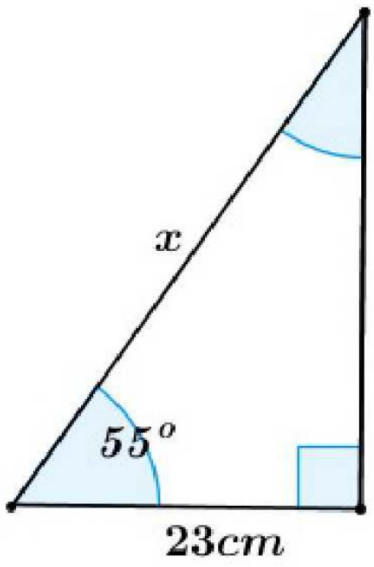
Good Morning!!

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



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!!

K: θ, A

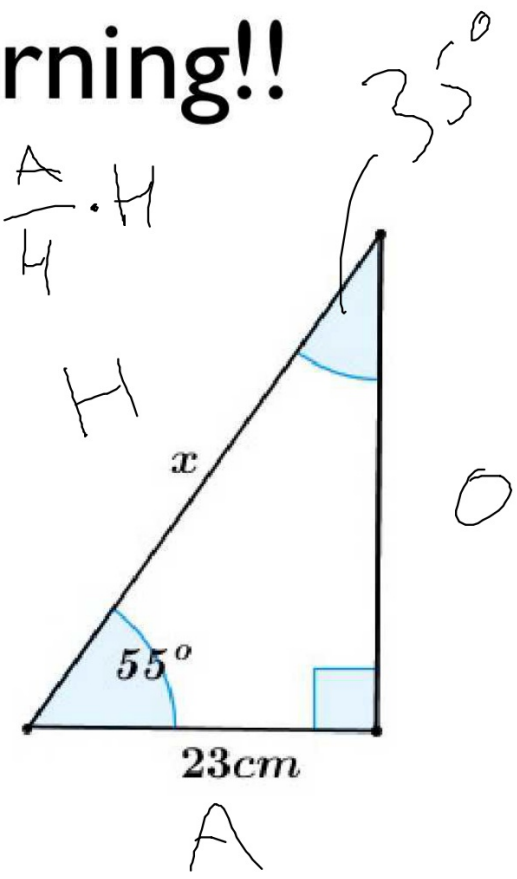
U: H

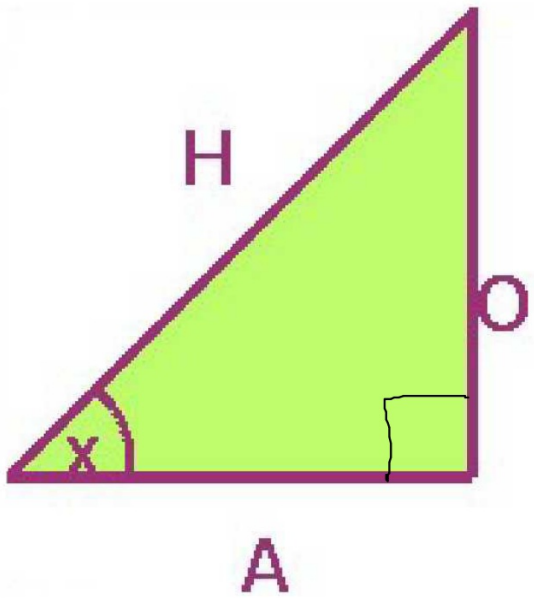
Eqn: $\cos\theta = \frac{A}{H} \cdot H$

$\frac{H\cancel{\cos\theta}}{\cancel{\cos\theta}} = \frac{A}{\cos\theta}$

- x: $H = \frac{A}{\cos\theta} = 40.1\,cm$

- other angles: $180° - 90° - 55° = 35°$





$$\text{SIN}(x) = \frac{O}{H}$$

$$\text{COS}(x) = \frac{A}{H}$$

$$\text{TAN}(x) = \frac{O}{A}$$

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 Cosine
- The vertical component of the vector can be found using Sine

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.

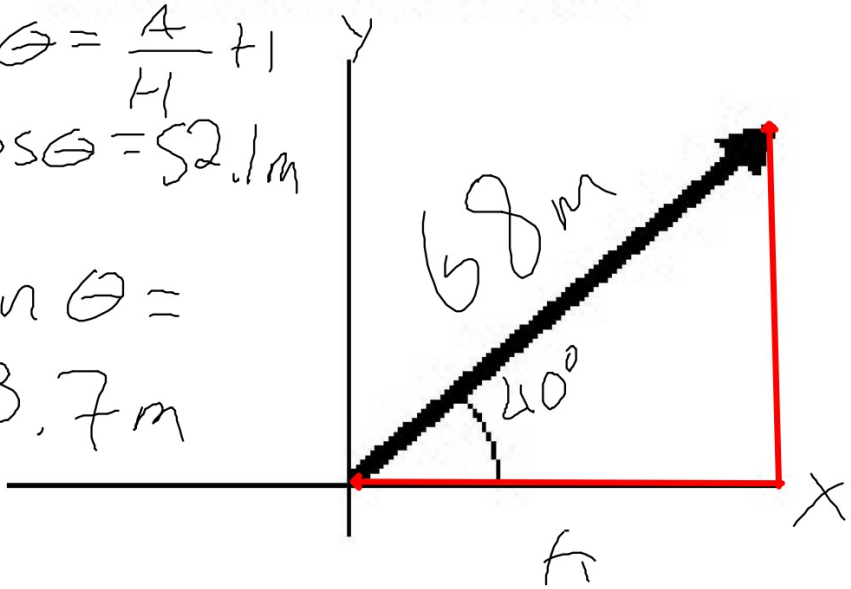
40° counter-clockwise rotation from East

