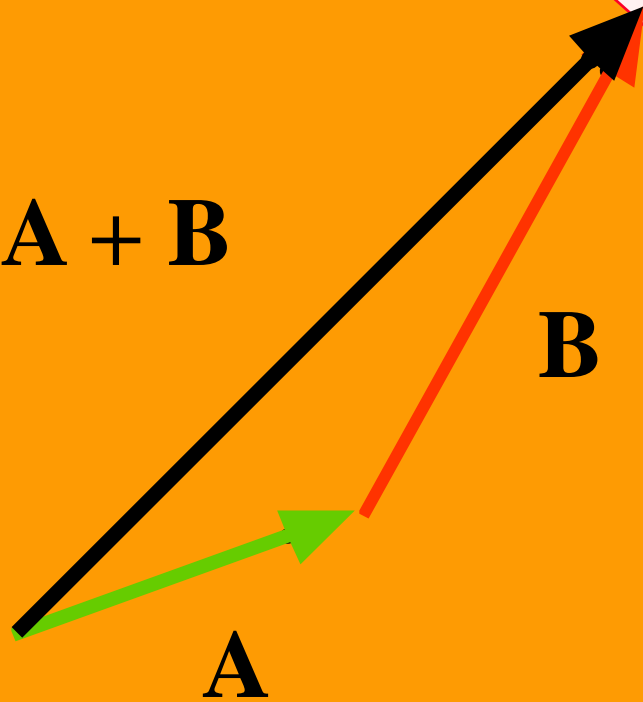
B

Vector Addition

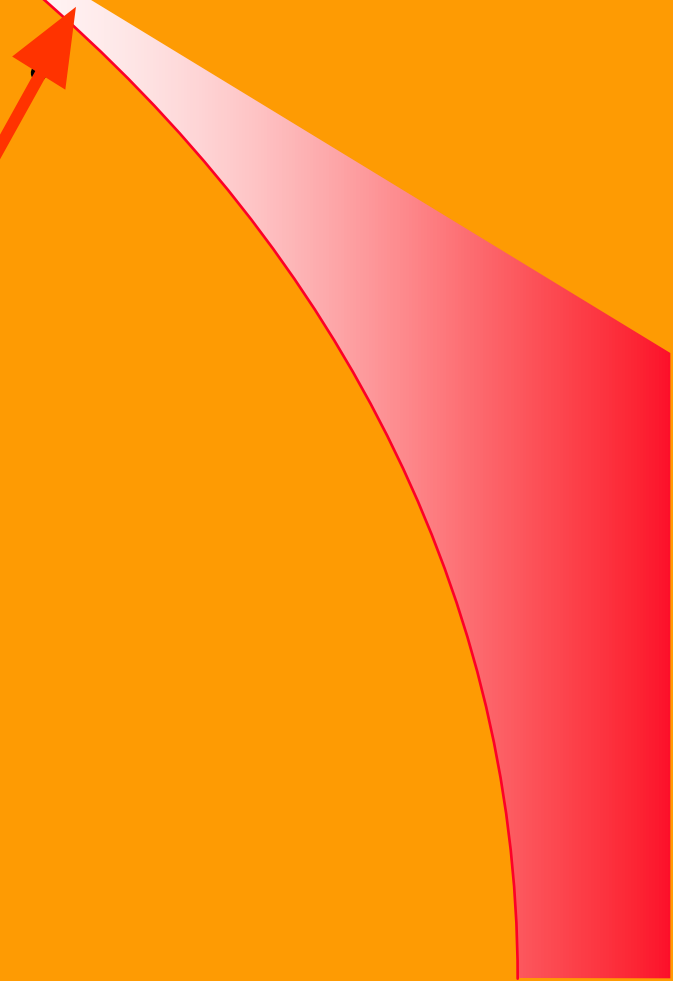
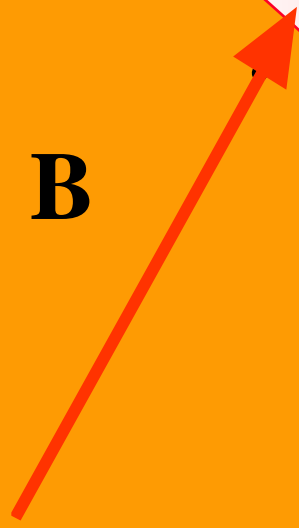
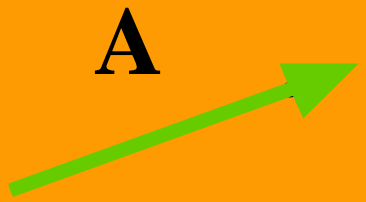


