Trig 8.1

Find equal, opposite and parallel vectors

Add and subtract vectors geometrically*

vector

magnitude

standard position

direction

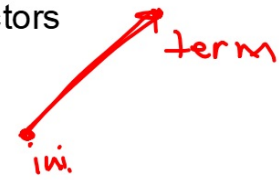
zero vector

equal vectors

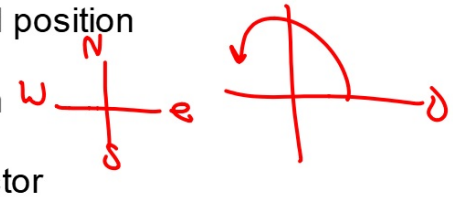
resultant

opposite vectors

scalar quantity (scalar)



distance



*Geometry 8.1-8.2

sine $\frac{O}{h}(y)$

cosine $\frac{a}{h}(x)$

tangent $\frac{O}{a}$

parallel vectors

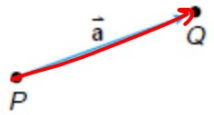
components

triangle method :)

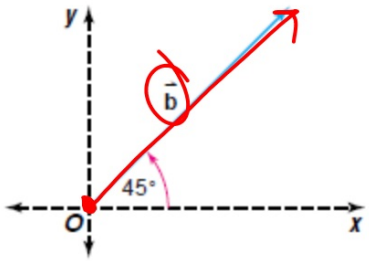
parallelogram method :(

tracing paper

$\overrightarrow{PQ}$ $|\vec{a}|$



magnitude (distance...looks like abs val.)



* standard position

direction

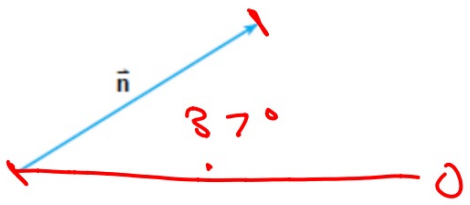
initial point

terminal point

https://www.youtube.com/watch?v=A05n32Bl0aY

(direction from horizontal)

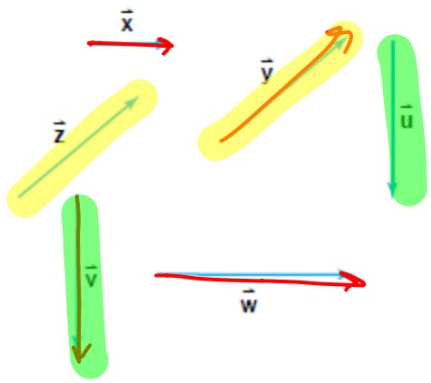
1 **Use a ruler and protractor to determine the magnitude (in centimeters) and the direction of $\vec{n}$.**



Six vectors are shown at the right.

- $\vec{z}$ and $\vec{y}$ are equal since they have the same direction and $|\vec{z}| = |\vec{y}|$.
- $\vec{v}$ and $\vec{u}$ are equal.
- $\vec{x}$ and $\vec{w}$ have the same direction but $|\vec{x}| \neq |\vec{w}|$, so $\vec{x} \neq \vec{w}$.
- $|\vec{v}| = |\vec{y}|$, but they have different directions, so they are not equal.

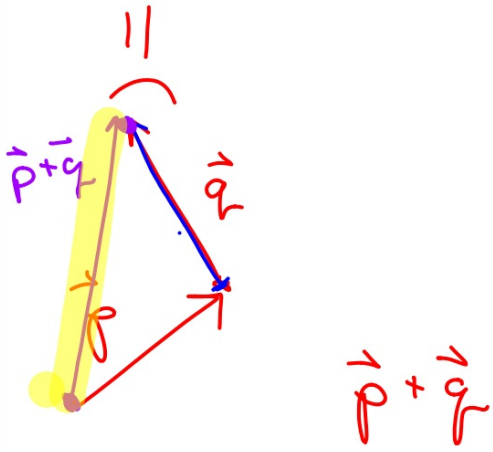
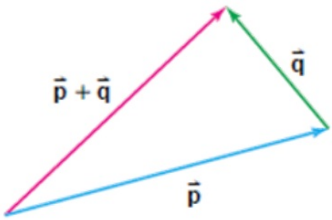
= vector: Same length
Same dir.



Equal vectors: Same direction and same length

tip to tail

Boo

Parallelogram Method	Triangle Method
	Draw the vectors one after another, placing the initial point of each successive vector at the terminal point of the previous vector. Then draw the resultant from the initial point of the first vector to the terminal point of the last vector.  *This method is also called the tip-to-tail method.*

initial-terminal
final answer

resultant: combine 2 (or more) vectors

$\vec{v} - \vec{w} = \vec{v} + -\vec{w}$

2 Find the sum of $\vec{v}$ and $\vec{w}$ using:

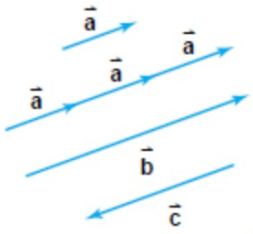
a.

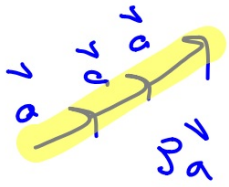
b. the triangle method.

c. Compare the resultants found in both methods.

