



LOS and LOC Word Problem Answers - Workbook p 153-154



1. 57.2 ft
2. 25.6 ft longer, new angle 28.2 degrees
3. 912.4 km
4. 674.5 ft
5. 9.3 in
6. 22 in.
7. 367.25 ft.
8. 218.0 ft.
9. A - 35 mi., B - 65.8 mi.
10. 16 in. and 22 in.
11. about 97 miles, $K = 6946 \text{ mi}^2$
12. 852.1 ft.



Mar 20-9:47 AM



GO COUGARS!



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
1.  



2.  



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

4.  



5.  



6.  



7.  



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

9.  

10.  

11.  

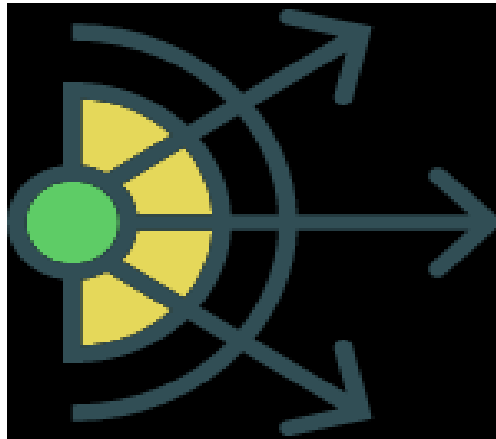
12.  

13.  

14.  

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6.3 Vectors in a Plane



Apr 16-10:31 AM

vector: a directed line segment with an initial point, P, and a terminal point, Q, that has a unique magnitude.

This is written \overrightarrow{PQ} .

magnitude: length of a vector.

This is written $\|v\|$.

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Two vectors are equal if they have the same

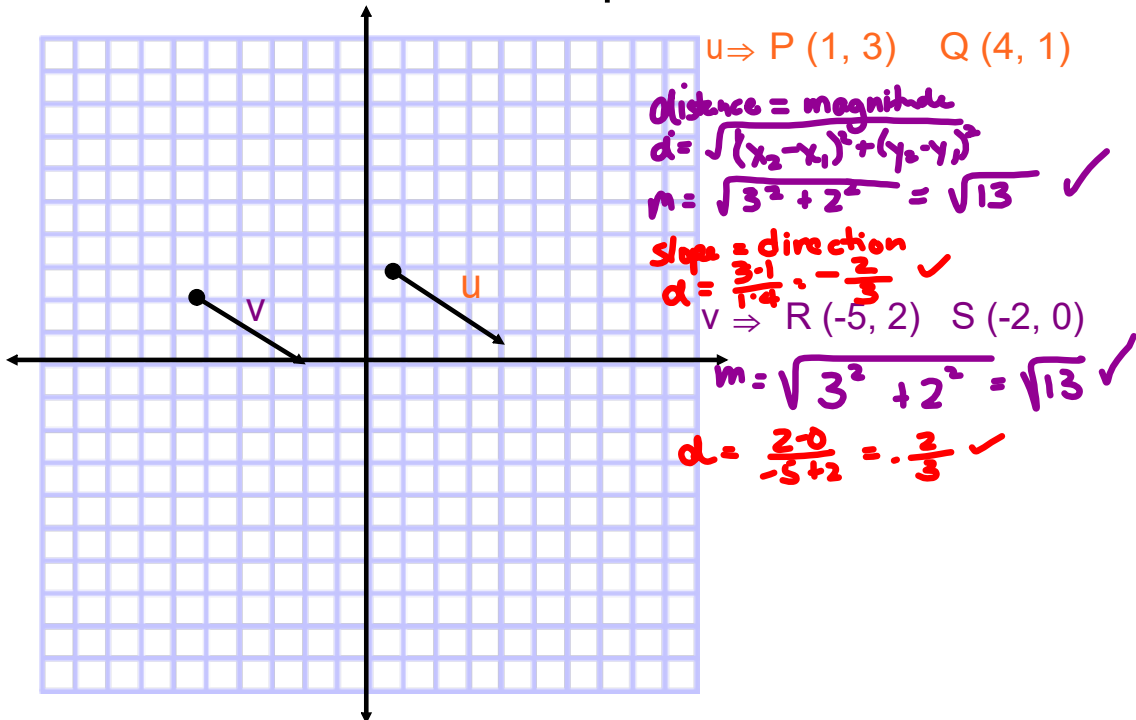
direction

magnitude



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Are these two vectors equal?



