

Warm up

1. Find the component form of the vector  $\overrightarrow{PQ}$  where P (2, 8) and Q (-3, 2).

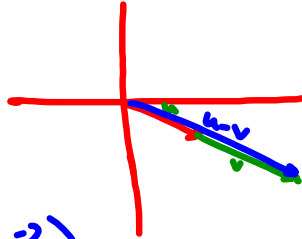
$$\vec{T} - \vec{I} = \langle -5, -6 \rangle$$

2. Find the unit vector for  $\overrightarrow{PQ}$  in problem #1.

$$\|v\| = \sqrt{61} \quad \left\langle \frac{-5}{\sqrt{61}}, \frac{-6}{\sqrt{61}} \right\rangle$$

3. For the vectors  $u = \langle 3, -2 \rangle$  and  $v = \langle -5, 2 \rangle$ :

a. Sketch  $u - v$




b. Find  $3v - 2u$

$$\begin{aligned} &3 \langle -5, 2 \rangle - 2 \langle 3, -2 \rangle \\ &\langle -15, 6 \rangle + \langle -6, 4 \rangle \\ &\langle -21, 10 \rangle \end{aligned}$$


Apr 7-3:19 PM


**GO COUGARS!**





**p433 Homework Questions**


In Exercises 3-12, find the component form and the magnitude of the vector  $v$ .


3. 

4. 

5. 


6. 

7. 

8. 

<small>Initial Point</small>	<small>Terminal Point</small>
9. $(\frac{1}{2}, 1)$	$(1, 2)$
10. $(\frac{1}{2}, 0)$	$(0, -1)$
11. $(-\frac{1}{2}, -1)$	$(\frac{1}{2}, \frac{1}{2})$
12. $(\frac{1}{2}, -2)$	$(1, 1)$

In Exercises 13-18, use the figure to sketch a graph of the specified vector. To print an enlarged copy of the graph, go to the website [www.mathgraphs.com](http://www.mathgraphs.com).



13.  $-v$

14.  $3u$

15.  $u + v$

16.  $u - v$


17.  $u + 2v$

18.  $v - \frac{1}{2}u$

In Exercises 25-30, find (a)  $u + v$ , (b)  $u - v$ , (c)  $2u - 3v$ , and (d)  $v + 4u$ .

25.  $u = (4, 2)$ ,  $v = (7, 1)$     26.  $u = (5, 3)$ ,  $v = (-4, 0)$   
 27.  $u = (-6, -8)$ ,  $v = (2, 4)$

In Exercises 31-34, use the figure and write the vector in terms of the other two vectors.



31.  $w = u + v$

32.  $v$

33.  $u = w - v$

34.  $2v$

In Exercises 35-44, find a unit vector in the direction of the given vector.

