Good Morning!!
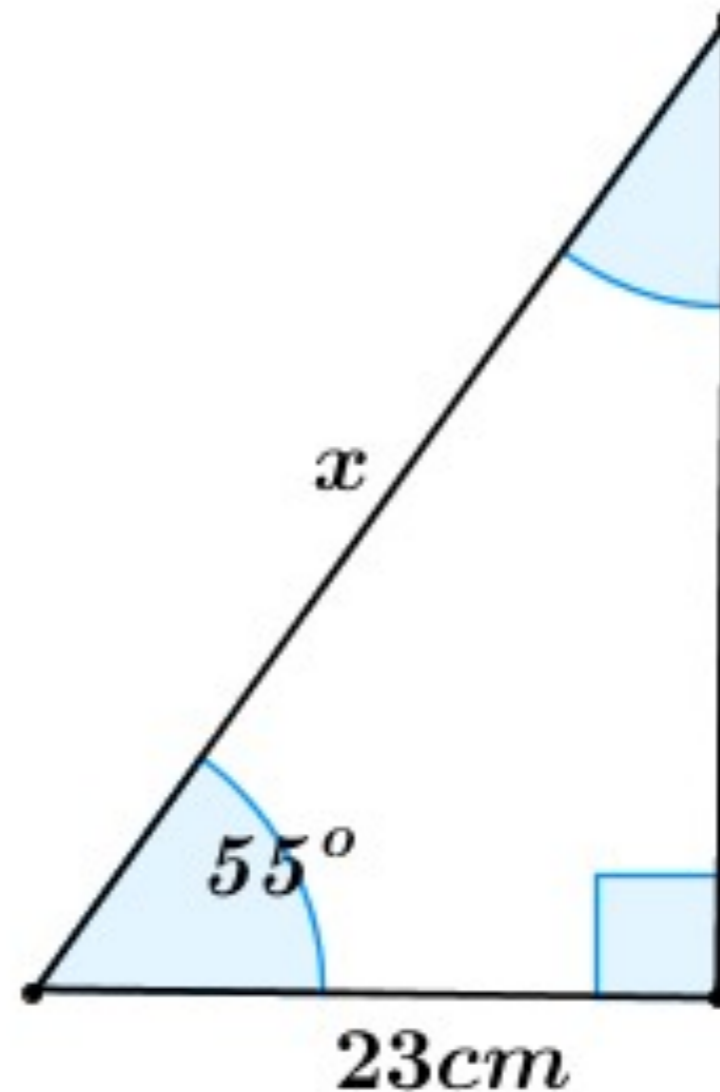
- Do Now: Solve for x and the other angle (not 90) on a whiteboard. Make sure that your calculator is in degrees.

