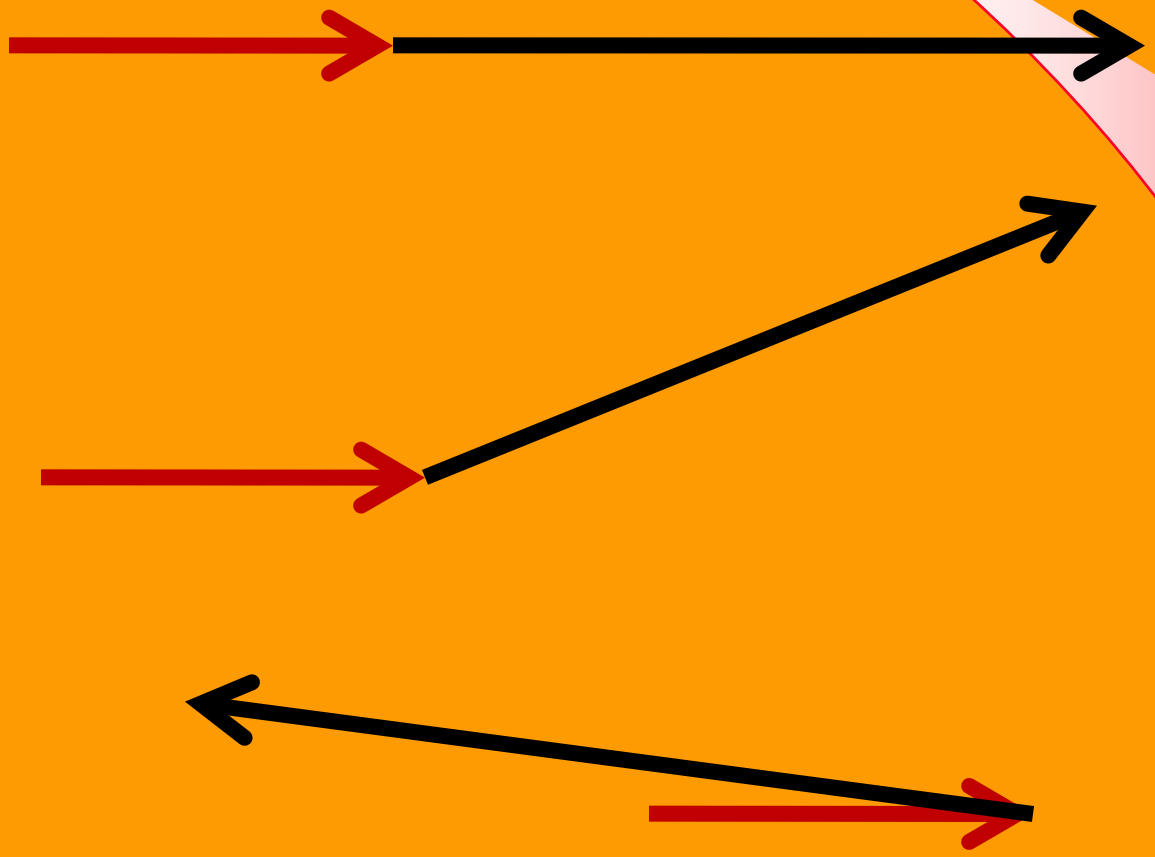
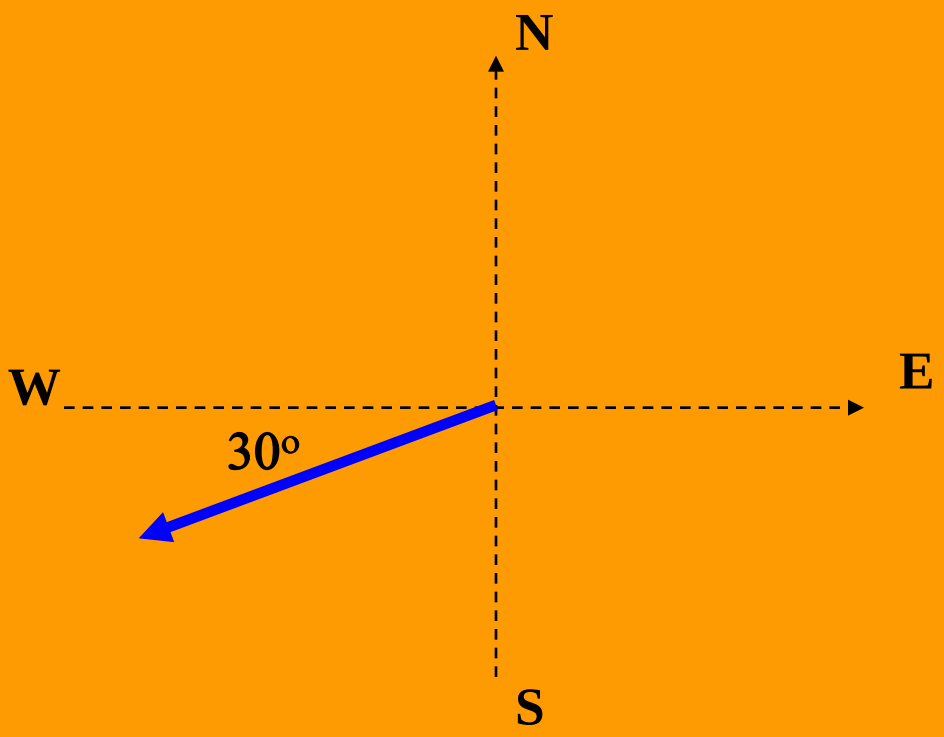