Vector Addition

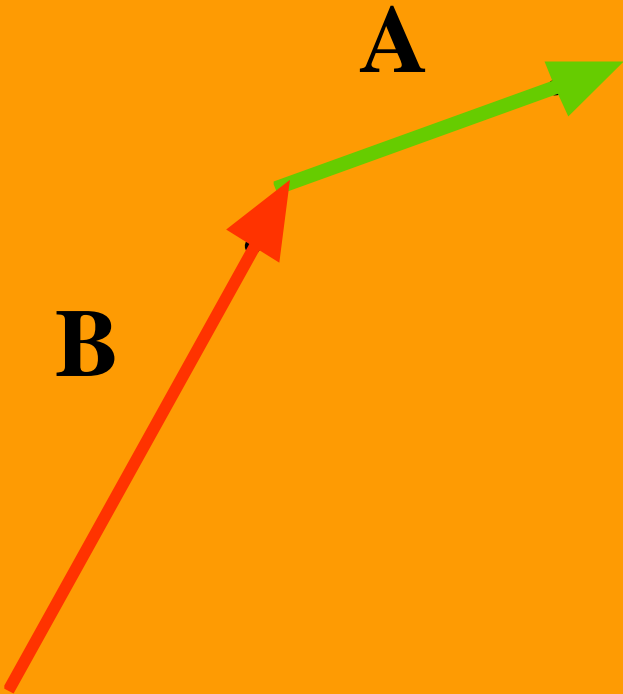
$$\mathbf{C} = \mathbf{A} + \mathbf{B}$$