x

55°

$23cm$

Today

- Vector addition

- Trigonometry (p)review

- Applied trig and vector problems
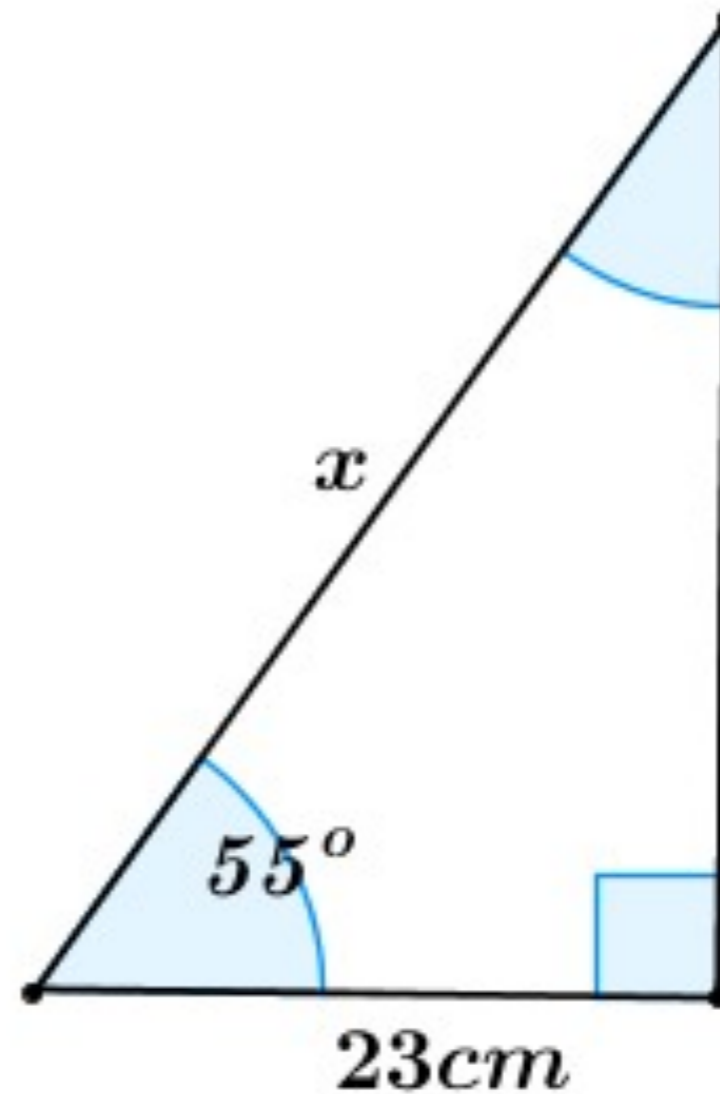
- Tonight: First page of vector worksheet
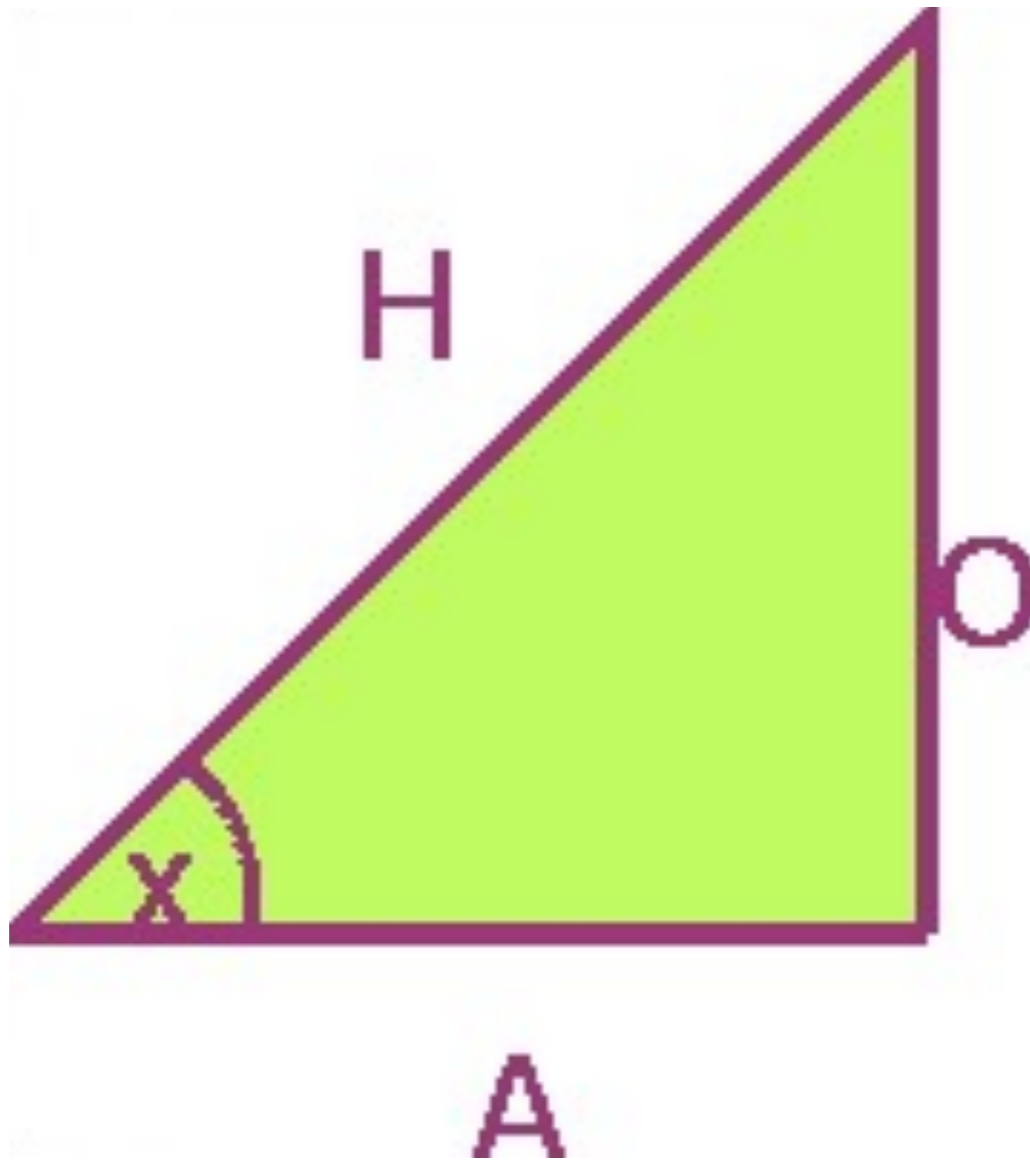
Tomorrow