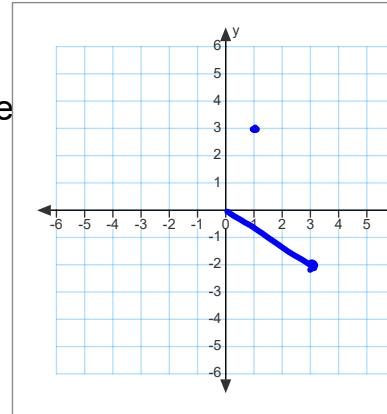
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The **component form** of a vector starts at the origin

To find the component form of a vector algebraically given two points we use **terminal** - **initial**

Example:

If the initial point of a vector is (1, 3) and the terminal point is (4, 1), find the vector in component form.



Terminal point - initial point

$$(4, 1) - (1, 3) = (4 - 1, 1 - 3)$$

$$\mathbf{v} = \langle 3, -2 \rangle$$

$\langle v_1, v_2 \rangle$

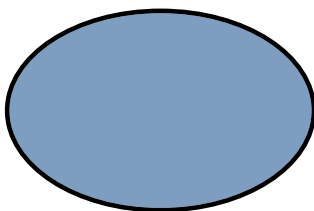
To find the magnitude of a vector from component form.

$$\begin{aligned} \|\mathbf{v}\| &= \sqrt{(v_1)^2 + (v_2)^2} \\ &= \sqrt{3^2 + (-2)^2} = \sqrt{13} \end{aligned}$$

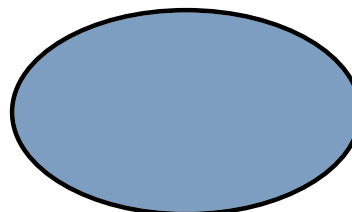
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Find the component form and the magnitude of the vector \overrightarrow{RS}

where R (-5, 6) and S (3, -1).



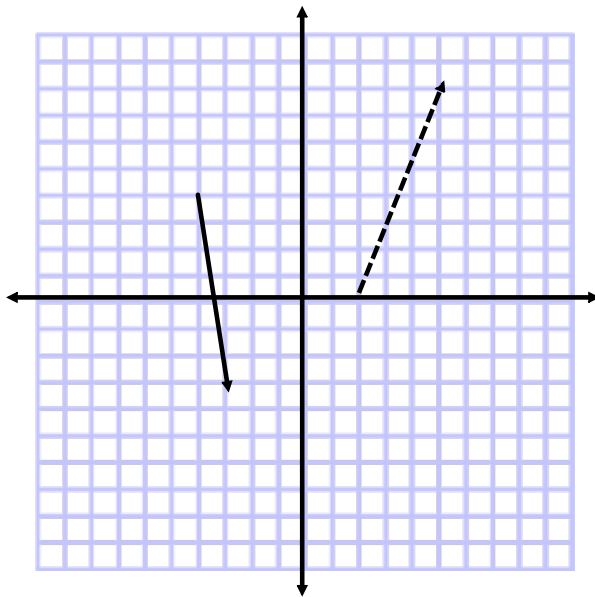
$$\langle 8, -7 \rangle$$



$$\sqrt{113}$$

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Vector Operations (addition, subtraction, scalar)