Vectors

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



Define the angle below

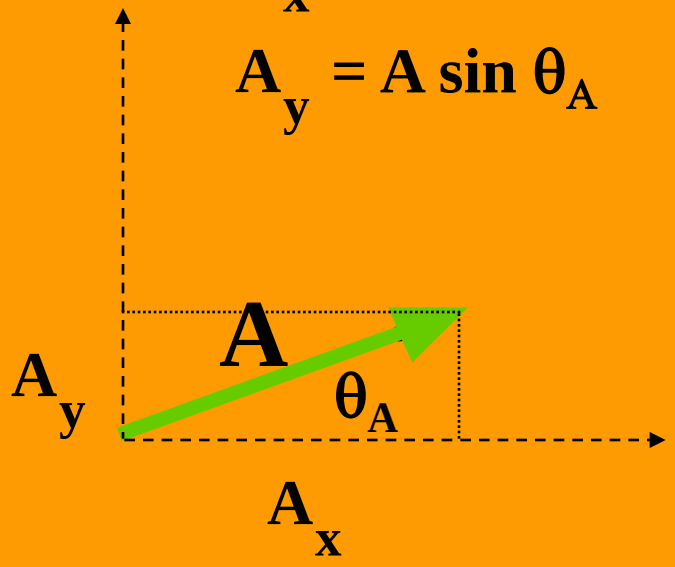


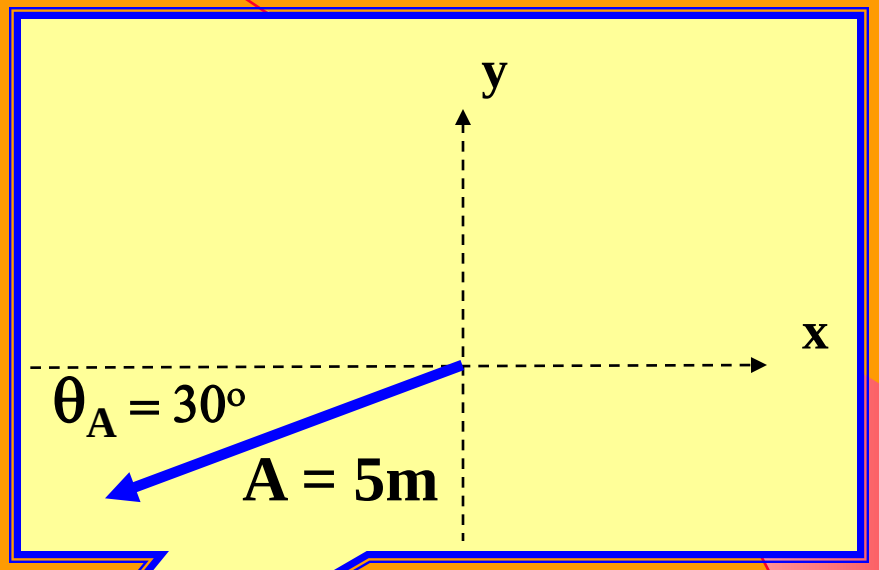
210°
30° S of W
60° W of S
-150°

Vector Components

$A_x = A \cos \theta_A$

$A_y = A \sin \theta_A$

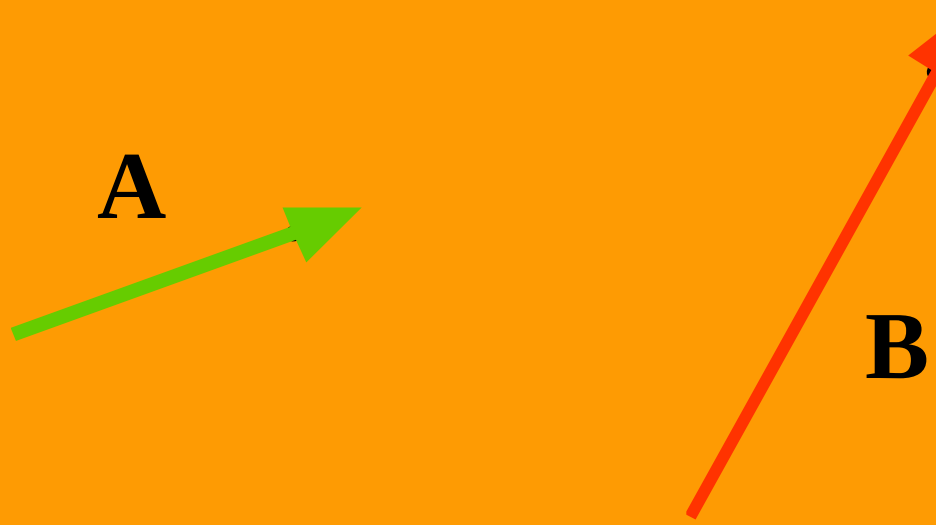




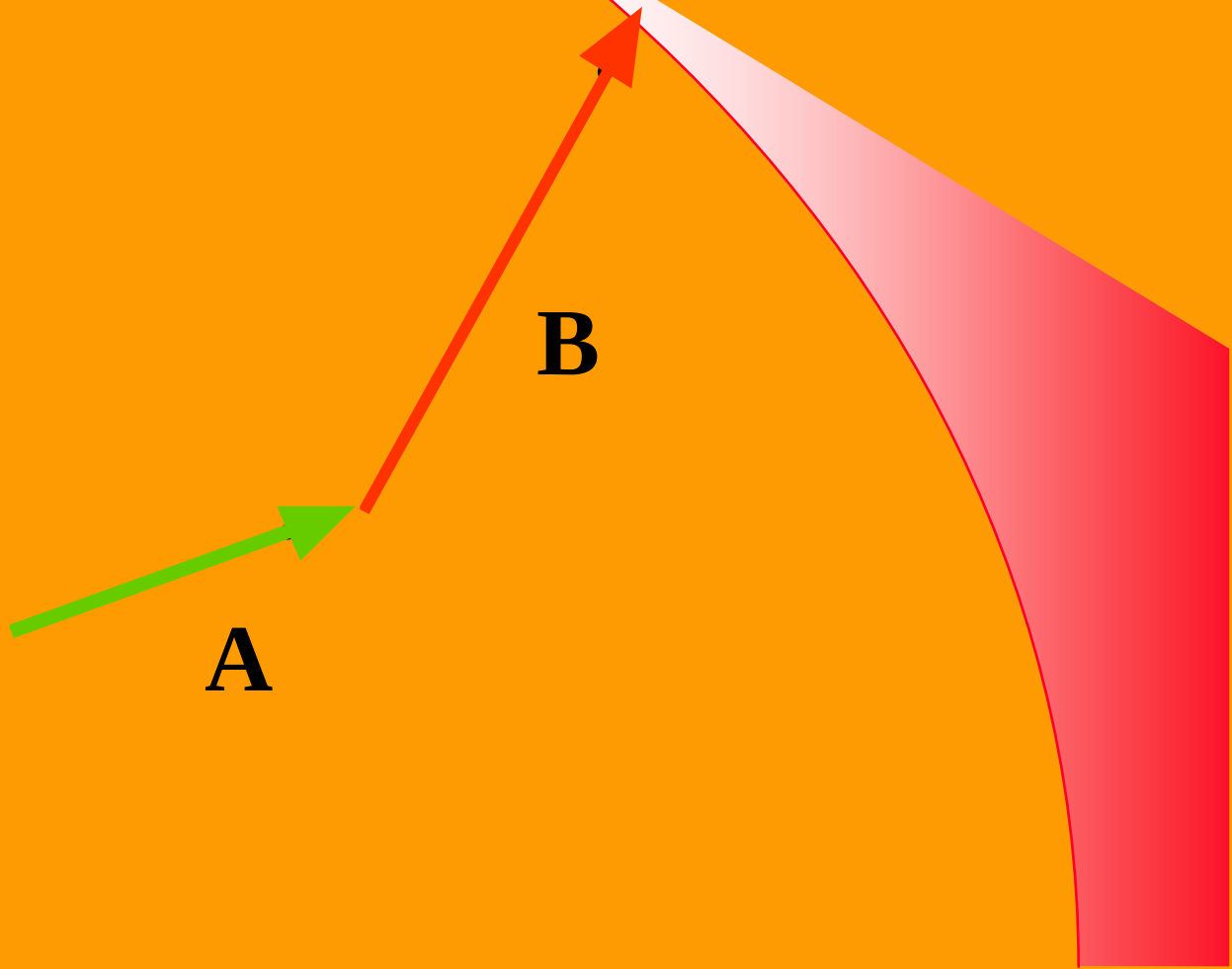
$A_x = -5\text{m} \cos 30^0 = -4.33\text{ m}$