35.  $u = (6, 0)$

36.  $u = (0, -2)$

37.  $v = (-1, 1)$

38.  $v = (3, -4)$

39.  $v = (-24, -7)$

40.  $v = (8, -20)$

Feb 2-9:51 PM

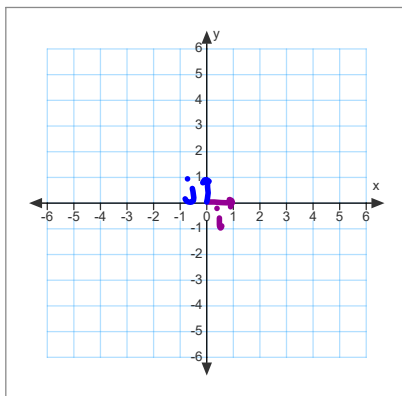
## 6.3 Day 2 Vectors in a Plane

Standard Unit Vectors

Trig Component Form

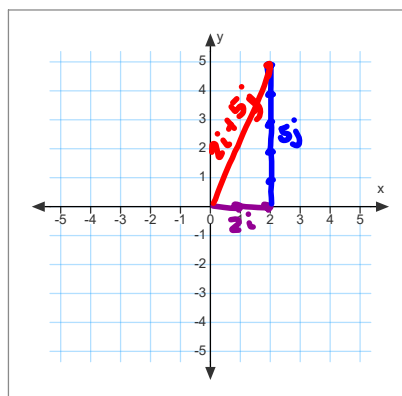
Apr 9-6:07 AM

### Standard Unit Vectors



$$i = \langle 1, 0 \rangle$$

$$j = \langle 0, 1 \rangle$$



$$v = \langle 2, 5 \rangle = 2i + 5j$$

Mar 22-12:15 PM

Example 1

If  $u = 3i + 4j$  find  $u+v$   $(3i + 4j) + (-2i + 3j)$   
 $v = -2i + 3j$   $i + 7j$

Example 2

Now find  $2u-4v$ 

$$= 14i - 4j$$

Mar 22-12:19 PM

If  $U$  is a unit vector on a unit circle, then

$$u = \langle u, v \rangle = \text{Component form}$$

$$= \langle \cos\theta, \sin\theta \rangle$$

$$= i\cos\theta + j\sin\theta$$

$\theta$  is the direction angle

trig component form

trig standard unit vector form

For any vector with direction angle  $\theta$ 

$$V = \|v\| \langle \cos\theta, \sin\theta \rangle$$

$$= \langle \|v\| \cos\theta, \|v\| \sin\theta \rangle$$

What if you know the components but not the angle??

Remember that  $\tan \theta = \frac{\sin \theta}{\cos \theta} \rightarrow \tan \theta = \frac{y}{x}$

Apr 9-6:11 AM

Example 3 Find the trig component form of the vector.

$$v = \langle -1, 1 \rangle \quad 1. \text{ Find } \|v\| = \sqrt{(-1)^2 + 1^2} = \sqrt{2}$$

Q2

$$2. \text{ Find } \theta \quad \tan \theta = \frac{1}{-1} = -1$$

$$\langle \sqrt{2} \cos 135^\circ, \sqrt{2} \sin 135^\circ \rangle \quad \begin{array}{l} \text{RA } \theta = 45^\circ \\ \theta = 135^\circ \end{array}$$

Example 4 Find the trig unit vector form of the vector.

$$v = 3i - 2j \quad \text{Find } \|v\| = \sqrt{9 + 4} = \sqrt{13}$$

Q4

$$\text{Find } \theta \Rightarrow \tan \theta = \frac{-2}{3} \Rightarrow \text{RA } \theta = 326.9$$

$$\theta = 326.91$$

$$i\sqrt{13} \cos 326.91 + j\sqrt{13} \sin 326.91$$

Example 5 Find component form if  $\|v\| = 5$ ,  $\theta = 45^\circ$

$$\langle 5 \cos 45^\circ, 5 \sin 45^\circ \rangle$$

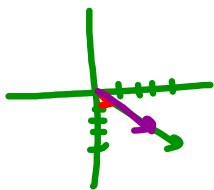
$$\langle 5 \left(\frac{1}{\sqrt{2}}\right), 5 \left(\frac{1}{\sqrt{2}}\right) \rangle$$

$$\langle \frac{5}{\sqrt{2}}, \frac{5}{\sqrt{2}} \rangle$$

Mar 22-12:29 PM

Example 6

If  $\|v\| = 3$  and  $u = \langle 4, -4 \rangle$  find a vector in the same direction as  $u$  but with the same magnitude as  $v$ .



$$1. \text{ Find } \|u\| = \sqrt{16 + 16} = \sqrt{32} = 4\sqrt{2}$$

2. Write the unit vector of  $u$

$$\left\langle \frac{4}{4\sqrt{2}}, \frac{-4}{4\sqrt{2}} \right\rangle = \left\langle \frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}} \right\rangle$$

3. Multiply the unit vector by the magnitude you

want

$$3 \left\langle \frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}} \right\rangle$$

$$\left\langle \frac{3}{\sqrt{2}}, -\frac{3}{\sqrt{2}} \right\rangle$$

Apr 9-6:35 AM

# HOMework



p 434 45-53 odd, 57, 61-75 odd

due Friday

Feb 2-9:51 PM