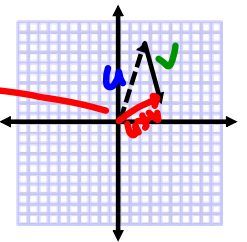


\vec{u}

Sketch $u + v$

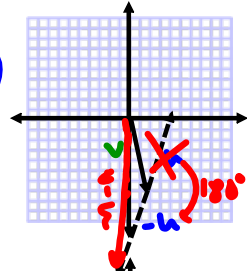
resultant vector

\vec{v}

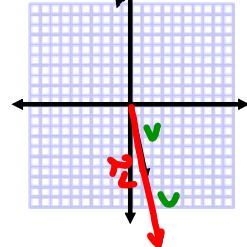


Sketch $v - u$

$v + (-u)$

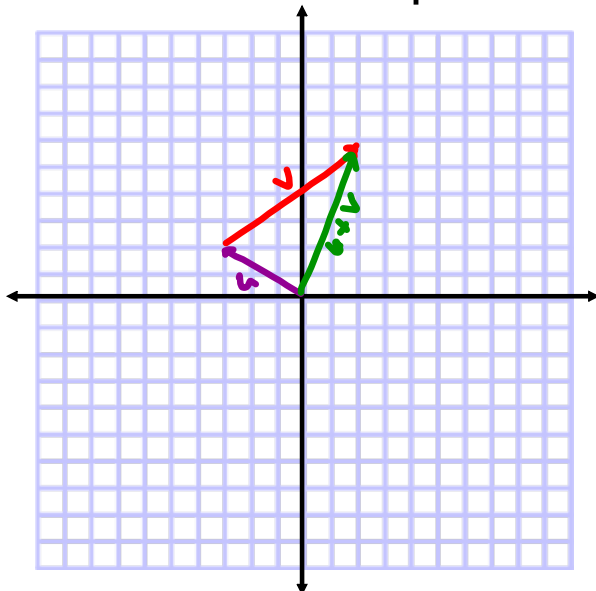


Sketch $2v$



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Vector Operations - Algebraically



$$v = \langle 5, 4 \rangle \quad u = \langle -3, 2 \rangle$$

Find $u + v$

$$\langle -3, 2 \rangle + \langle 5, 4 \rangle$$

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

Find $v - u$

$$\langle 5, 4 \rangle - \langle -3, 2 \rangle = \langle 5+3, 4-2 \rangle$$

$$= \langle 8, 2 \rangle$$

Find $-3u$

$$-3\langle -3, 2 \rangle = \langle 9, -6 \rangle$$

Find $2u + 6v$

$$\langle 24, 28 \rangle$$

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Unit vector: a vector in the same direction as a given vector with a magnitude of one

$$\text{unit vector} = \frac{v}{\|v\|} = \left\langle \frac{v_1}{\|v\|}, \frac{v_2}{\|v\|} \right\rangle$$

Example: Given vector $v = \langle 2, -5 \rangle$, find the unit vector of v .

1. Find the magnitude of vector v .

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

2. Divide the component form of the vector by the magnitude.

$$\text{unit vector} = \frac{\|v\|}{\sqrt{29}} \left\langle \frac{2}{\sqrt{29}}, \frac{-5}{\sqrt{29}} \right\rangle$$

$$\text{check: } \left(\frac{2}{\sqrt{29}}\right)^2 + \left(\frac{-5}{\sqrt{29}}\right)^2$$

$$= \frac{4}{29} + \frac{25}{29}$$

$$= \frac{29}{29}$$

$$= 1 \quad \checkmark$$

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HOMWORK



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5-17 odd, 25, 27, 31-39 odd

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GO COUGARS!

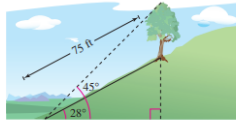


Homework Questions

In Exercises 13–16, find the area of the triangle having the indicated angle and sides.

- 13. $A = 27^\circ$, $b = 5$, $c = 8$
- 14. $B = 80^\circ$, $a = 4$, $c = 8$
- 15. $C = 122^\circ$, $b = 18$, $a = 29$
- 16. $C = 100^\circ$, $a = 120$, $b = 74$

19. **Height** A tree stands on a hillside of slope 28° from the horizontal. From a point 75 feet down the hill, the angle of elevation to the top of the tree is 45° (see figure). Find the height of the tree.



33. **Geometry** The lengths of the diagonals of a parallelogram are 10 feet and 16 feet. Find the lengths of the sides of the parallelogram if the diagonals intersect at an angle of 78° .

In Exercises 37–40, use Heron's Area Formula to find the area of the triangle with the given side lengths.

- 37. $a = 4$, $b = 5$, $c = 7$
- 38. $a = 15$, $b = 8$, $c = 10$
- 39. $a = 64.8$, $b = 49.2$, $c = 24.1$
- 40. $a = 8.55$, $b = 5.14$, $c = 12.73$

In Exercises 1–6, use the given information to solve the triangle. If two solutions exist, find both solutions.

- 1. $A = 36^\circ$, $B = 98^\circ$, $c = 16$
- 2. $a = 4$, $b = 8$, $c = 10$
- 3. $A = 35^\circ$, $b = 8$, $c = 12$
- 4. $A = 25^\circ$, $b = 28$, $a = 18$
- 5. $B = 130^\circ$, $c = 10.1$, $b = 5.2$
- 6. $A = 150^\circ$, $b = 4.8$, $a = 9.4$

- 7. Find the length of the pond shown at the right.
- 8. A triangular parcel of land has borders of lengths 55 meters, 85 meters, and 100 meters. Find the area of the parcel of land.

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