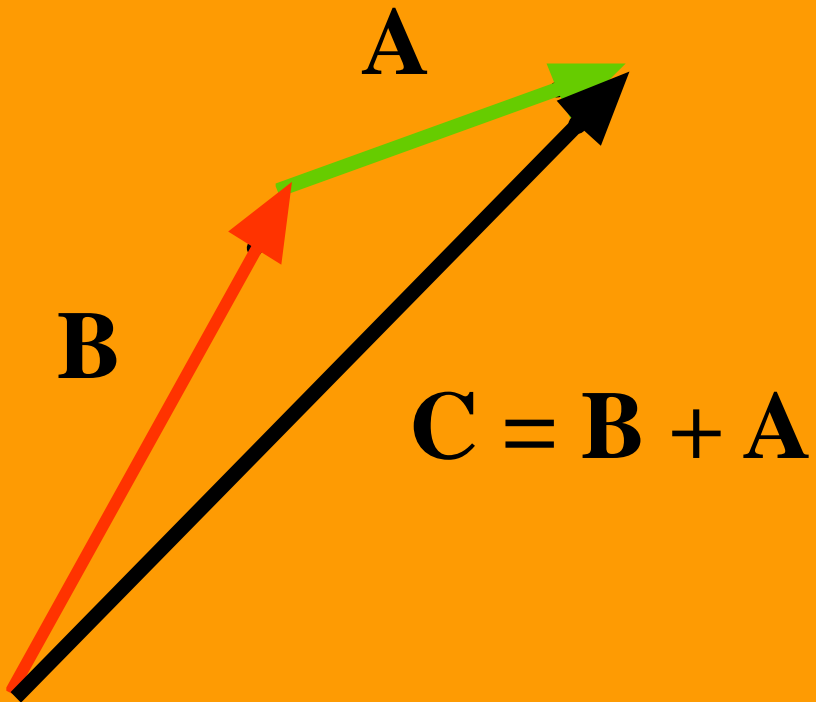
Vectors



Vector Addition

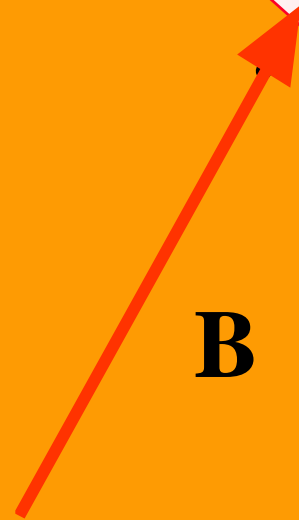
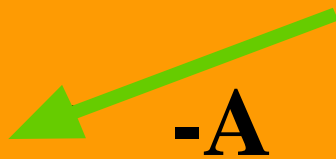
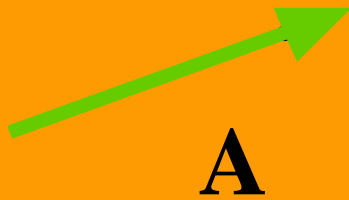