$X: H\cos\theta = \frac{A}{H} \cdot H$

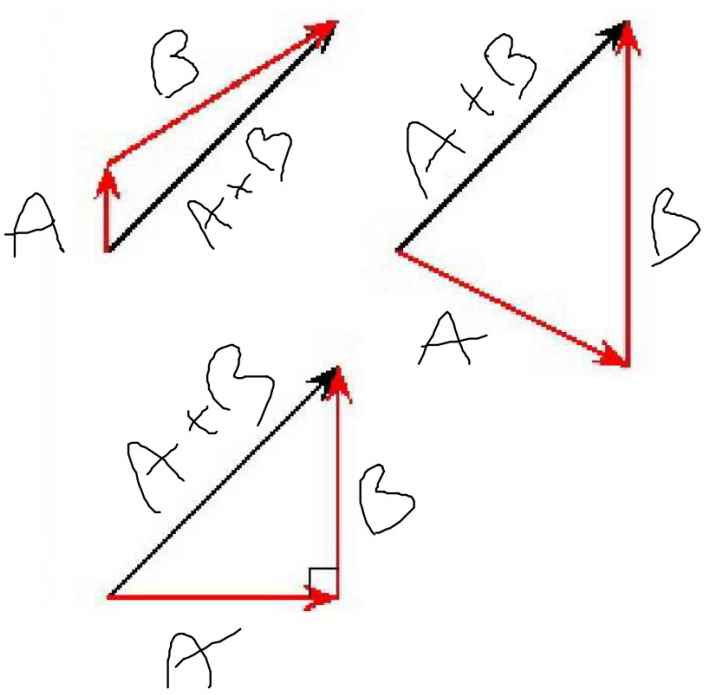
$A = H\cos\theta = 52.1\,m$

$Y: H\sin\theta =$

$43.7\,m$



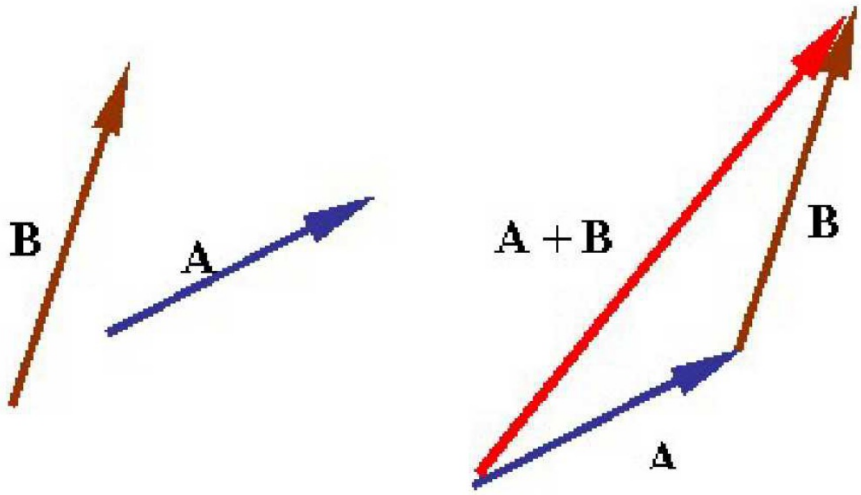
Find the vertical and horizontal components of the vector.