$A_y = -5\text{m} \sin 30^0 = -2.5\text{ m}$

Vector Addition

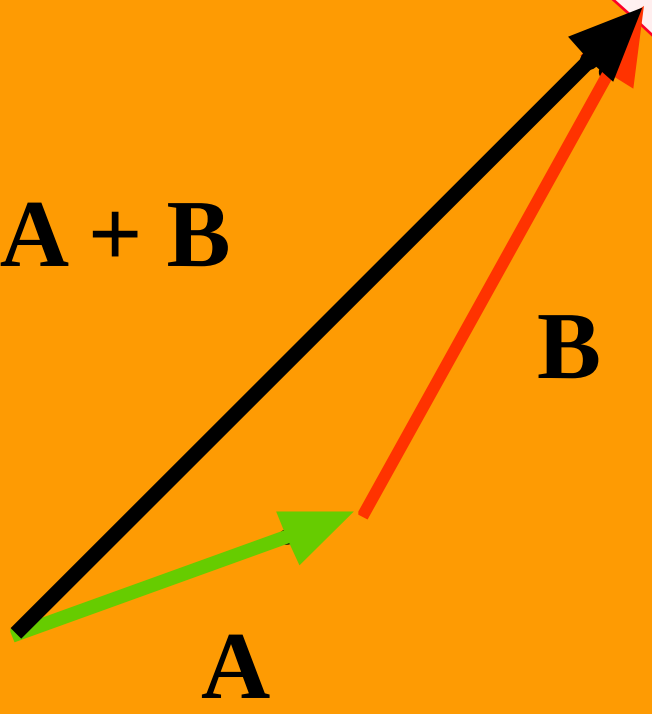


Vector Addition

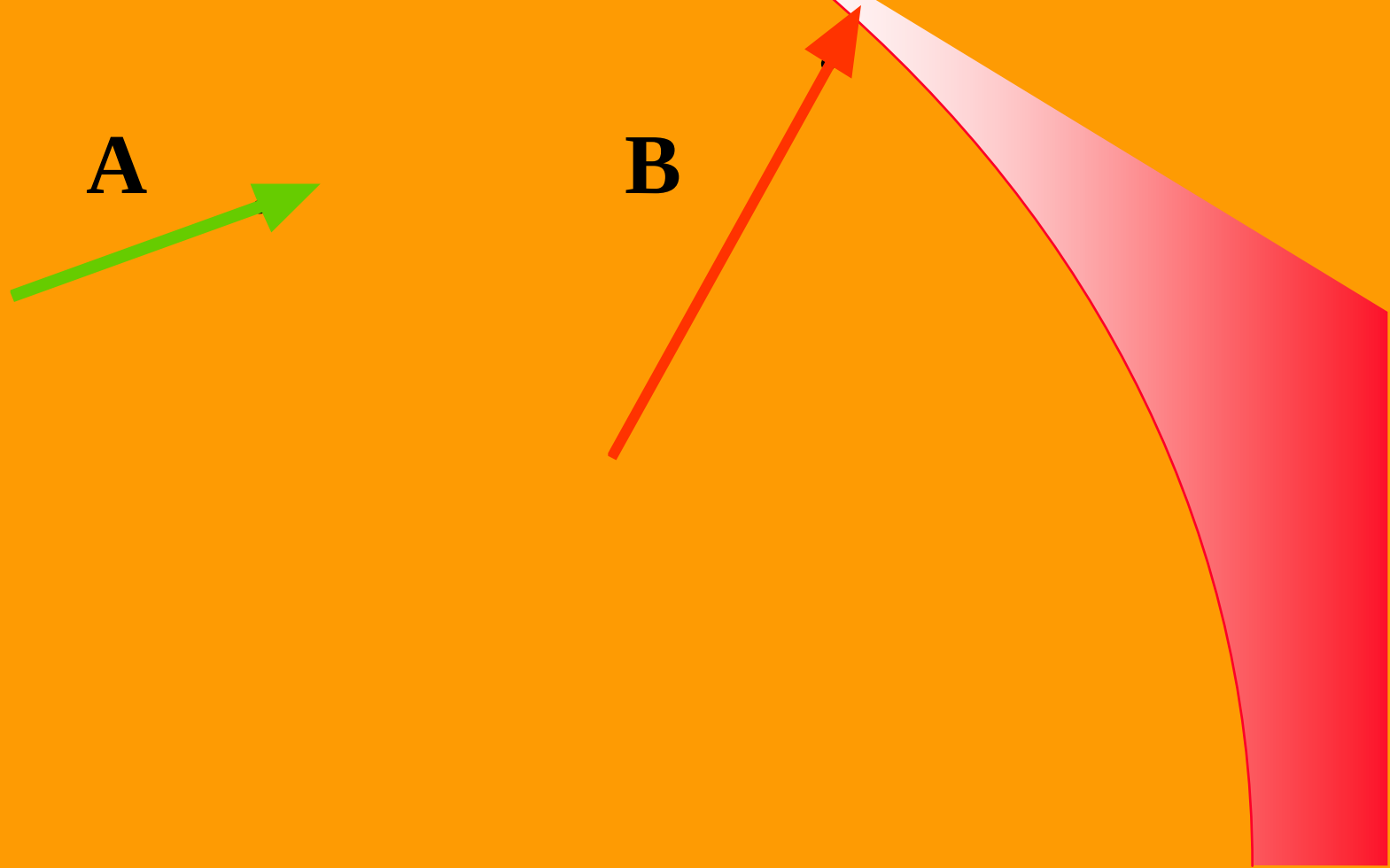


Vector Addition

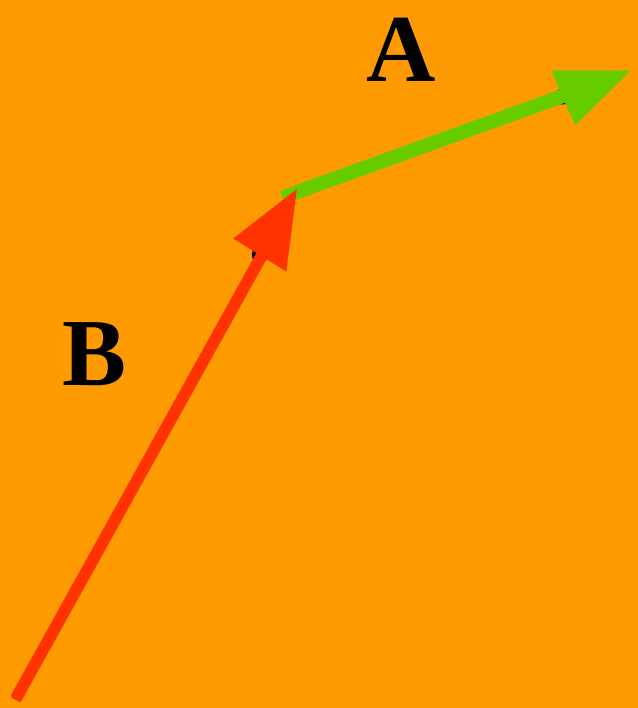
C = A + B