- Quest trig problem set.

- You will have a problem set that will take you most (if not all) of the period.

- It closes at the end of class.

- Finish the vector worksheet for homework Wednesday night.

Good Morning!!

- x:

- other angles:

x

55°

$23cm$

SIN(x) $= \dfrac{O}{H}$

COS(x) $= \dfrac{A}{H}$

TAN(x) $= \dfrac{O}{A}$

SOH CAH TOA

Components of Vectors

- Treat each vector like the hypotenuse of a triangle.

- Theta (θ) is the angle of the vector.

- The horizontal component of the vector can be found using _____

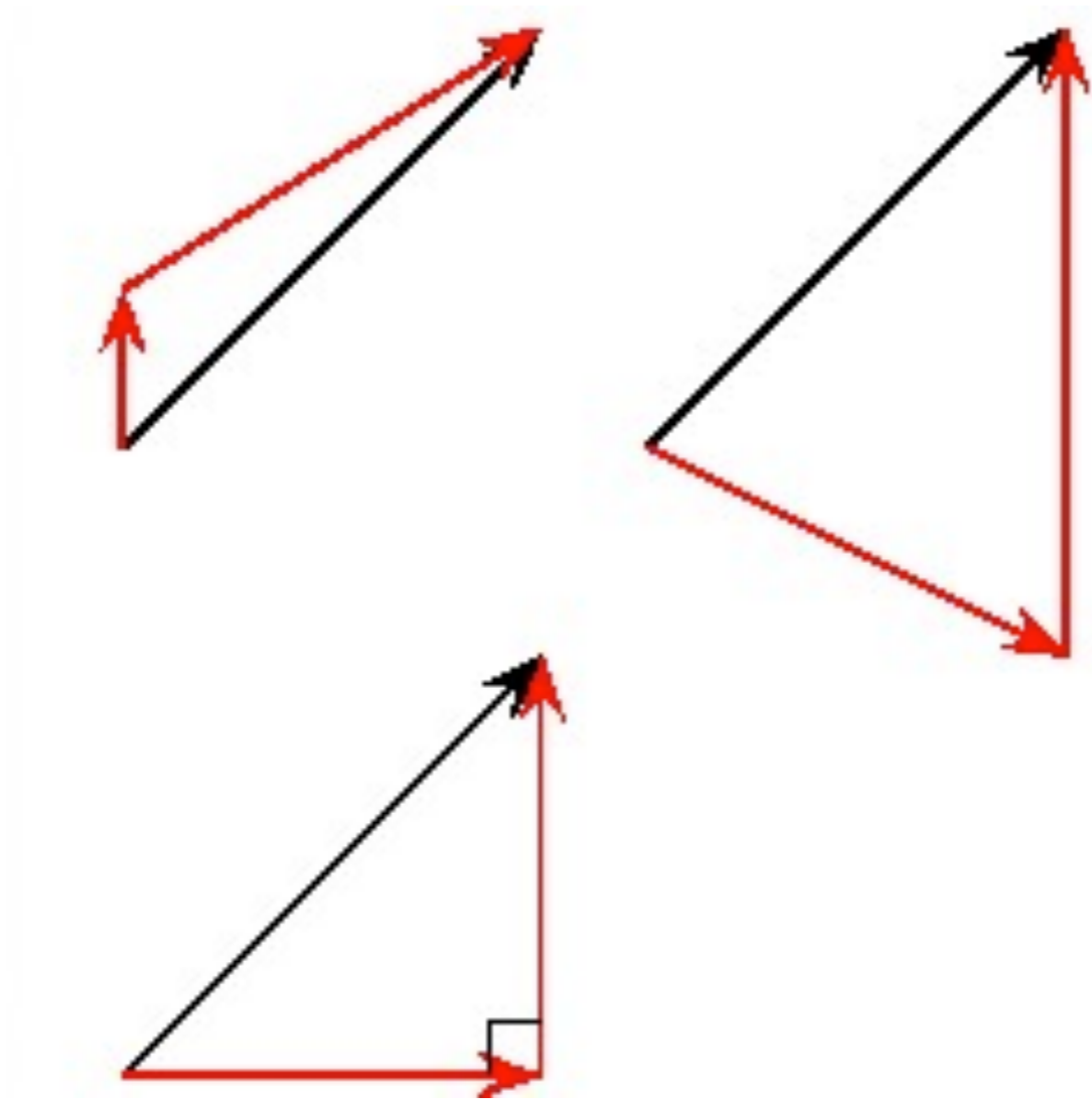- The vertical component of the vector can be found using _____