Vector Addition



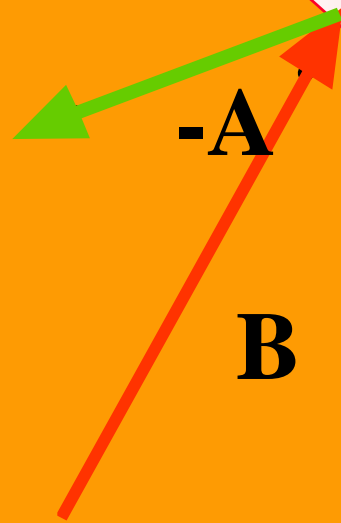
Vector Addition

$$\mathbf{D} = \mathbf{B} - \mathbf{A} = ?$$

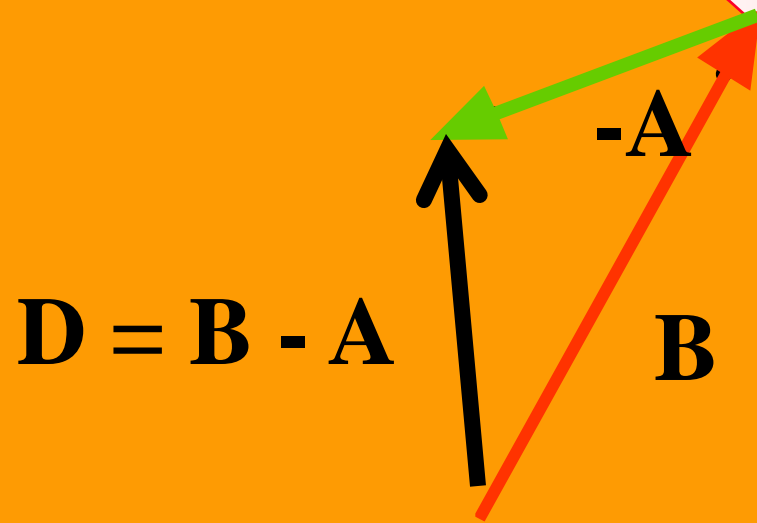


Vector Addition

$$\mathbf{D} = \mathbf{B} - \mathbf{A} = ?$$



Vector Addition

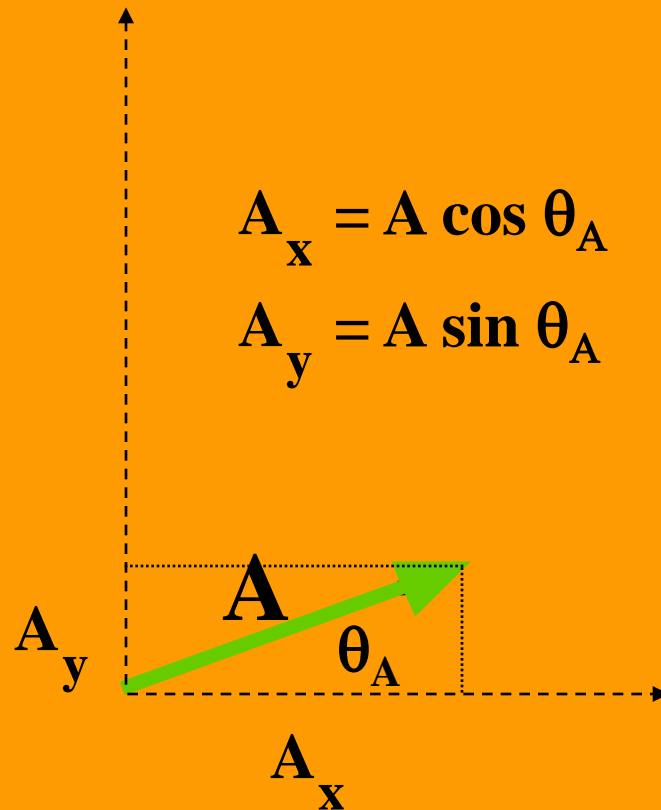


$$D = B - A$$

