

Name key

4-9-18 Vectors day 1 show all steps

1. The initial point of a vector is (7, 4) and the terminal point is (3, -2).

a. What is the component form of the vector?
 $\langle 3-7, -2-4 \rangle$
 $\langle -4, -6 \rangle$

b. What is the linear combination form of the vector?
 $-4i - 6j$

c. What is the magnitude of the vector?
 $\sqrt{(-4)^2 + (-6)^2}$
 $\sqrt{16+36}$
 $\sqrt{50}$ $2\sqrt{13}$

2. The initial point of a vector is (3, -4) and the terminal point is (2, -8).

a. What is the component form of the vector?
 $\langle 2-3, -8-(-4) \rangle$
 $\langle -1, -4 \rangle$

b. What is the linear combination form of the vector?
 $-1i - 4j$

c. What is the magnitude of the vector?
 $\sqrt{(-1)^2 + (-4)^2}$
 $\sqrt{1+16}$
 $\sqrt{17}$

Given the vectors $u = \langle 6, 2 \rangle$ and $v = \langle -4, 3 \rangle$ find the following:

3. $u+v$ 4. $u-v$ 5. $3u-v$ 6. $u+2v$ 7. $7v-4u$
 $\langle 6+(-4), 2+3 \rangle$ $\langle 6-(-4), 2-3 \rangle$ $3\langle 6, 2 \rangle - \langle -4, 3 \rangle$ $\langle 6, 2 \rangle + \langle -8, 6 \rangle$ $7\langle -4, 3 \rangle - 4\langle 6, 2 \rangle$
 $\langle 2, 5 \rangle$ $\langle 10, -1 \rangle$ $\langle 18, 6 \rangle - \langle -4, 3 \rangle$ $\langle -2, 8 \rangle$ $\langle -28, 21 \rangle - \langle 24, 8 \rangle$
 $\langle 18-(-4), 6-3 \rangle$ $\langle -28-24, 21-8 \rangle$
 $\langle 22, 3 \rangle$

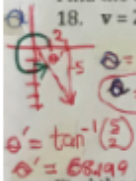
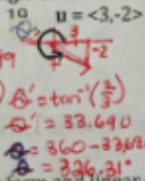
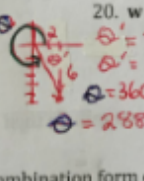
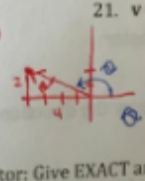
Given the vectors $u = 3i+2j$ and $v = 4i-5j$ find the following:

8. $u+v$ 9. $u-v$ 10. $2u-v$ 11. $u+3v$ 12. $-5v-3u$
 $3i+2j + 4i-5j$ $3i+2j - (4i-5j)$ $2(3i+2j) - (4i-5j)$ $3i+2j + 3(4i-5j)$ $-5(4i-5j) - 3(3i+2j)$
 $7i-3j$ $3i+2j-4i+5j$ $6i+4j-4i+5j$ $3i+2j+12i-15j$ $-20i+25j-9i-6j$
 $-1i+7j$ $2i+9j$ $15i-13j$ $-29i+19j$

Find the exact (simplified radical form) unit vector in the direction of v for each vector:

14. $v = 2i-5j$ 15. $u = \langle 3, -2 \rangle$ 16. $w = 2i-6j$ 17. $v = \langle -4, 2 \rangle$
 $\frac{2i-5j}{\sqrt{4+25}}$ $\frac{\langle 3, -2 \rangle}{\sqrt{9+4}}$ $\frac{2i-6j}{\sqrt{4+36}} = \frac{2i-6j}{2\sqrt{10}}$ $\frac{\langle -4, 2 \rangle}{\sqrt{16+4}} = \frac{\langle -4, 2 \rangle}{\sqrt{20}} = \frac{\langle -4, 2 \rangle}{2\sqrt{5}}$
 $\frac{2i}{\sqrt{29}} - \frac{5j}{\sqrt{29}} = \frac{2\sqrt{29}i - 5\sqrt{29}j}{29}$ $\langle \frac{3}{\sqrt{13}}, -\frac{2}{\sqrt{13}} \rangle$ $\frac{i}{\sqrt{10}} - \frac{3j}{\sqrt{10}}$ $\langle \frac{-4}{2\sqrt{5}}, \frac{2}{2\sqrt{5}} \rangle = \langle \frac{-2}{\sqrt{5}}, \frac{1}{\sqrt{5}} \rangle$
 $\langle \frac{3\sqrt{13}}{13}, -\frac{2\sqrt{13}}{13} \rangle$ $\frac{\sqrt{10}i}{10} - \frac{3\sqrt{10}j}{10}$ $\langle \frac{-2\sqrt{5}}{5}, \frac{\sqrt{5}}{5} \rangle$

Find the direction angle of each vector:

18. $v = 2i-5j$ 19. $u = \langle 3, -2 \rangle$ 20. $w = 2i-6j$ 21. $v = \langle -4, 2 \rangle$
   
 $\theta = \tan^{-1}(\frac{5}{2})$ $\theta = \tan^{-1}(\frac{2}{3})$ $\theta = \tan^{-1}(\frac{6}{2})$ $\theta = \tan^{-1}(\frac{2}{-4})$
 $\theta = 68.199$ $\theta = 33.690$ $\theta = 71.565$ $\theta = 26.565$
 $\theta = 360 - 68.199$ $\theta = 360 - 33.690$ $\theta = 360 - 71.565$ $\theta = 180 - 26.565$
 $\theta = 291.801$ $\theta = 326.31$ $\theta = 288.435$ $\theta = 153.435$

Find the component form and linear combination form of each vector: Give EXACT answers.

22. v has magnitude 8 and direction angle $\theta = 150^\circ$.
 $8 \langle \cos 150^\circ, \sin 150^\circ \rangle$

23. u has magnitude of 3 and direction angle $\theta = 60^\circ$.
 $3 \langle \cos 60^\circ, \sin 60^\circ \rangle$