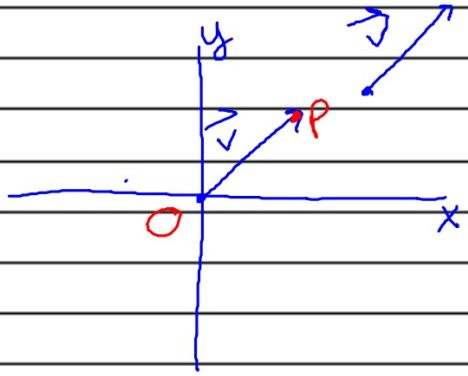
Questions:	Notes:

POSITION VECTORS

9/6/17

A POSITION VECTOR IS ONE WHOSE TAIL HAS BEEN PLACED AT THE ORIGIN
- IT IS IN STANDARD POSITION



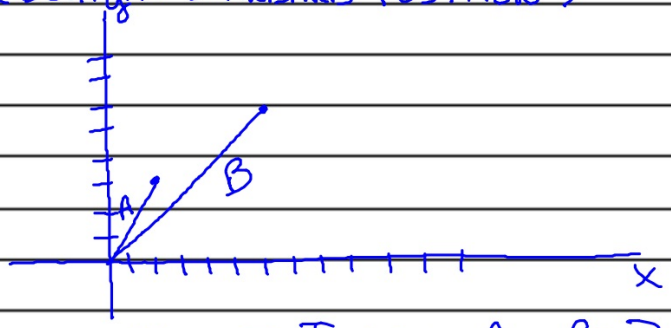
THE POINT P WITH COORDINATES (x, y) HAS POSITION VECTOR

$$\overrightarrow{OP} = \begin{pmatrix} x \\ y \end{pmatrix} = x\mathbf{i} + y\mathbf{j}$$

Questions:	Notes:

RESULTANT VECTORS

CONSIDER POINTS A (2,3) AND B (6,6)
(BOTH AT STANDARD POSITION)

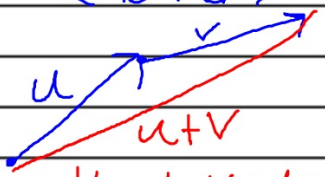


WHAT HAPPENS IF I ADD A + B ?

ADDITION OF VECTORS $u = \begin{pmatrix} a \\ b \end{pmatrix}, v = \begin{pmatrix} c \\ d \end{pmatrix}$

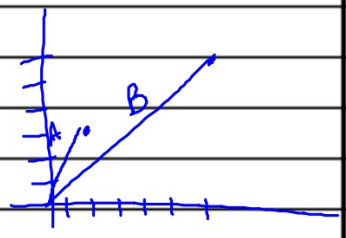
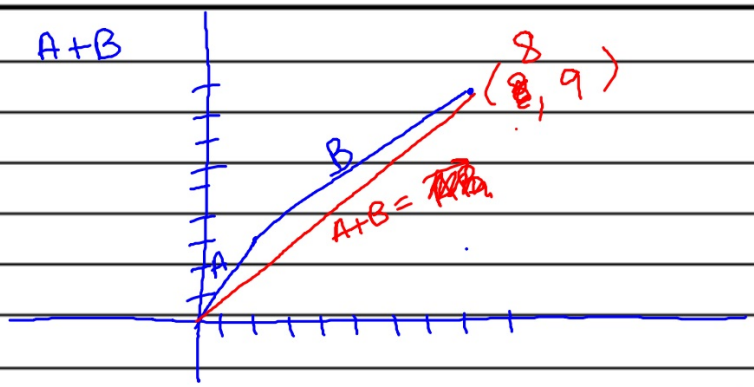
Algebra: $u + v = \begin{pmatrix} a+c \\ b+d \end{pmatrix}$

