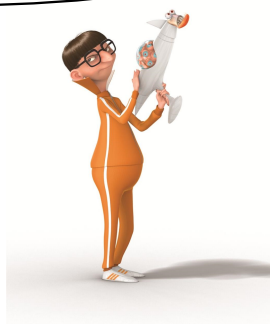
4.2 Vector Addition

4.2 I can add and subtract vectors graphically.

4.3 I can add and subtract vectors using the component method.

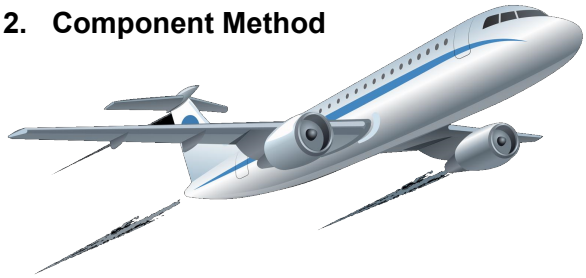
Every vector can be broken into 2 components

To add vectors graphically, we use the head-to-tail technique.



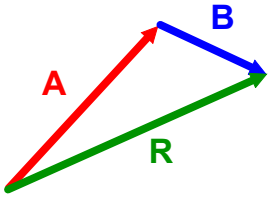
2 Methods of Adding Vectors

1. **Graphical Method**
   - « Head-to-Tail Addition
2. **Component Method**



Graphical Method: Head-to-Tail Addition

Adding vectors graphically: Place the tail of the second at the head of the first. The sum points from the tail of the first to the head of the last.



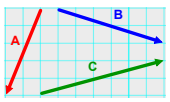
$\vec{R} = \vec{A} + \vec{B}$

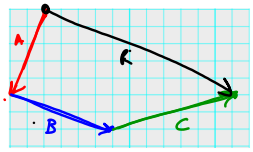
Component Method

Adding Vectors Using Components:

1. **Find the components of each vector to be added.**
2. **Add the *x*- and *y*-components separately.**
3. **Find the resultant vector.**

Example 2: Vector Addition



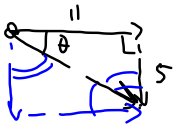


Vector	Horizontal Component	Vertical Component
A	-2	-5
B	6	-2
C	7	3
R	11	-5

Magnitude of R (Pythagorean theorem):

$R = \sqrt{11^2 + 5^2} = 12u$

Direction of R (SOH CAH TOA):



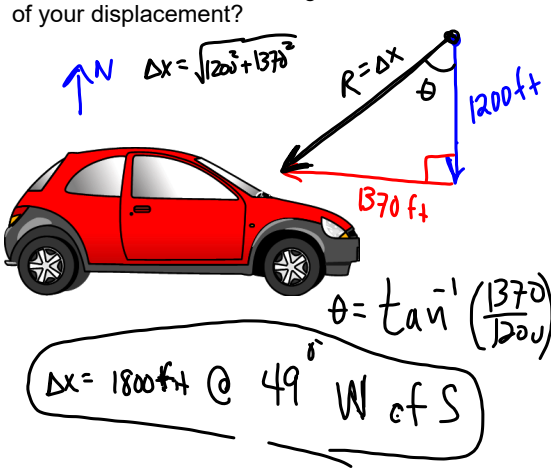
$\theta = \tan^{-1}\left(\frac{5}{11}\right)$

$\theta = 24°$ below +x axis

$\theta = 66°$ right of -y axis

THE COMPONENTS OF A VECTOR

You drive a car 1200 ft to the south, then 1370 ft to the west. What is the magnitude and direction of your displacement?



$\theta = \tan^{-1}\left(\frac{1370}{1200}\right)$

$\Delta x = 1800$ ft @ $49°$ W of S

HOMEWORK

- Worksheet
- Unit 4 Problems (1-4)