Angle Direction Matters

- Angles are always measured counter clockwise from due east.

- If an angle is measure clockwise, it is in the negative direction.

- The math works out the same.

40° counter-clockwise rotation from East
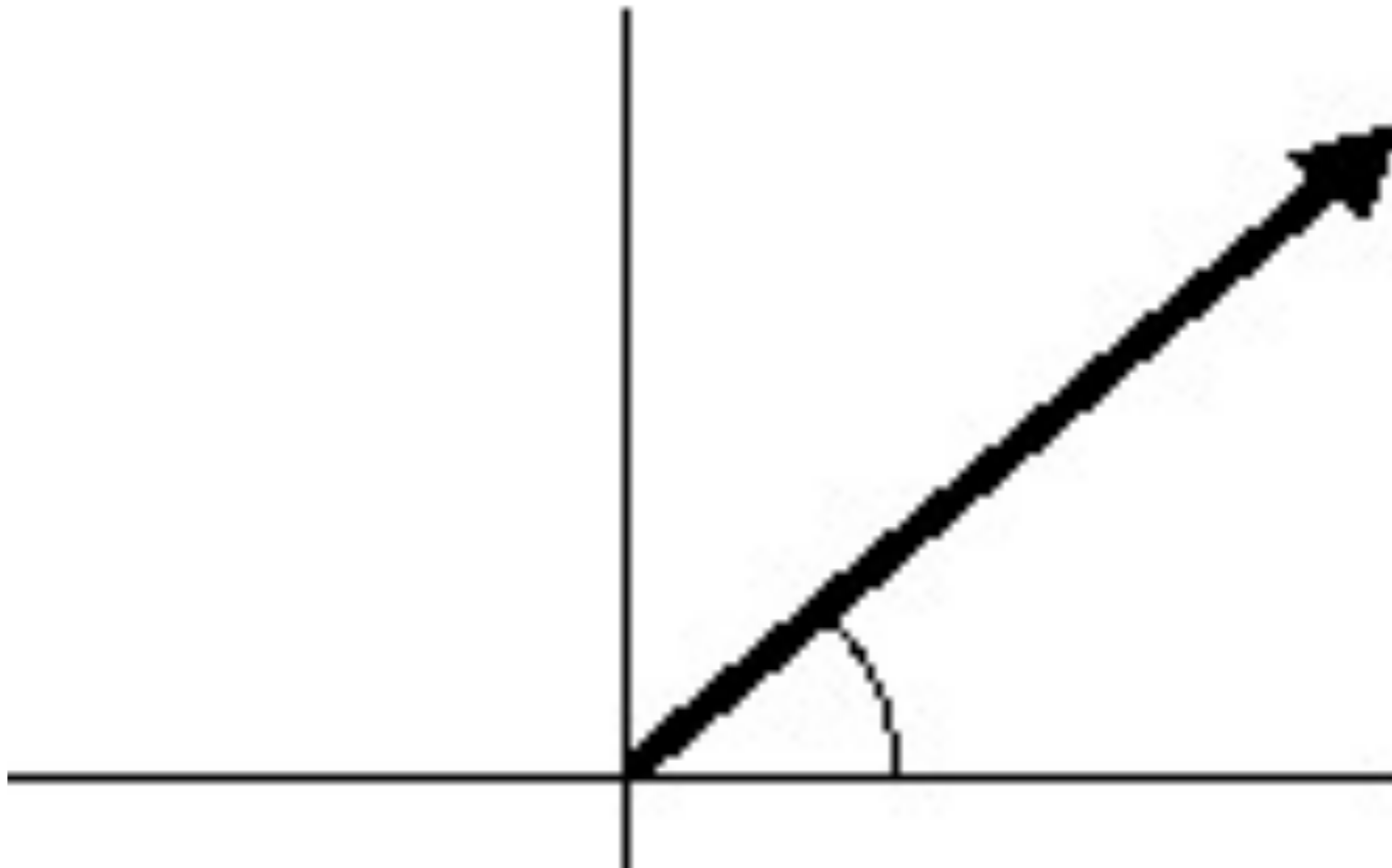
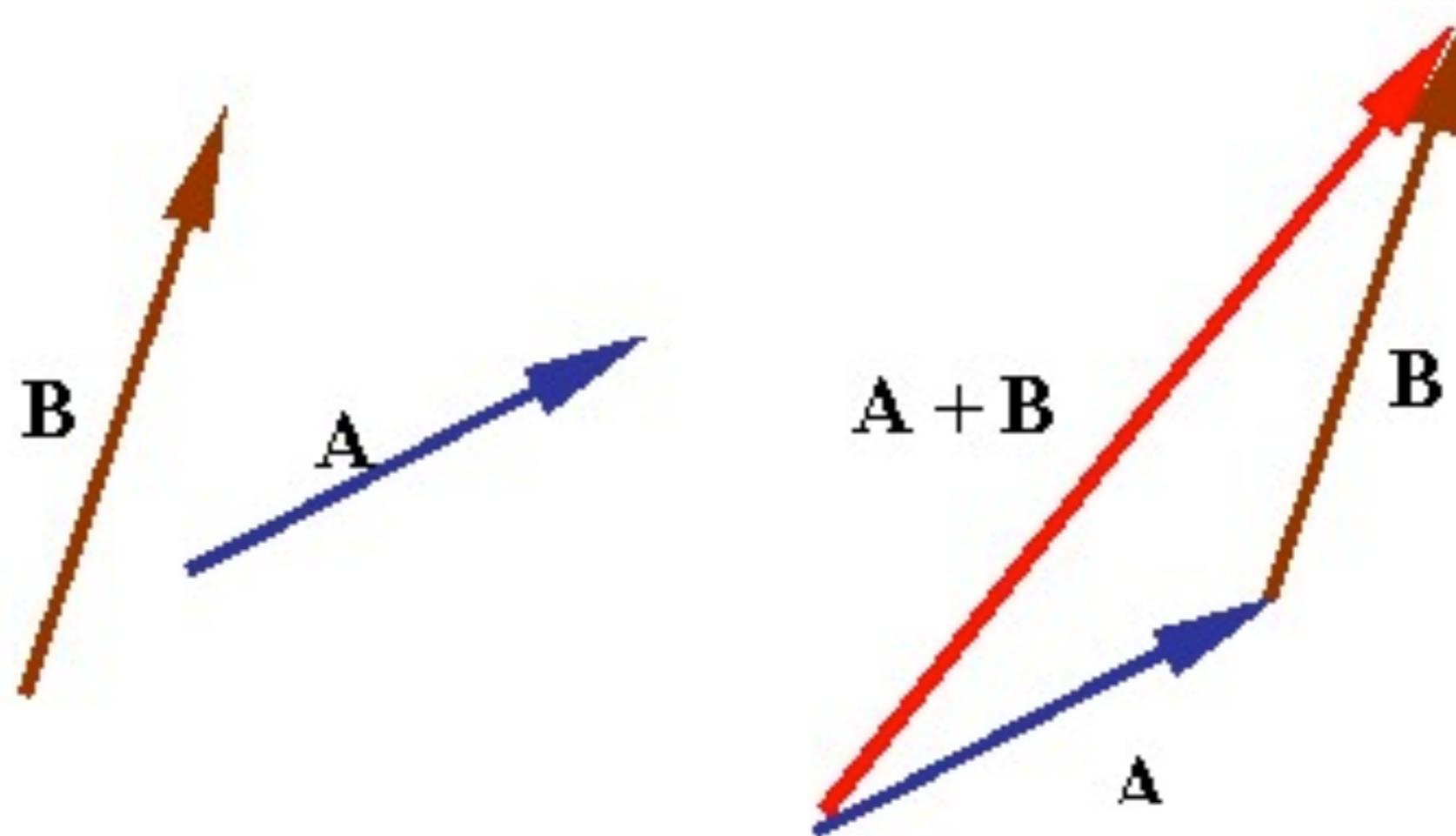Find the vertical and horizontal components of the vector.

