

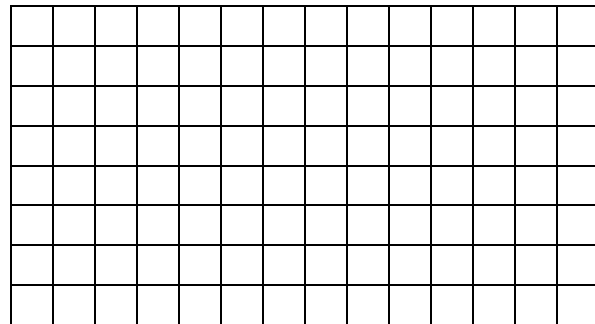
## Vectors Help Session Test Review WS 3

**Given:** X (-1, 9) and Y (-3,7)

1. Find the component form of  $\overrightarrow{XY}$ .
2. Find the direction, in standard position, of  $\overrightarrow{XY}$ .
3. Write  $\overrightarrow{YX}$  as the sum of unit vectors.
4. Find the magnitude of  $\overrightarrow{YX}$ .

**Given:**  $\vec{u} = \langle -2, -3 \rangle$ ,  $\vec{v} = \langle 1, -3 \rangle$

5. Find the angle between  $\vec{u}$  and  $\vec{v}$ .
6. Find the magnitude and direction of  $\vec{u}$ .
7. Find  $\vec{m} = \vec{u} - 2\vec{v}$ . Show work algebraically.
8. Draw the vector diagram for  $\vec{m} = \vec{u} - 2\vec{v}$  and label the resultant.



9. Find the magnitude and direction of  $\vec{m} = \vec{u} - 2\vec{v}$ .
10. Create 2 vectors that are parallel to  $\vec{v}$ . Justify your answer.
11. Determine whether  $\vec{a}$  and  $\vec{b}$  are orthogonal.  $\vec{a} = \langle 2, -3 \rangle$  and  $\vec{b} = \langle 4, 5 \rangle$

12. Convert bearing of  $314^\circ$  to standard position.
13. Convert S  $12^\circ$  W to standard position.
14. Convert the standard position of  $197^\circ$  into bearing.
15. A plane is flying at a speed of 320 mph on a bearing N  $70^\circ$  E. Its resultant speed is 370 mph and resultant direction is  $60^\circ$ . Find the speed and direction of the wind.
16. A ship is sailing through the water in the English Channel with a velocity of 22 knots along a bearing of  $157^\circ$ . The current has a velocity of 5 knots along a bearing of  $213^\circ$ . The actual velocity of the ship is the vector sum of the ship's velocity and the water's velocity. Find the actual velocity.
17. A bear travels 70 miles in a northeasterly direction from his den. It then travels 150 miles 60 degrees north of west. Determine how far and in what direction the bear is from his den.
18. A motorboat with a speed of 9 mph in still water must aim upstream at an angle of 25.5 degrees in order to travel directly across the stream. What is the speed of the current? What is the resultant speed of the boat?