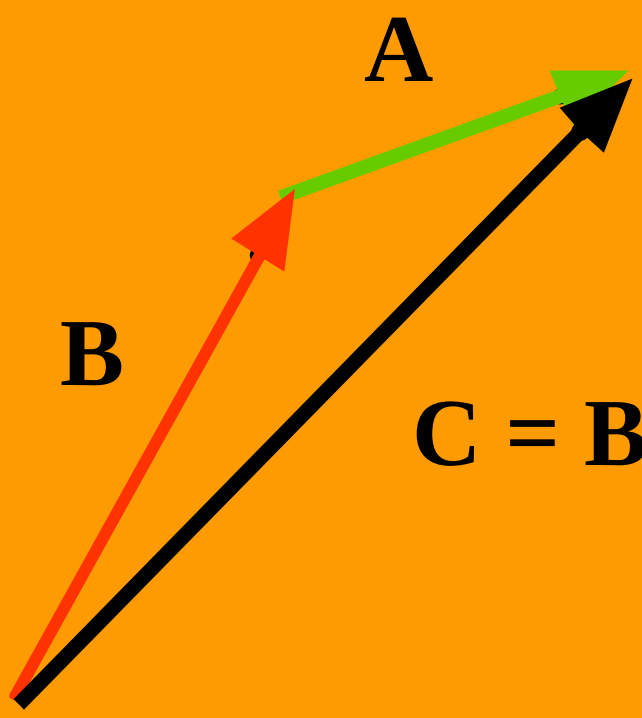
Vectors



Vector Addition



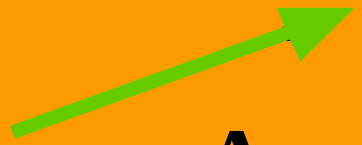
Vector Addition



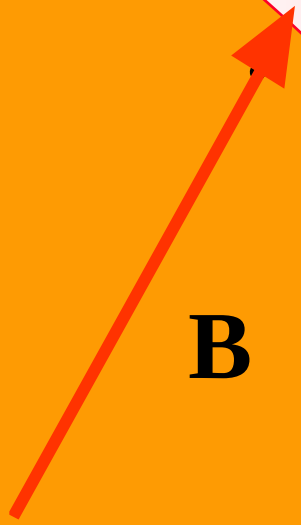
C = B + A

Vector Addition

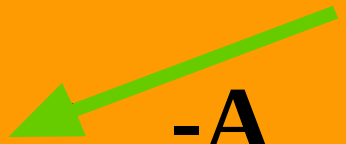
D = B - A = ?