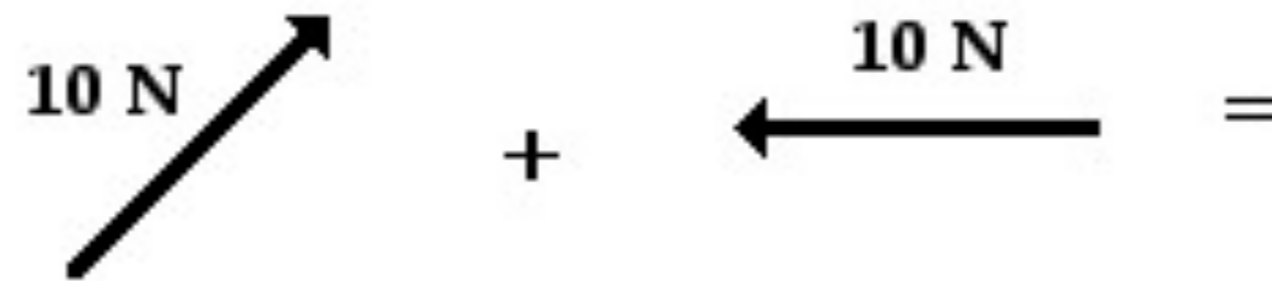# Vector Addition

Adding Vectors

- Draw the vectors "tail to head".
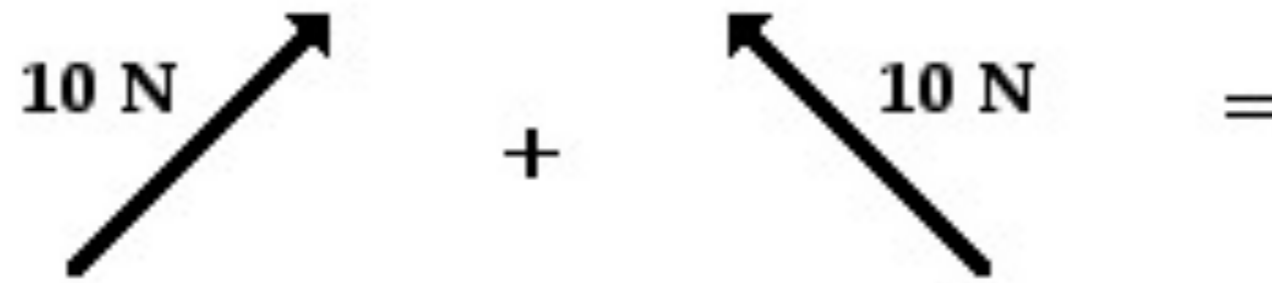
- Start each vector where the previous ended.