$\vec{v} - \vec{w}$

A quantity with only magnitude is called a **scalar quantity.** Examples of scalars include mass, length, time, and temperature. The numbers used to measure scalar quantities are called **scalars.**

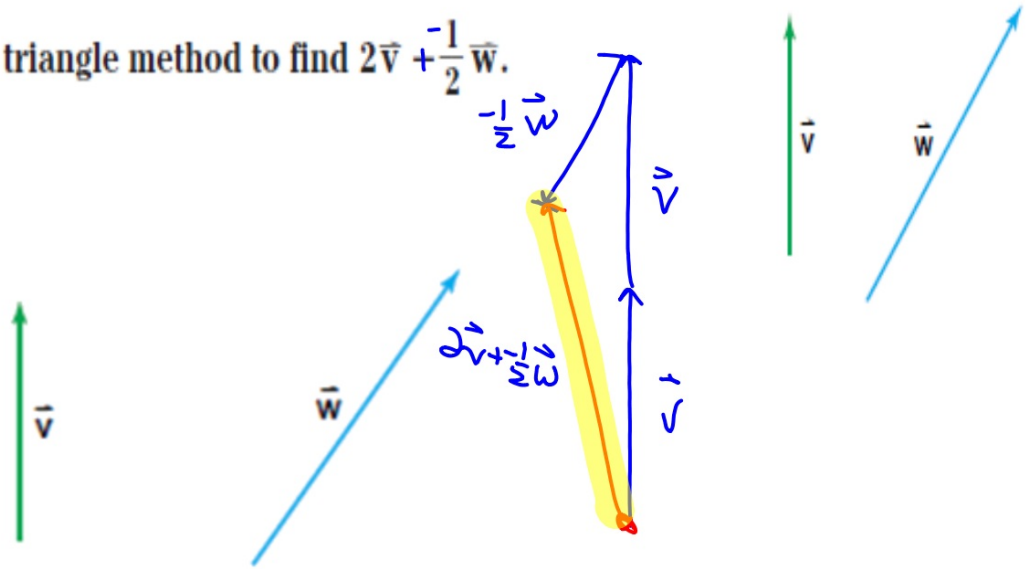


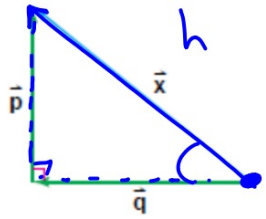


scalar product
(scale factor...)
3a = a + a + a

smato

4 Use the triangle method to find $2\vec{v} + \frac{-1}{2}\vec{w}$.





H, V

parallel vectors

perpendicular vectors

components

horizontal

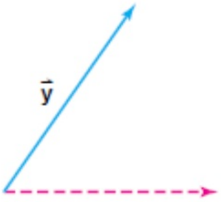
vertical

Use tracing paper, measure direction from horizontal

Use a ruler and a protractor to determine the magnitude (in centimeters) and direction of each vector.

5.

6.



7.

Trace to get resultant and then measure your final answer

Use $\vec{x}$, $\vec{y}$, and $\vec{z}$ above to find the magnitude and direction of each resultant.

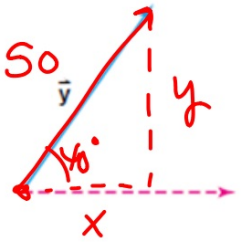
8. $\vec{x} + \vec{y}$

9. $\vec{x} - \vec{y}$

10. $4\vec{y} + \vec{z}$

12. Find the magnitude of the horizontal and vertical components of $\vec{y}$.

measure & use sine, cosine
where is the reference angle?



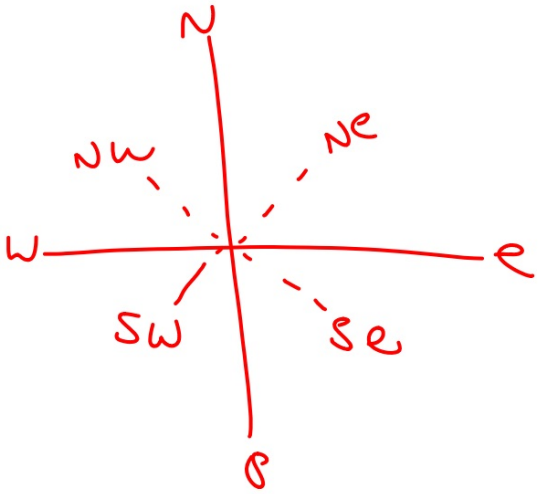
$\cos 40 = \frac{x}{50}$

$50 \cos 40 = x$

$\sin 40 = \frac{y}{50}$

$y = 50 \sin 40$

Compass directions



15-39

5 **NAVIGATION** A ship leaving port sails for 75 miles in a direction 35° north of due east. Find the magnitude of the vertical and horizontal components.

Imagine that there are ropes attached to the object.
Write the vectors so that you can use the triangle method (pulling)...

6 CONSTRUCTION **A piling for a high-rise building is pushed by two bulldozers at exactly the same time. One bulldozer exerts a force of 1550 pounds in a westerly direction. The other bulldozer pushes the piling with a force of 3050 pounds in a northerly direction.**

a. What is the magnitude of the resultant force upon the piling, to the nearest ten pounds?

b. What is the direction of the resulting force upon the piling, to the nearest ten pounds?