A



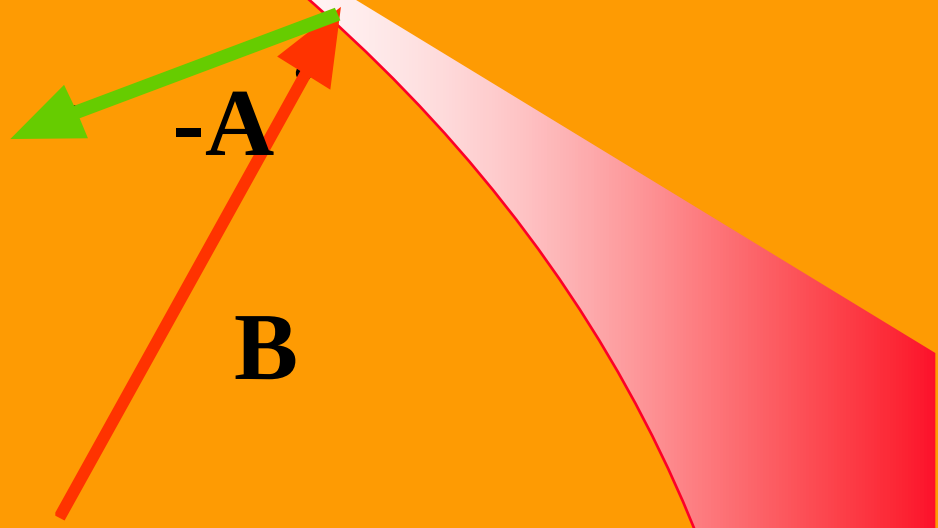
B



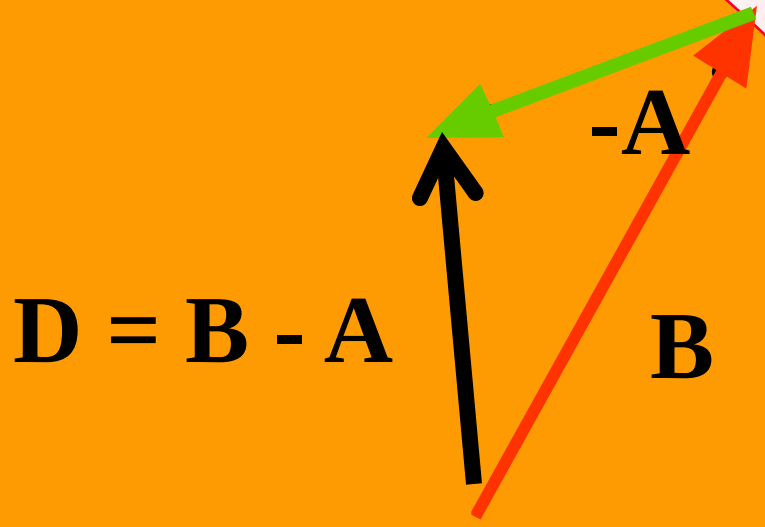
-A

Vector Addition

D = B - A = ?