- When all of the vectors are drawn, create a "resultant" vector by drawing a vector from the tail of the beginning vector to the head of the last vector.
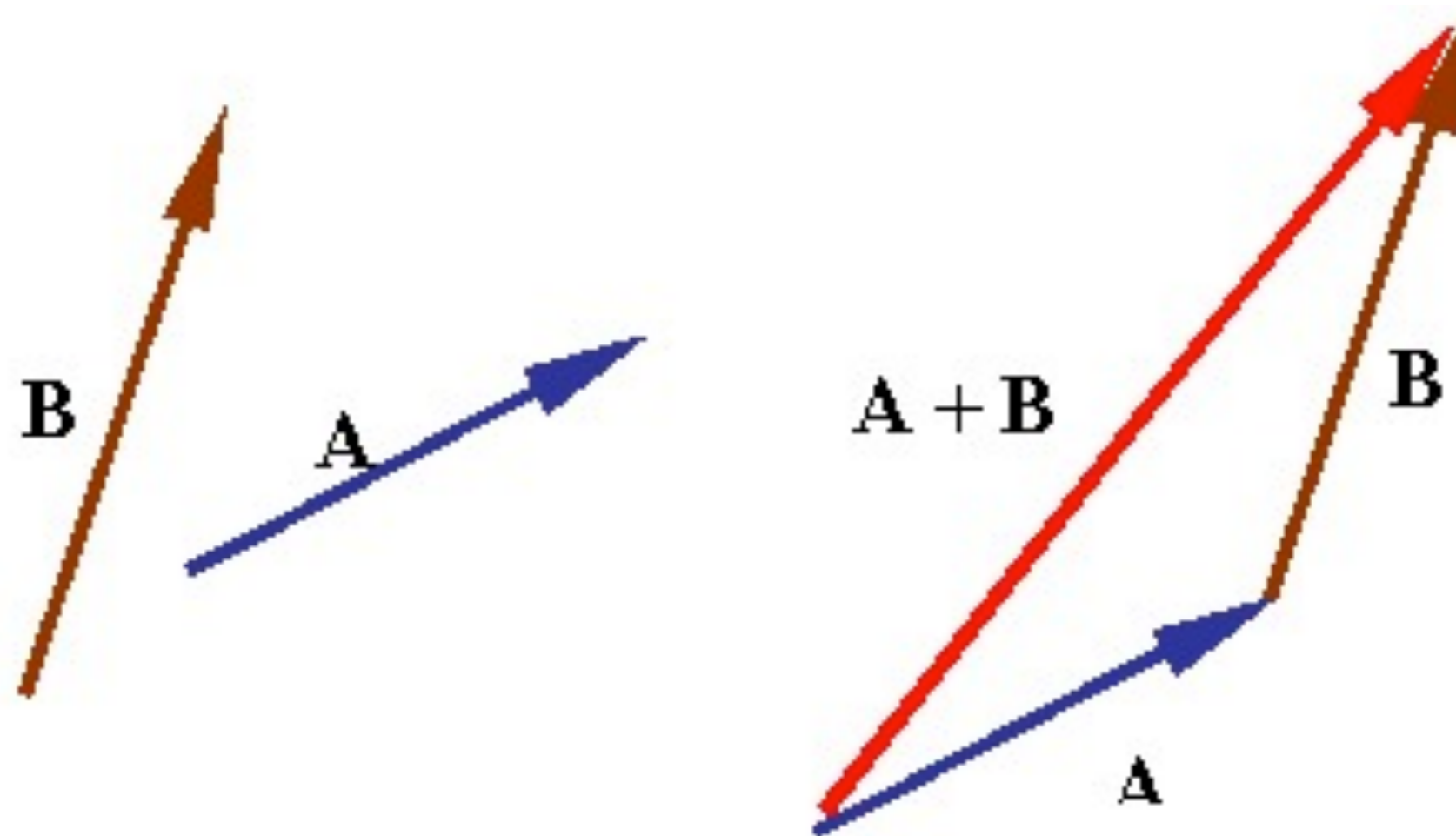
Example

Draw A - B on a whiteboard

10 N ↗ + ↖ **10 N** =

10 N ↗ + **10 N** ← =

10 N ↗ + **5 N** → =

Find the magnitude and direction of the resultant vector.