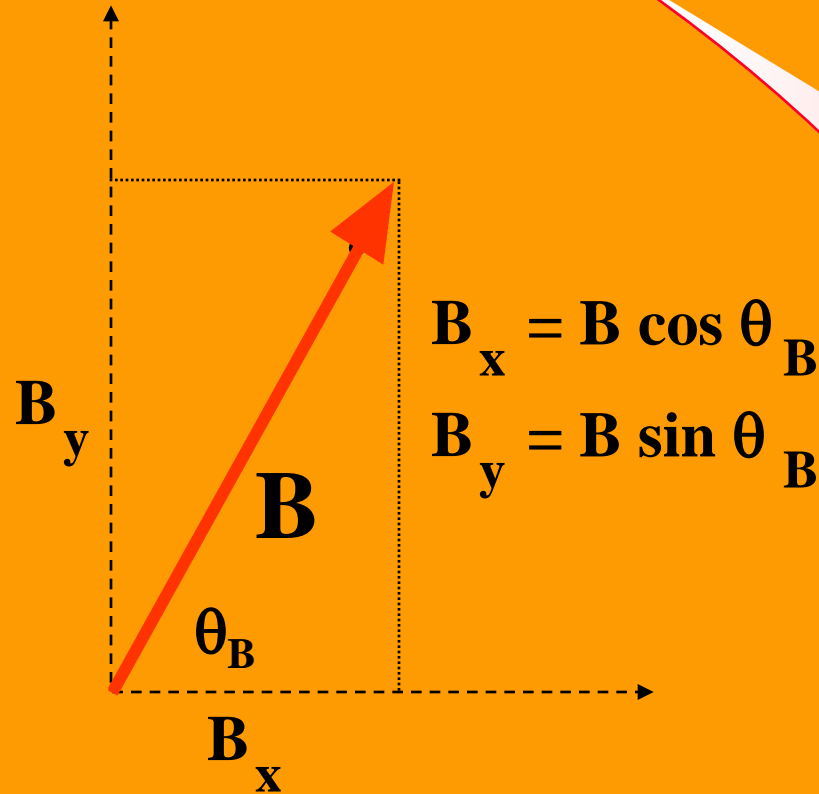
B

-A

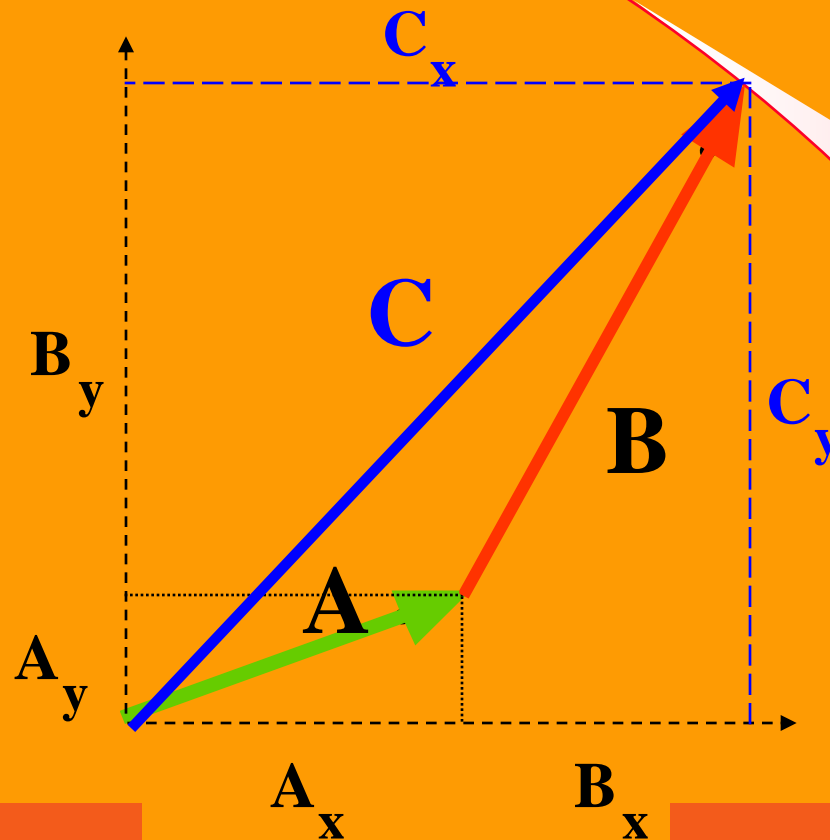
Vector Components



Vector Components



Vector Addition



$$C_x = A_x + B_x$$

$$C_y = A_y + B_y$$

$$C_x = C \cos \theta_C$$

$$C_y = C \sin \theta_C$$

Vector Addition

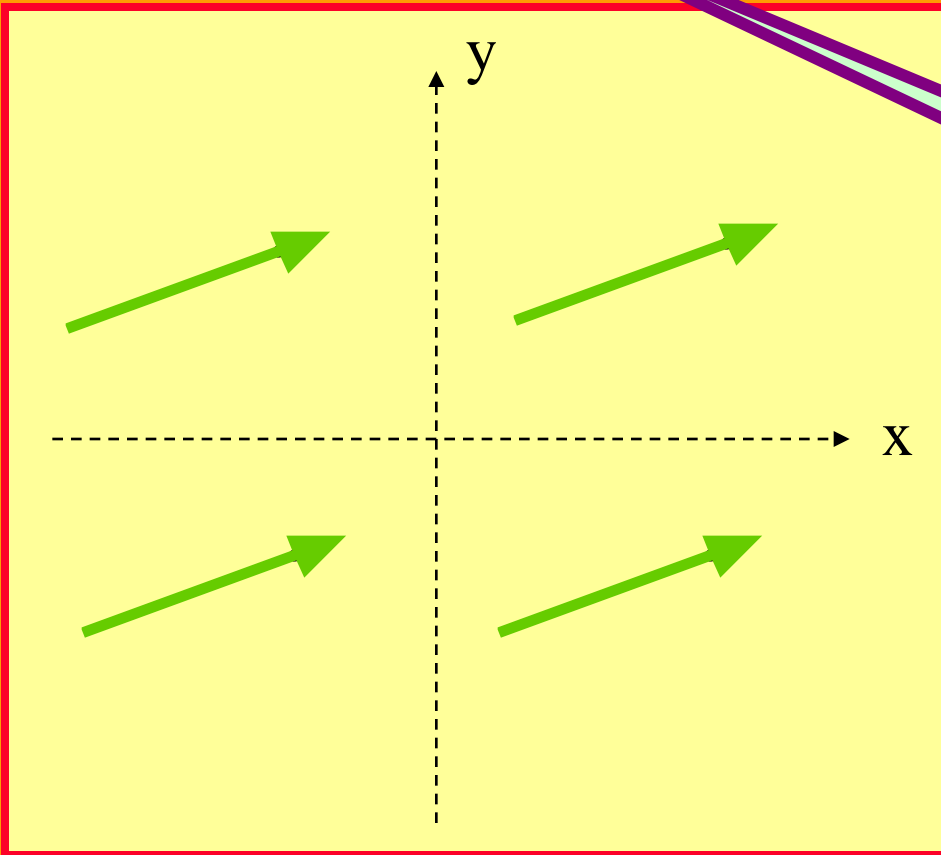