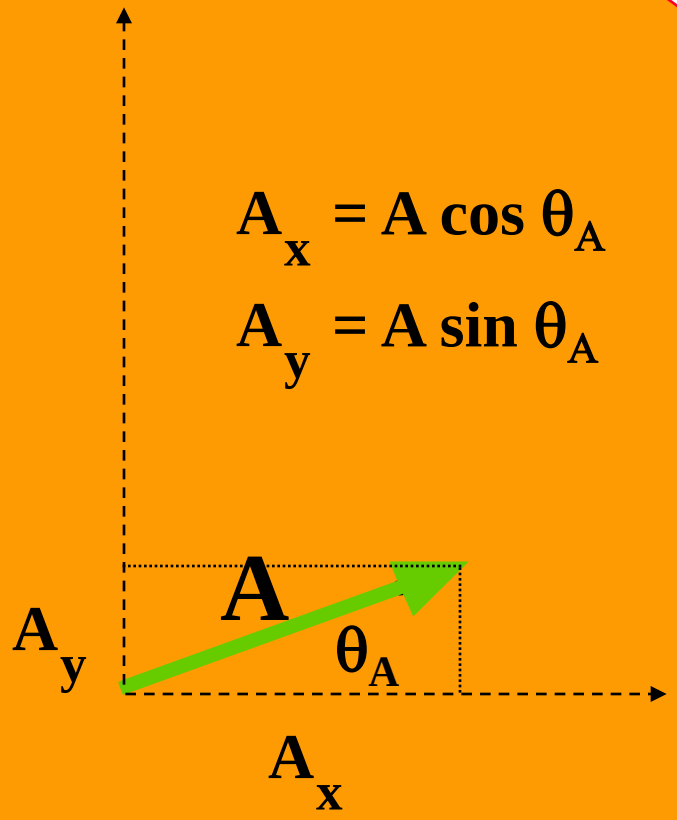
Vector Addition



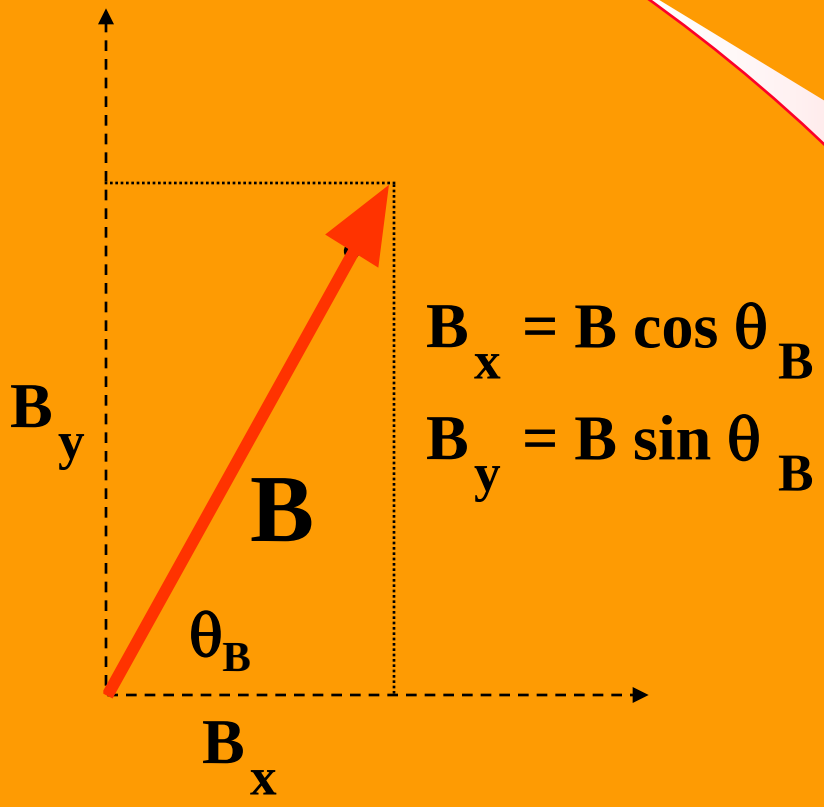
Vector Components

$$A_x = A \cos \theta_A$$

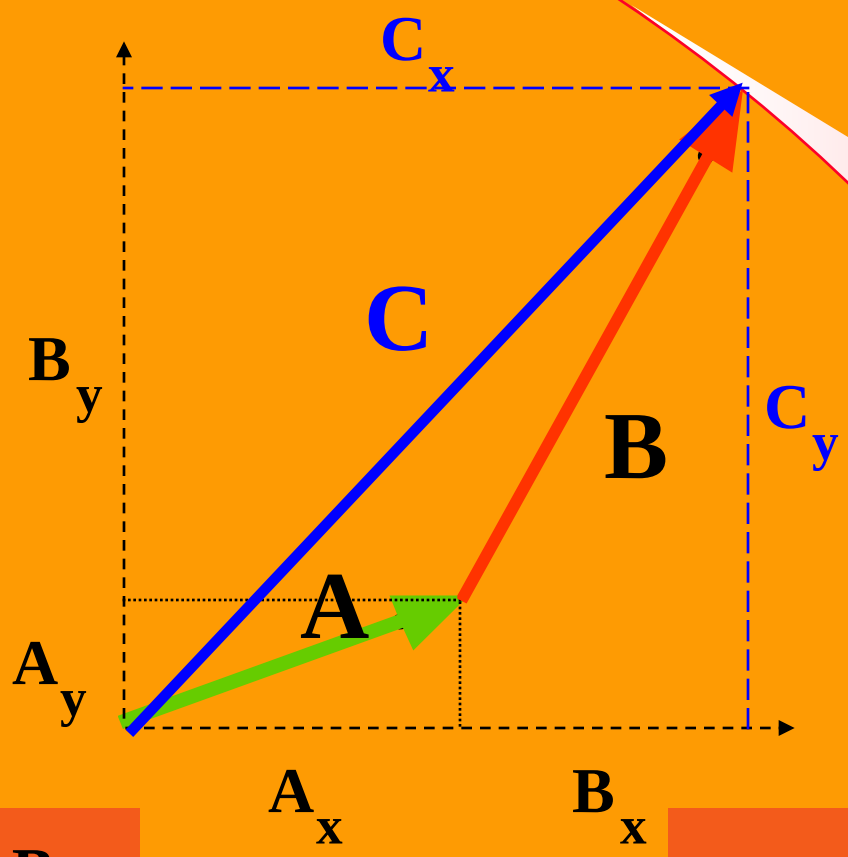
$$A_y = A \sin \theta_A$$



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

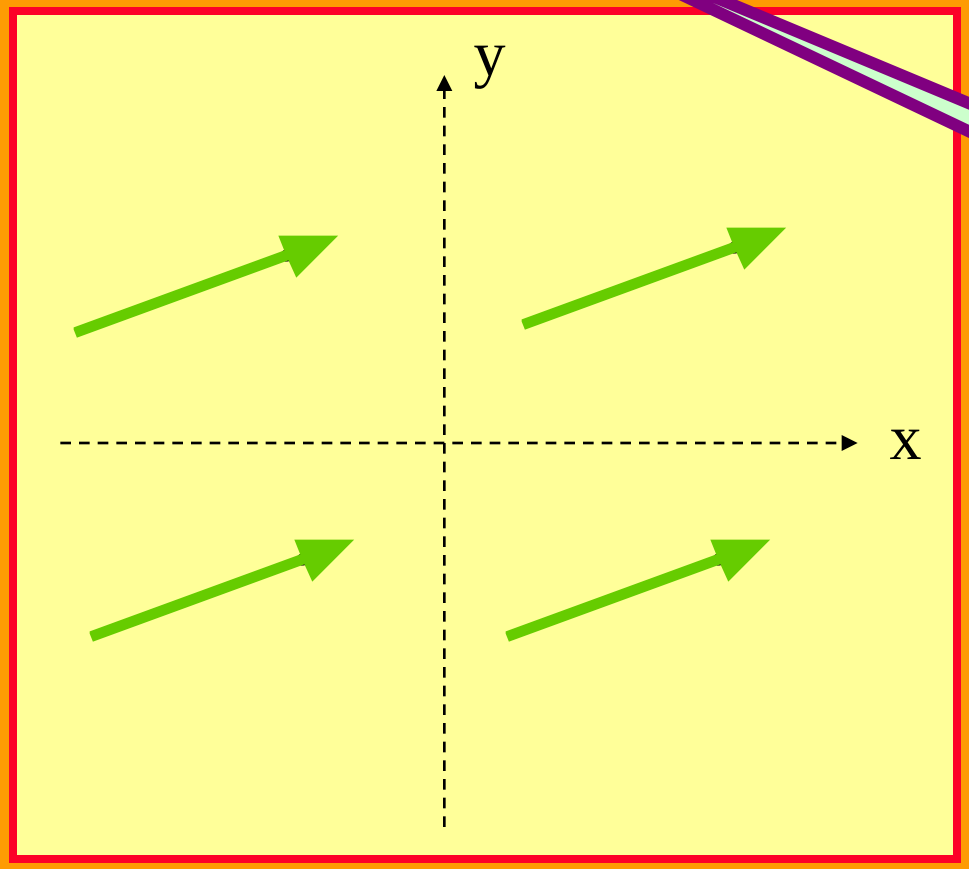