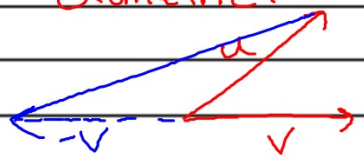
Geometric:



attach tail of v to end of u

$\overrightarrow{u+v}$ is the Resultant Vector

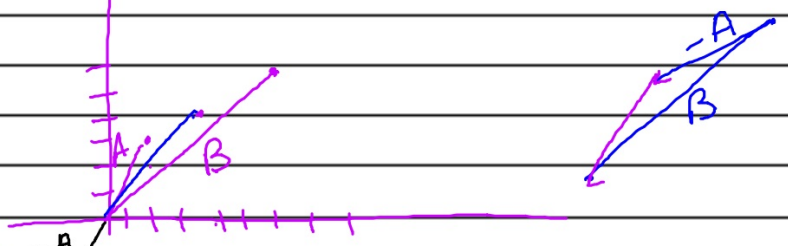
Questions:	Notes:
	A+B 
	$A+B=\begin{pmatrix}2\\3\end{pmatrix}+\begin{pmatrix}6\\6\end{pmatrix}=\begin{pmatrix}2+6\\3+6\end{pmatrix}=\begin{pmatrix}8\\9\end{pmatrix}$
	You try $A=\begin{pmatrix}-1\\7\end{pmatrix}$ $B=\begin{pmatrix}3\\5\end{pmatrix}$
	just Algebraically $\overrightarrow{AB}=\begin{pmatrix}2\\12\end{pmatrix}$

Questions:	Notes:
	SUBTRACTION: $u = \begin{pmatrix} a \\ b \end{pmatrix}$ and $v = \begin{pmatrix} c \\ d \end{pmatrix}$
	Algebra: $u - v = \begin{pmatrix} a-c \\ b-d \end{pmatrix}$
	Geometric:  make v negative
	now: connect the endpoints of u and $-v$
	TO FIND THE RESULTANT VECTOR $\overrightarrow{AB}$ BETWEEN TWO POINTS A AND B WE CAN SUBTRACT THE POSITION VECTOR A FROM THE POSITION VECTOR B.

Questions:	Notes:

$\overrightarrow{AB} = \begin{pmatrix} 4 \\ 3 \end{pmatrix}$ From A to B

Measure



$\overrightarrow{AB} = B - A = \begin{pmatrix} 6 \\ 6 \end{pmatrix} - \begin{pmatrix} 2 \\ 3 \end{pmatrix} = \begin{pmatrix} 4 \\ 3 \end{pmatrix}$

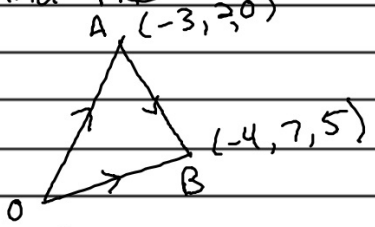
From O to A, then O to B

Thus $\overrightarrow{AB} = \overrightarrow{OA} + \overrightarrow{OB}$

recall $\overrightarrow{AB} = -\overrightarrow{OA}$

then $\overrightarrow{AB} = -\overrightarrow{OA} + \overrightarrow{OB}$

$= \overrightarrow{OB} - \overrightarrow{OA}$

Questions:	Notes:
	Ex) Points A and B have coordinates $(-3,2,0)$ and $(-4,7,5)$
	Find $\overrightarrow{AB}$
	
	$\overrightarrow{OA} = \begin{pmatrix} -3 \\ 2 \\ 0 \end{pmatrix}$ and $\overrightarrow{OB} = \begin{pmatrix} -4 \\ 7 \\ 5 \end{pmatrix}$
	$\overrightarrow{AB} = \overrightarrow{OB} - \overrightarrow{OA} = \begin{pmatrix} -4 \\ 7 \\ 5 \end{pmatrix} - \begin{pmatrix} -3 \\ 2 \\ 0 \end{pmatrix} = \begin{pmatrix} -1 \\ 5 \\ 5 \end{pmatrix}$

Ex 2) $\overrightarrow{XY} = \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix}$ and $\overrightarrow{XZ} = \begin{pmatrix} 0 \\ -10 \\ -1 \end{pmatrix}$

a. $\overrightarrow{YZ} =$

$\overrightarrow{YZ} = \overrightarrow{XZ} - \overrightarrow{XY} = \begin{pmatrix} 0 \\ -10 \\ -1 \end{pmatrix} - \begin{pmatrix} 2 \\ 1 \\ -3 \end{pmatrix} = \begin{pmatrix} -2 \\ -11 \\ 2 \end{pmatrix}$