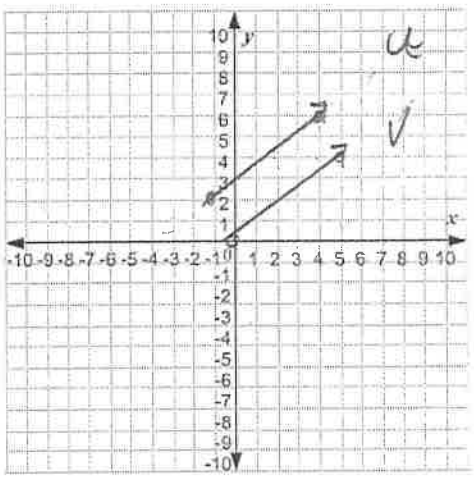
Vectors Day 1 Assignment

Name: Key Date:_____ Period:_____

1. Listed below are the initial points and endpoints for vectors **u** and **v.**
   - *Sketch the vectors.*
   - *Determine the direction of the direction of the vectors.*
   - *Find the magnitude of the vectors.*

a

Vector	Initial Point	End Point
u	(-1,2)	(4,6)
v	(0,0)	(5,4)



$m_u = \frac{6-2}{4+1} \frac{4}{5}$ $m_v = \frac{4-0}{5-0} = \frac{4}{5}$

Vectors u & v have the same direction

$\|u\| = \sqrt{(4--1)^2+(6-2)^2} = \sqrt{5^2+4^2}$

$\|u\| = \sqrt{25+16} = \sqrt{41}$

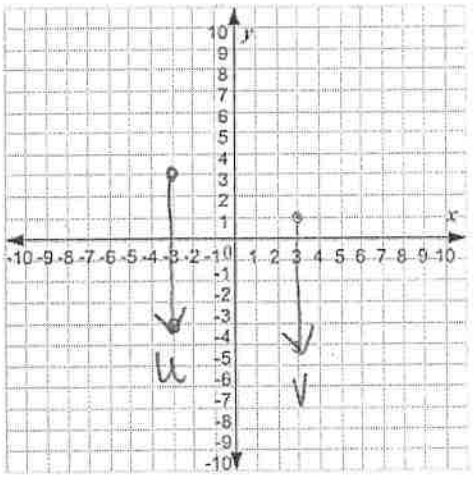
$\|v\| = \sqrt{(5-0)^2+(4-0)^2} = \sqrt{5^2+4^2}$

$\|v\| = \sqrt{25+16} = \sqrt{41}$

Same magnitude

b

Vector	Initial Point	End Point
u	(-3,3)	(-3,-3)
v	(3,1)	(3,-4)



$m_u = \frac{-3-3}{-3+3} = \frac{-6}{0}$ $m_v = \frac{-4-1}{3-3} = \frac{-5}{0}$

Vertical Vertical

both vectors are vertical with an undefined slope.

$\|u\| = \sqrt{(-3--3)^2+(-3-3)^2}$

$\|u\| = \sqrt{0^2+(-6)^2} = \sqrt{36} = 6$

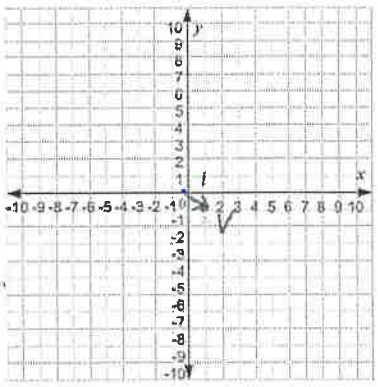
$\|v\| = \sqrt{(-4-1)^2+(3-3)^2}$

$\|v\| = \sqrt{(-5)^2+(0)^2} = \sqrt{25} = 5$

different magnitude.

Sketch each vector as a position vector and find its magnitude.

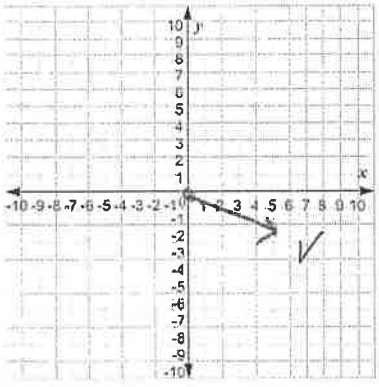
2. a. $\mathbf{v} = \mathbf{i} - \mathbf{j}$



$\|v\| = \sqrt{(-1)^2+(1)^2}$

$\|v\| = \sqrt{2}$

b. $\mathbf{v} = 5\mathbf{i} - 2\mathbf{j}$



$\|v\| = \sqrt{5^2+(-2)^2}$

$\|v\| = \sqrt{25+4}$

$\|v\| = \sqrt{29}$

Let $\mathbf{v}$ *be the vector from initial point* $\mathbf{P_1}$ *to terminal point* $\mathbf{P_2}$. *Write* $\mathbf{v}$ *in terms of* $\mathbf{i}$ *and* $\mathbf{j}$.