$$C_x = C \cos \theta_C$$

$$C_y = C \sin \theta_C$$

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

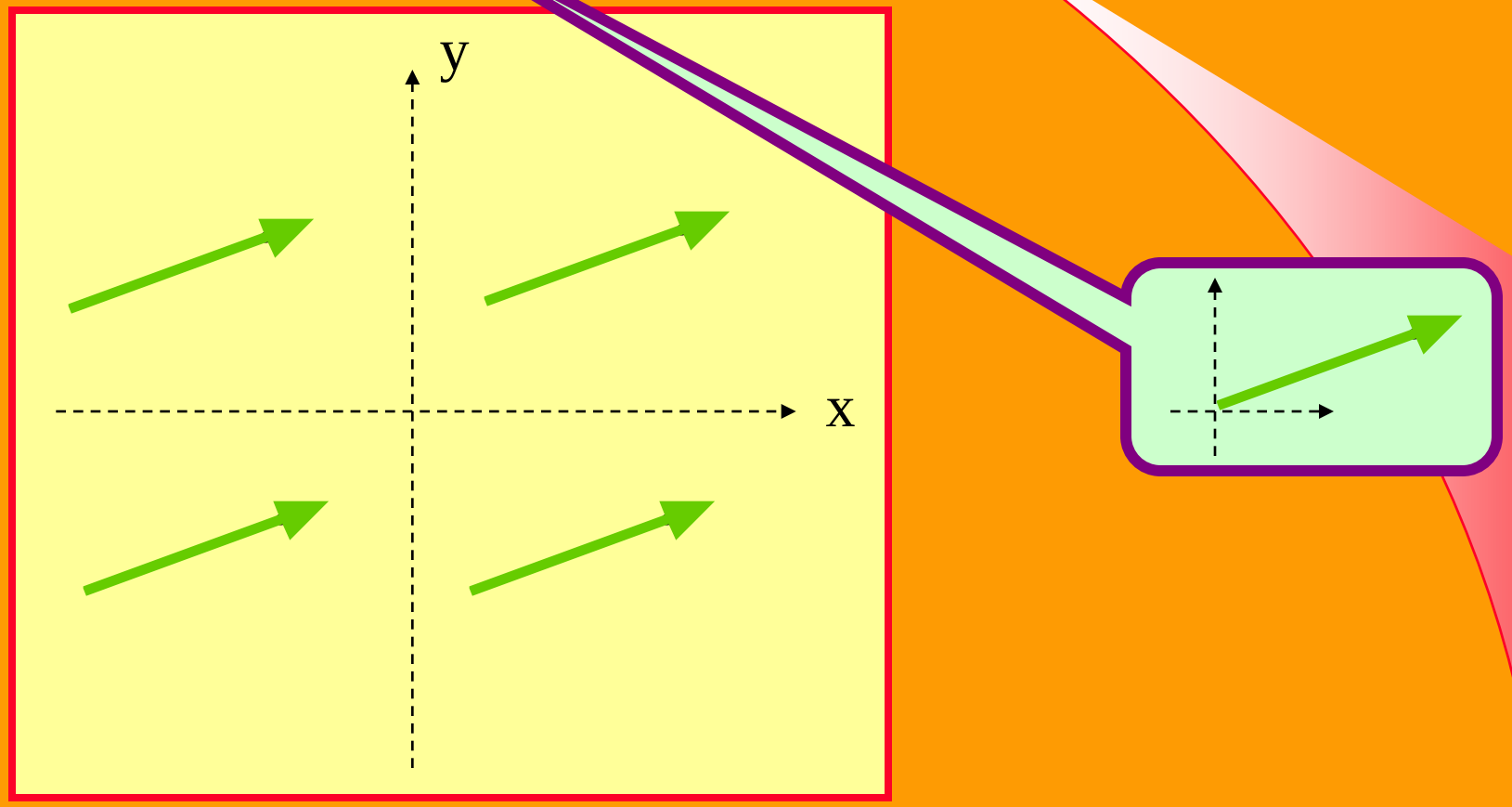
$$\tan \theta_C = C_y / C_x$$

Above or below the horizontal?



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

Above or below the horizontal?