$$C_x = C \cos \theta_C$$

$$C_y = C \sin \theta_C$$

$$C^2 = C_x^2 + C_y^2$$

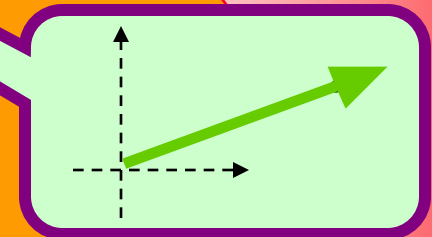
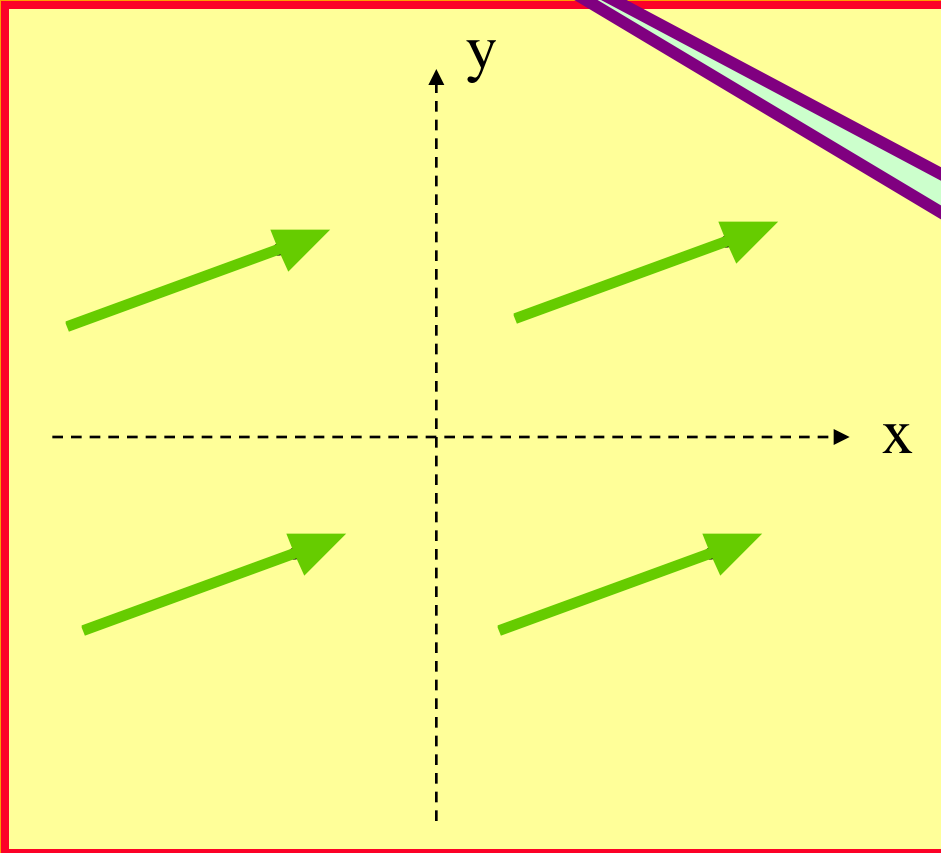
$$\tan \theta_C = C_y / C_x$$

Above or below the horizontal?



1st, 2nd, 3rd, 4th
quadrant?

Above or below the horizontal?



