

Show ALL work . Give final answers to 3 decimal places when necessary.

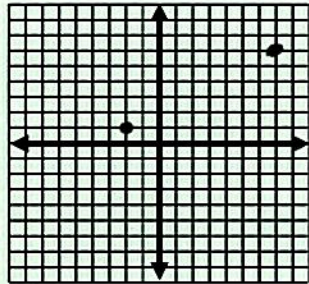
1. Find the component form of vector  $\mathbf{v}$  that has an initial point of  $(-2, 1)$  and a terminal point of  $(7, 6)$ .

$$\vec{v} = \langle 9, 5 \rangle$$

$$\|\vec{v}\| = \sqrt{9^2 + 5^2}$$

$$= \sqrt{106}$$

or 10.295



5. Given  $\mathbf{v} = -2\mathbf{i} + 4\mathbf{j}$ , find the magnitude of the vector.

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

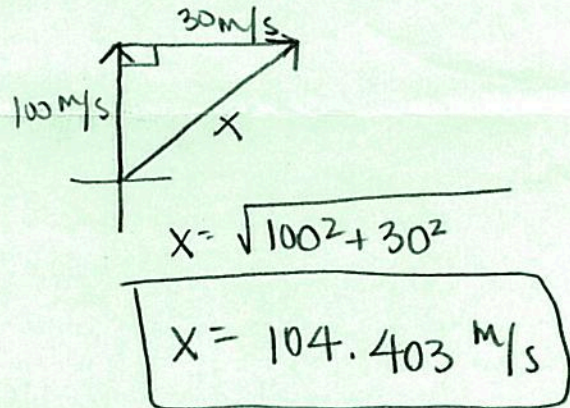
$$= \sqrt{20} \rightarrow 2\sqrt{5}$$

2. Find the magnitude of  $\mathbf{v}$ :  
 $\mathbf{v} = -\mathbf{i} - 4\mathbf{j} \rightarrow \langle -1, -4 \rangle$

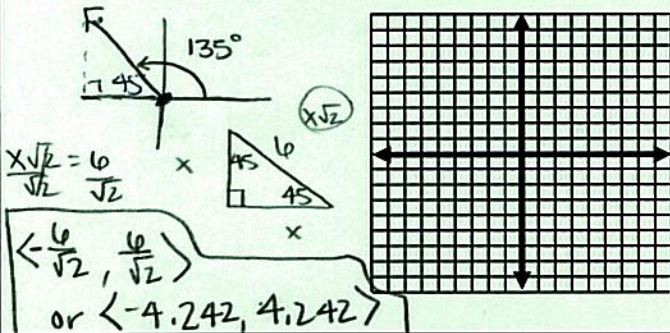
$$\|\vec{v}\| = \sqrt{(-1)^2 + (-4)^2}$$

$$= \sqrt{17} \text{ or } 4.123$$

6. An airplane tries to fly due north at 100 m/s but a wind is blowing from the west at 30 m/s. What is the plane's resultant velocity?



3. A vector  $\mathbf{v}$  has a magnitude of 6 and a direction angle of  $135^\circ$ . Find the component form of the vector.



4. Given  $\mathbf{u} = 4\mathbf{i} - 3\mathbf{j}$  and  $\mathbf{w} = \mathbf{i} - \mathbf{j}$ , find  $2\mathbf{u} + 3\mathbf{w}$ .

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

$$\langle 8, -6 \rangle + \langle 3, -3 \rangle$$

$$= \langle 11, -9 \rangle$$

7. An airplane has an airspeed of 600 mph and a heading of  $200^\circ$ . Write the plane's motion as a vector in component form.

