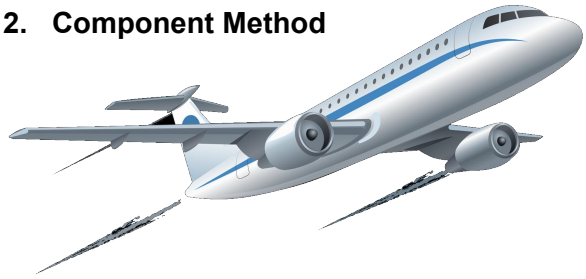
4.2 Vector Addition

4.2 I can add and subtract vectors graphically.

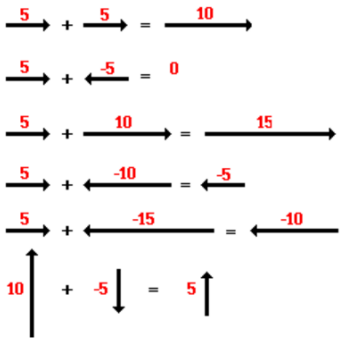
4.3 I can add and subtract vectors using the component method.

2 Methods of Adding Vectors

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

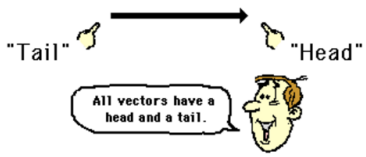


Simple Vector Addition



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.



Graphical Method: Head-to-Tail Addition

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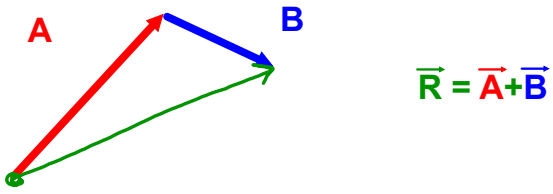
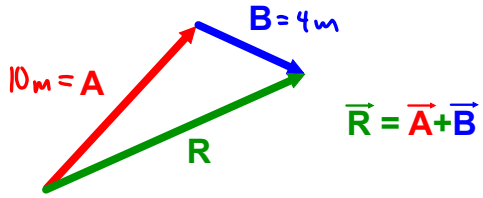


Graphical Method: Head-to-Tail Addition

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.

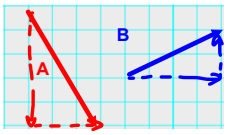


Component Method

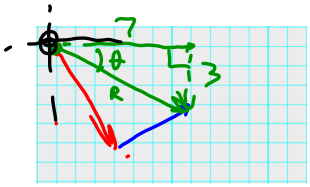
Adding Vectors Using Components:

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

Example 1: Vector Addition



Vector	Horizontal Component	Vertical Component
A	3	−5
B	4	2
R	7	−3



Magnitude of R (Pythagorean theorem):

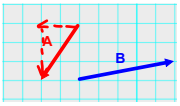
$R = \sqrt{7^2+3^2} = 7.6\ u$

Direction of R (SOH CAH TOA):

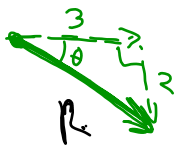
$\theta = \tan^{-1}\left(\frac{3}{7}\right) = 23^\circ$ @

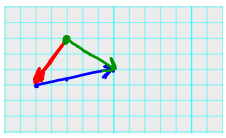
below +x axis

Example 2: Vector Addition



Vector	Horizontal Component	Vertical Component
A	−2	−3
B	5	1
R	3	−2





Magnitude of R (Pythagorean theorem):

$R = \sqrt{3^2+2^2} = 3.6\ u$

Direction of R (SOH CAH TOA):

$\theta = \tan^{-1}\left(\frac{2}{3}\right)$

$\theta = 34^\circ$

below +x axis

HOMEWORK

Worksheet