Unit Vectors

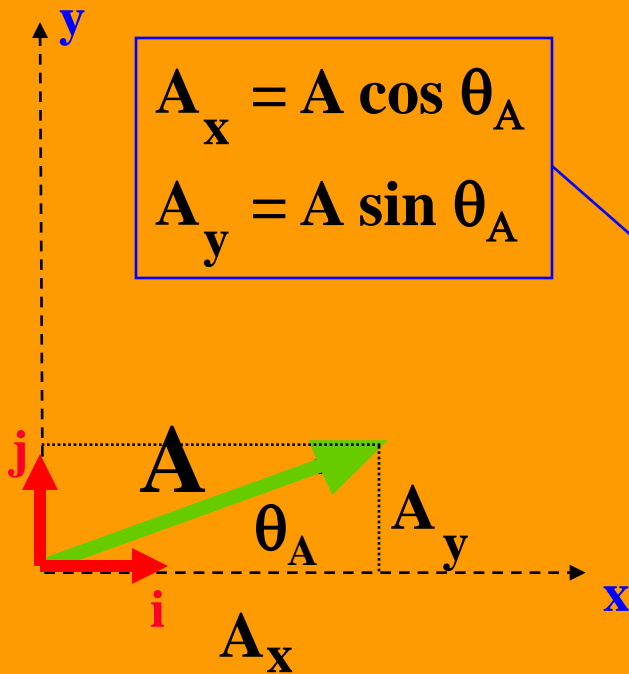
$$\vec{A} = A_x \vec{i} + A_y \vec{j}$$

$$A_x = A \cos \theta_A$$

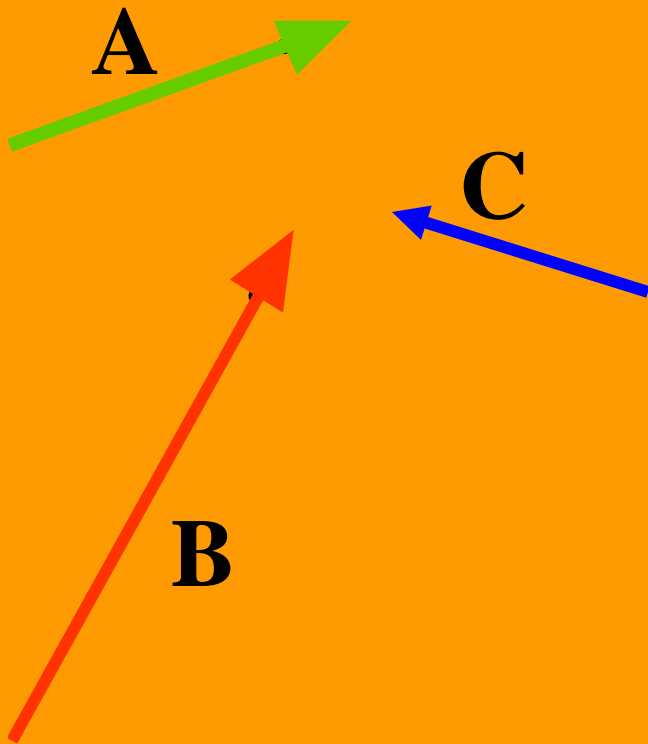
$$A_y = A \sin \theta_A$$

$$A^2 = A_x^2 + A_y^2$$

$$\tan \theta_A = A_y / A_x$$



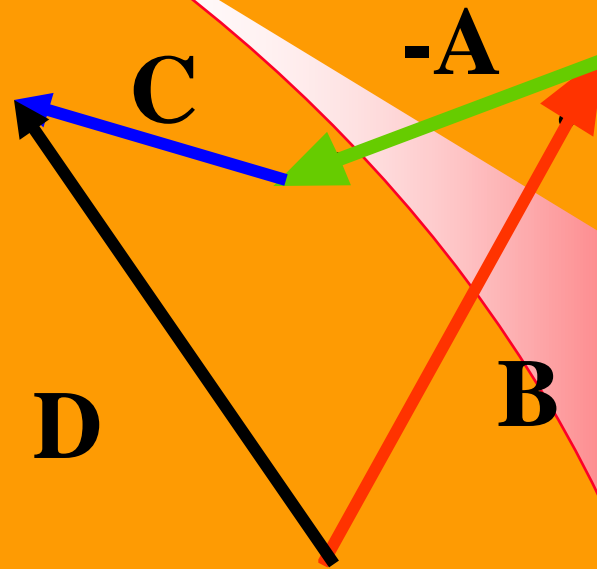
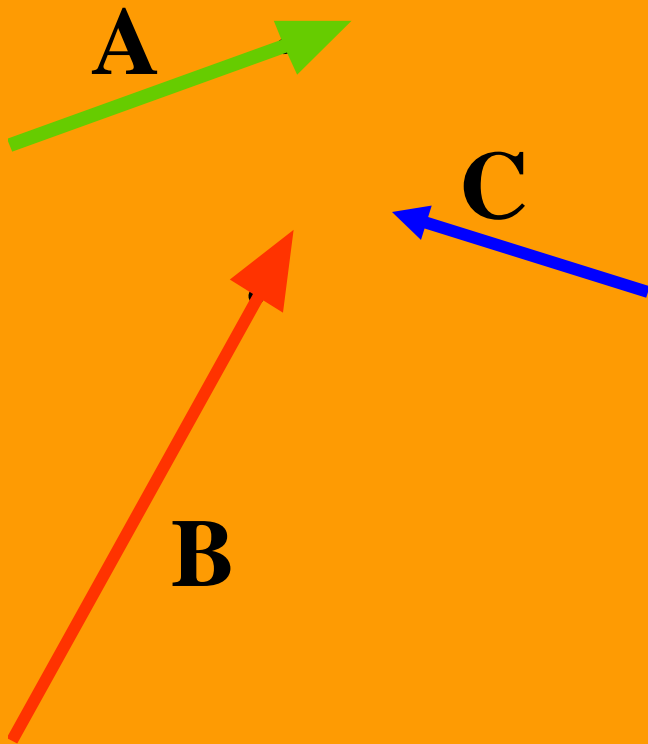
Vector Addition



?

$$\mathbf{D} = \mathbf{B} - \mathbf{A} + \mathbf{C}$$

Vector Addition