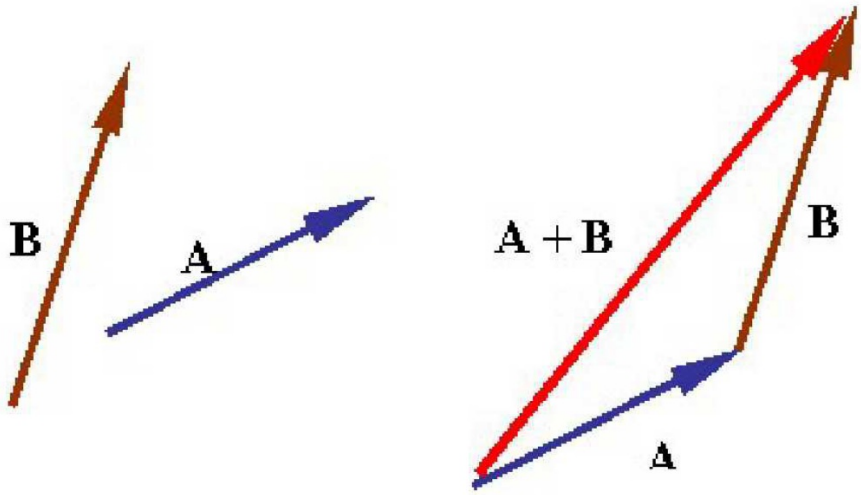
Vector Addition

Adding Vectors

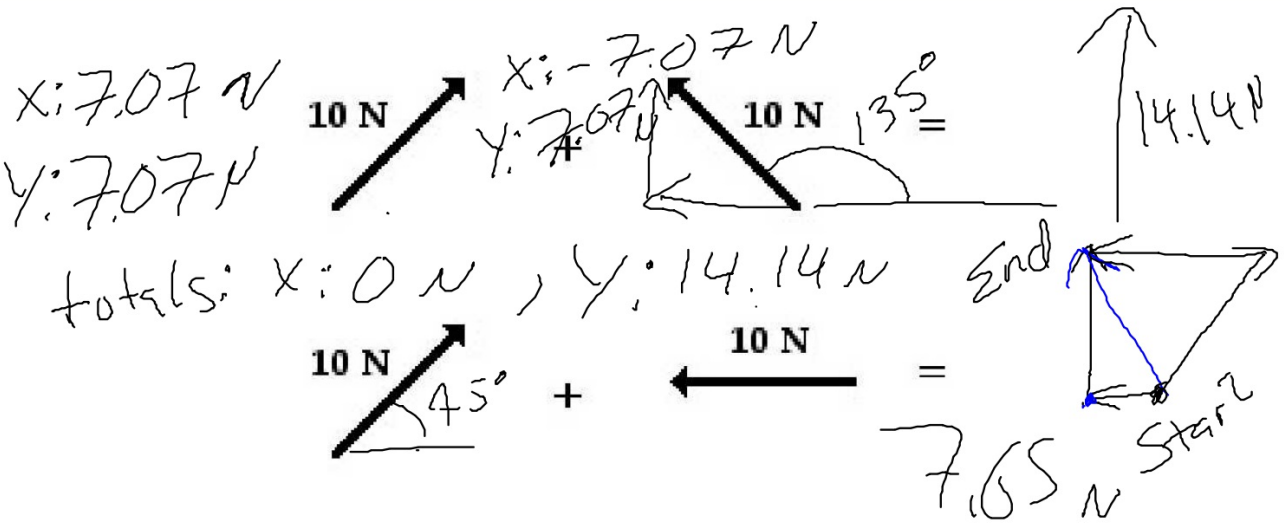
- Draw the vectors "tail to head".
- Start each vector where the previous ended.
- When all of the vectors are drawn, create a "resultant" vector by drawing a vector from the tail of the beginning vector to the head of the last vector.



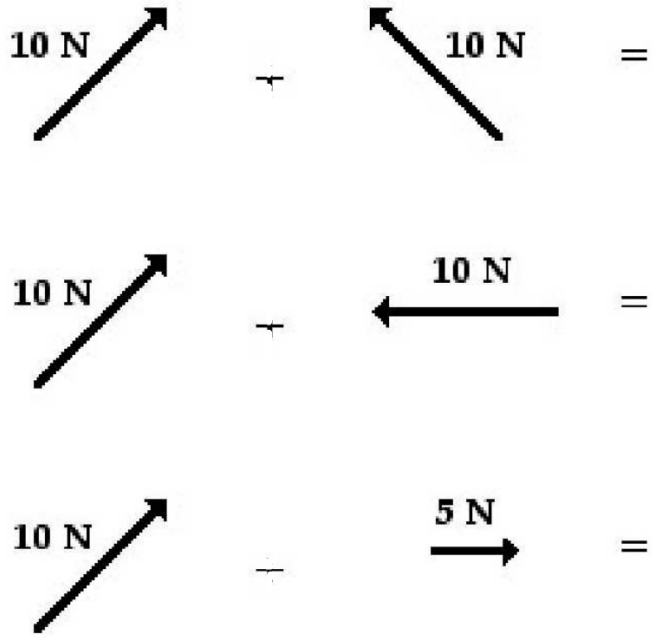
Example



Draw A - B on a whiteboard

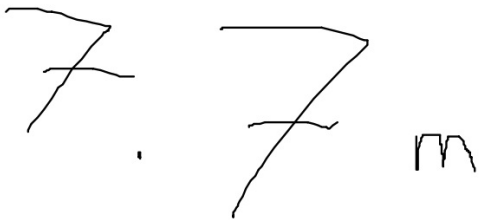


Find the magnitude and direction of the resultant vector.



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?