10 N ↗ + ↖ 10 N =

10 N ↗ + ← 10 N =

10 N ↗ + → 5 N =
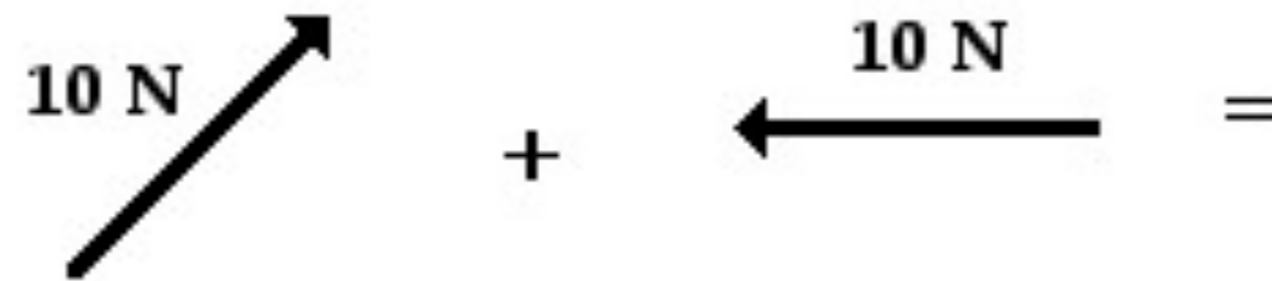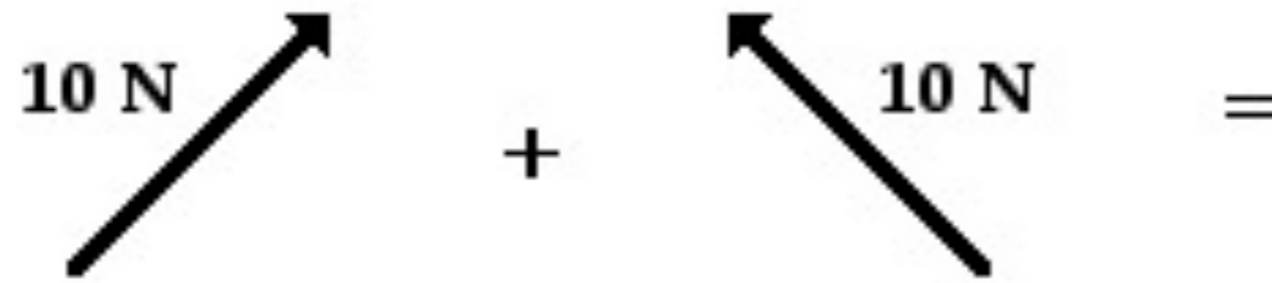
Find the magnitude and direction of the resultant vector.

A football player runs 5m north. He then turns and runs 3m at an angle of 60° north of west. How far is he from where he started?

A football player runs 5m north. He then turns and runs 3m at an angle of 60° north of west. At what angle is the football player from where he started?

How Does A Sailboat Actually Work?

Batman slides down a zip line that has an angle of 20° below vertical. He accelerates at 2.3m/s^2. Assuming he starts from rest, how fast is he going in the **vertical direction** after 7.0seconds?

Batman slides down a zip line that has an angle of 20° below vertical. He accelerates at 2.3m/s^2. Assuming he starts from rest, what is his **vertical** displacement after 4.5 seconds?

Multiple Accelerations

- Keep track of direction.

- Break everything into its directional components (x and y).

- Solve your problems in one component.

- Combine later if resultant vector is needed.

A weather balloon moves at 110° with a velocity of 3.7m/s. A jet on the bottom of the balloon accelerates the balloon vertically at 2.1m/s^2. A jet on the side of the balloon accelerates it at 0.8m/s^2. What is the horizontal component of the velocity after 5.4s?

A weather balloon moves at 110° with a velocity of 3.7m/s. A jet on the bottom of the balloon accelerates the balloon vertically at 2.1m/s^2. A jet on the side of the balloon accelerates it at 0.8m/s^2. What is the speed of the particle after 5.4s?

A weather balloon moves at 110° with a velocity of 3.7m/s. A jet on the bottom of the balloon accelerates the balloon vertically at 2.1m/s^2. A jet on the side of the balloon accelerates it at 0.8m/s^2. What is the magnitude of the displacement after 5.4s?

A ball is thrown horizontally off of a tall building at 9.4m/s. It continues to move with the same horizontal velocity, but begins to accelerate vertically at -9.8m/s^2. What is its speed after 2.2s?