Unit Vectors

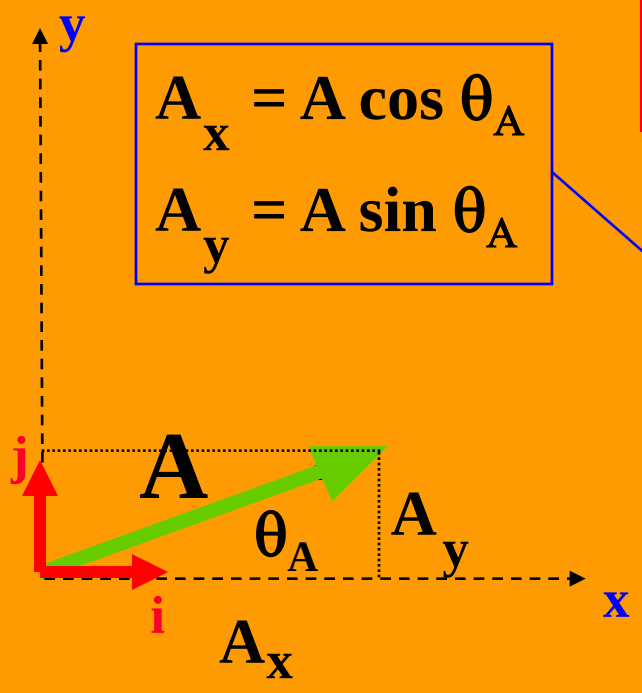
$$\vec{A} = A_x \vec{i} + A_y \vec{j}$$

$A_x = A \cos \theta_A$

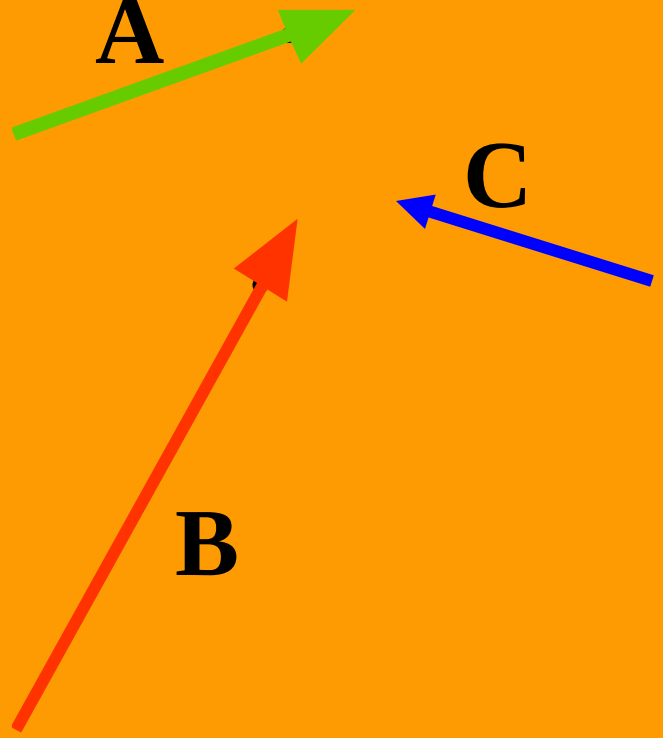
$A_y = A \sin \theta_A$

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

$\tan \theta_A = A_y / A_x$



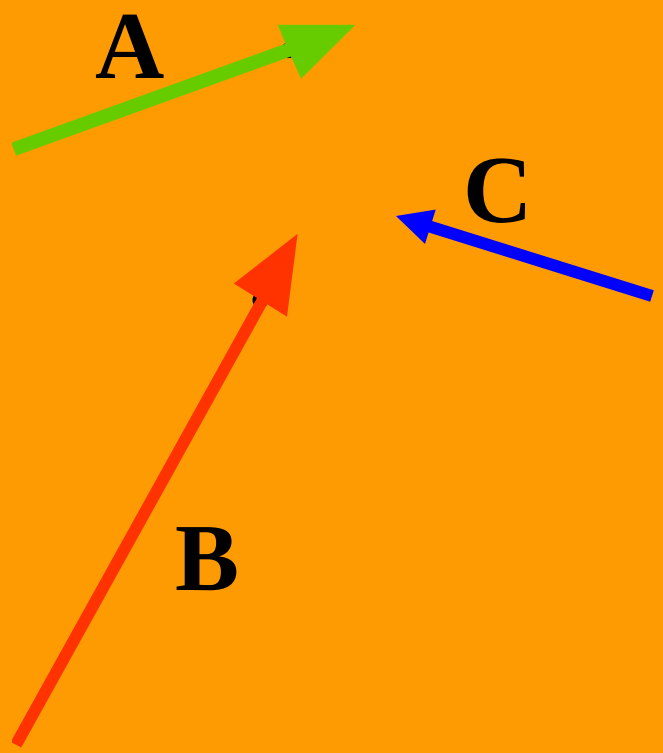
Vector Addition

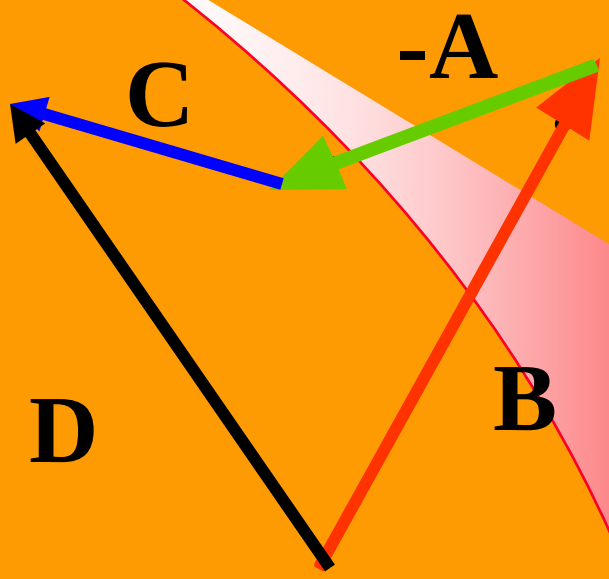


?

D = B – A + C

Vector Addition





D = B – A + C

Animations

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

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

Vectors Summary

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

$A_x = A \cos \theta_A$

$A_y = A \sin \theta_A$

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

$\tan \theta_A = A_y / A_x$