$$\mathbf{D} = \mathbf{B} - \mathbf{A} + \mathbf{C}$$

Animations

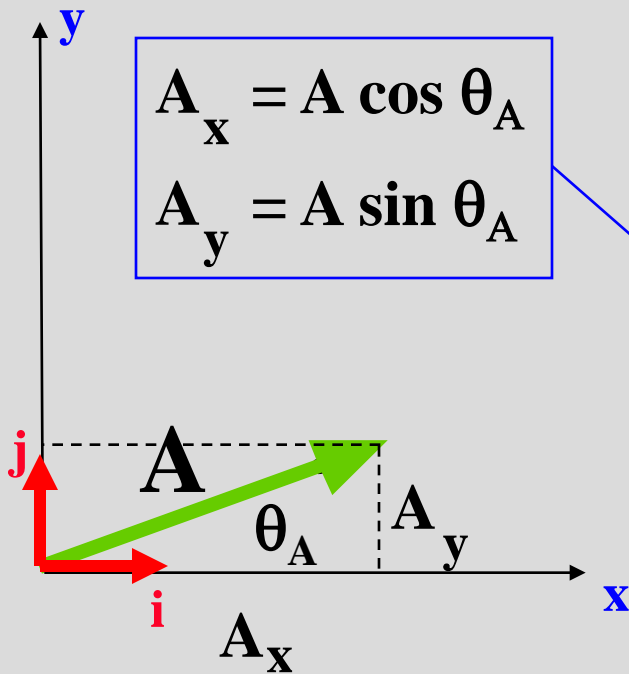
<http://www.upscale.utoronto.ca/GeneralInterest/Harrison/Flash/ClassMechanics/DisplaceDistance/DisplaceDistance.html>

<http://www.walter-fendt.de/ph11e/resultant.htm>

Vectors Summary

$$\vec{A} = A_x \vec{i} + A_y \vec{j}$$

$$A_x = A \cos \theta_A$$
$$A_y = A \sin \theta_A$$



$$A^2 = A_x^2 + A_y^2$$
$$\tan \theta_A = A_y / A_x$$