Vectors Worksheet Day 2 Name:_____ 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)

$\overrightarrow{RS} = \langle -1+4, 5-7 \rangle = \langle 3, -2 \rangle$ ✓

$\overrightarrow{PQ} = \langle 3-0, -2-0 \rangle = \langle 3, -2 \rangle$

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

$\overrightarrow{RS} = \langle 4-7, -5+3 \rangle = \langle -3, -2 \rangle$ ✓

$\overrightarrow{PQ} = \langle -3-0, -2-0 \rangle = \langle -3, -2 \rangle$

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

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

$|\overrightarrow{PQ}| = \sqrt{5^2+2^2} = \sqrt{25+4} = \sqrt{29}$

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

$|\overrightarrow{RS}| = \sqrt{4^2+3^2} = \sqrt{16+9} = \sqrt{25} = 5$

5. $\overrightarrow{QR} = \langle -2-3, 5-4 \rangle = \langle -5, 1 \rangle$

$|\overrightarrow{QR}| = \sqrt{(-5)^2+1^2} = \sqrt{25+1} = \sqrt{26}$

6. $2\overrightarrow{QS} = 2\langle 2-3, 8-4 \rangle = 2\langle -1, 4 \rangle = \langle -2, 8 \rangle$

$|2\overrightarrow{QS}| = \sqrt{(-2)^2+8^2} = \sqrt{4+64} = \sqrt{68}$

7. $3\overrightarrow{QR} + \overrightarrow{PS} = 3\langle -5, 1 \rangle + \langle 2+2, 8-2 \rangle = 3\langle -5, 1 \rangle + \langle 4, 6 \rangle$

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

$= \langle -11, 9 \rangle$

$|3\overrightarrow{QR} + \overrightarrow{PS}| = \sqrt{(-11)^2+9^2} = \sqrt{121+81} = \sqrt{202} = \cancel{\sqrt{12}}$

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

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

$= \langle -4,24\rangle - \langle -6,14\rangle + \langle 6,-15\rangle = \langle 8,-5\rangle$

13. $\|-2\mathbf{u}\|$

$-2\vec{u} = -2\langle 2,-5\rangle = \langle -4,10\rangle$

$|-2\vec{u}| = \sqrt{(-4)^2+10^2} = \sqrt{16+100} = \sqrt{116} = 2\sqrt{29}$

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

$= \sqrt{(-3)^2+11^2} = \sqrt{9+121} = \sqrt{130}$

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

$= \sqrt{3^2+(-11)^2} = \sqrt{9+121} = \sqrt{130}$

Vectors Day 1 Assignment

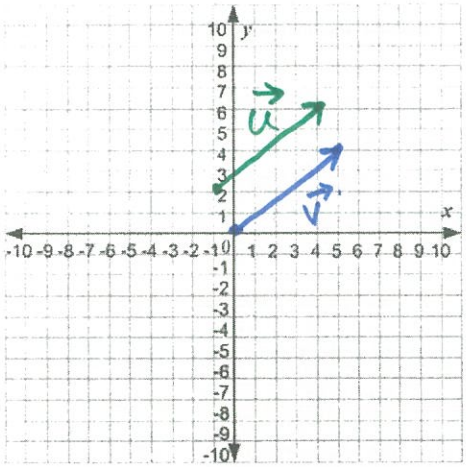
Name:_____ Date:_____ Period:_____

Listed below are the initial points and endpoints for vectors **u** and **v**.

- *Sketch the vectors.*
- *Write each vector in component form.*
- *Find the magnitude of the vectors.*

a

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



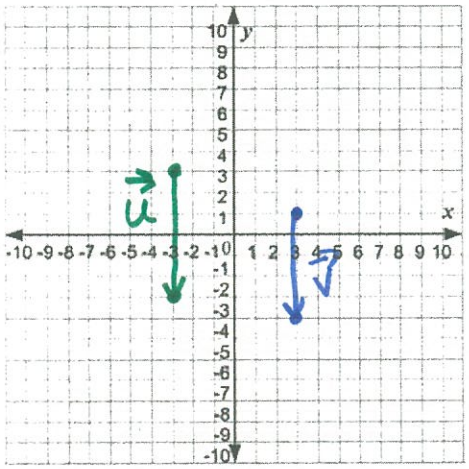
$\vec{u} = \langle 4+1, 6-2 \rangle = \langle 5, 4 \rangle$

$\vec{v} = \langle 5-0, 4-0 \rangle = \langle 5, 4 \rangle$

$|\vec{u}| = |\vec{v}| = \sqrt{5^2+4^2} = \sqrt{25+16} = \sqrt{41}$

b

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



$\vec{u} = \langle -3-(-3), -3-3 \rangle = \langle 0, -6 \rangle$

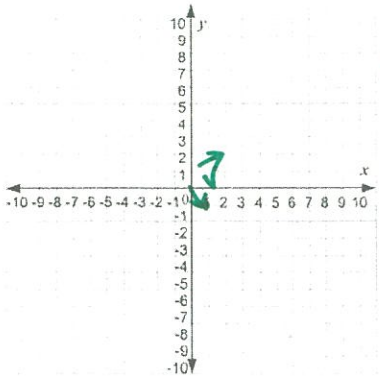
$\vec{v} = \langle 3-3, -4-1 \rangle = \langle 0, -5 \rangle$

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

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

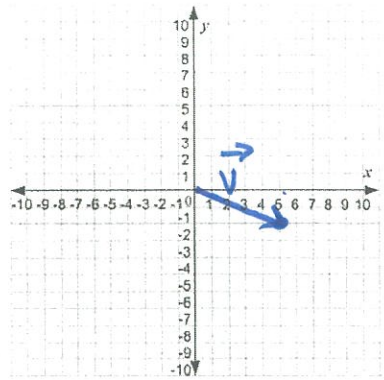
Sketch each vector as a position vector and find its magnitude.

2. a. $\mathbf{v} = < 1, -1 >$



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

b. $\mathbf{v} = < 5, -2 >$



$|\vec{v}| = \sqrt{5^2+(-2)^2}$
$= \sqrt{25+4}$
$= \sqrt{29}$

Let **v** *be the vector from initial point* $\mathbf{P_1}$ *to terminal point* $\mathbf{P_2}$. *Write* **v** *in component form.*

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

$\vec{v} = \langle 6+4, 2+4 \rangle = \langle 10, 6 \rangle$

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

$\vec{v} = \langle 0+7, -2+4 \rangle = \langle 7, 2 \rangle$

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

$\vec{v} = \langle 6+3, 4-4 \rangle = \langle 9, 0 \rangle$

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

$\vec{v} = \langle 4-4, 3+5 \rangle = \langle 0, 8 \rangle$

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

$\vec{v} = \langle -2+8, 3-6 \rangle = \langle 6, -3 \rangle$