3. $\mathbf{P_1} = (-4, -4)$, $\mathbf{P_2} = (6,2)$

$v = (6--4)i + (2--4)j = 10i + 6j$

$\langle 10, 6 \rangle$

4. $\mathbf{P_1} = (-7, -4)$, $\mathbf{P_2} = (0,-2)$

$v = (0--7)i + (-2--4)j = 7i + 2j$

$\langle 7, 2 \rangle$

5. $\mathbf{P_1} = (-3, 4)$, $\mathbf{P_2} = (6,4)$

$v = (6--3)i + (4-4)j = 9i + 0j = 9i$

$\langle 9, 0 \rangle$

6. $\mathbf{P_1} = (4, -5)$, $\mathbf{P_2} = (4,3)$

$v = (4-4)i + (3--5)j = 0i + 8j = 8j$

$\langle 0, 8 \rangle$

7. $\mathbf{P_1} = (-8, 6)$, $\mathbf{P_2} = (-2, 3)$

$v = (-2--8)i + (3-6)j = 6i - 3j$

$\langle 6, -3 \rangle$

Vectors Worksheet Day 2 Name: KEY Date:_____ Period:____

Prove that $\overrightarrow{RS}$ and $\overrightarrow{PQ}$ are equivalent by showing that the represent the same vector.

1. R = (-4, 7), S = (-1, 5), P = (0,0), and Q = (3, -2)

$\overrightarrow{RS} = \langle -1--4, 5-7 \rangle = \langle 3, -2 \rangle$ $\overrightarrow{PQ} = \langle 3-0, -2-0 \rangle = \langle 3, -2 \rangle$ $\|\overrightarrow{RS}\| = \sqrt{3^2+(-2)^2} = \sqrt{13}$ $\|\overrightarrow{PQ}\| = \sqrt{13}$

2. 2. R = (7, -3), S = (4, -5), P = (0,0), and Q = (-3, -2)

$\overrightarrow{RS} = \langle 4-7, -5--3 \rangle = \langle -3, -2 \rangle$ $\overrightarrow{PQ} = \langle -3-0, -2-0 \rangle = \langle -3, -2 \rangle$ $\|\overrightarrow{RS}\| = \sqrt{-3^2+(-2)^2} = \sqrt{13}$ $\|\overrightarrow{PQ}\| = \sqrt{13}$

*Let **P = (-2, 2), Q = (3, 4), R = (-2, 5),** and **S = (2,8)**. Find the component form and magnitude of the vector.*

3. $\overrightarrow{PQ} = \langle 3--2, 4-2 \rangle = \langle 5, 2 \rangle$ $\|\overrightarrow{PQ}\| = \sqrt{5^2+2^2} = \sqrt{29}$

4. $\overrightarrow{RS} = \langle 2--2, 8-5 \rangle = \langle 4, 3 \rangle$ $\|\overrightarrow{RS}\| = \sqrt{4^2+3^2} = \sqrt{25} = 5$

5. $\overrightarrow{QR} = \langle -2-3, 5-4 \rangle = \langle -5, 1 \rangle$ $\|\overrightarrow{QR}\| = \sqrt{-5^2+1^2} = \sqrt{26}$

6. $2\overrightarrow{QS} = 2\langle 2-3, 8-4 \rangle = 2\langle -1, 4 \rangle = \langle -2, 8 \rangle$ $\|2\overrightarrow{QS}\| = \sqrt{-2^2+8^2} = \sqrt{68}$

7. $3\overrightarrow{QR} + \overrightarrow{PS} = 3\langle -2-3, 5-4 \rangle + \langle 2--2, 8-2 \rangle$

$= 3\langle -5, 1 \rangle + \langle 4, 6 \rangle$

$= \langle -15, 3 \rangle + \langle 4, 6 \rangle$

$= \langle -11, 9 \rangle$

$\| \ \| = \sqrt{-11^2+9^2}$

$= \sqrt{202}$

Let $\mathbf{u} = \langle -1, 3\rangle$, $\mathbf{v} = \langle 2, 4\rangle$, $\mathbf{w} = \langle 2, -5\rangle$. *Find the component form of the vector.*

8. $\mathbf{u} + \mathbf{v}$

$\langle -1,3\rangle + \langle 2,4\rangle$

$\langle 1, 7\rangle$

9. $\mathbf{u} - \mathbf{w}$

$\langle -1,3\rangle - \langle 2,-5\rangle$

$\langle -3, 8\rangle$

10. $2\mathbf{u} + 3\mathbf{w}$

$2\langle -1,3\rangle + 3\langle 2,-5\rangle$

$\langle -2,6\rangle + \langle 6,-15\rangle$

$\langle 4,-9\rangle$

11. $-2\mathbf{u} - 3\mathbf{v}$

$-2\langle -1,3\rangle - 3\langle 2,4\rangle$

$\langle 2,-6\rangle - \langle 6,12\rangle$

$\langle -4,-18\rangle$

Let $\mathbf{u} = \langle 2, -5\rangle$, $\mathbf{v} = \langle -3, 7\rangle$ *and* $\mathbf{w} = \langle -1, 6\rangle$. *Find each specified vector or scalar.*

12. $\mathbf{4w - 2v + 3u}$

$4\langle -1,6\rangle - 2\langle -3,7\rangle + 3\langle 2,-5\rangle$

$\langle -4,24\rangle - \langle -6,14\rangle + \langle 6,-15\rangle$

$\langle 8,-5\rangle$

13. $\|\mathbf{-2u}\|$ $-2\langle 2,-5\rangle = \langle -4,+10\rangle$ $\|-2u\| = \sqrt{-4^2 + 10^2}$

$= \sqrt{116}$

14. $\|\mathbf{w - u}\|$ $w - u = \langle -1,6\rangle - \langle 2,-5\rangle$ $\|w-u\| = \sqrt{-3^2 + 11^2}$

$= \langle -3, 11\rangle$ $= \sqrt{130}$

15. $\|\mathbf{u - w}\|$ $u - w = \langle 2,-5\rangle - \langle -1,6\rangle$ $\|u-w\| = \sqrt{3^2 + (-11)^2}$

$= \langle 3,-11\rangle$ $= \sqrt{130}$