Wednesday Feb 20 2008

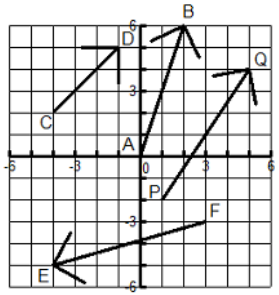
Test today on pages 39 - 41

OTL is the gift on the next 2 pages. Follow directions!

"PRE"-GIFT ON VECTORS

NOTE: Please list all answers in exact form first. Then round lengths to 4 decimal places and round angles to the nearest minute. Write on the graph grids on this paper, but show all equations and work on your paper.

A ***vector*** is a directed line segment. A vector has magnitude and direction.



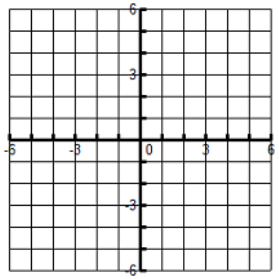
The symbol, $\overrightarrow{PQ}$, is read "vector PQ." The ***initial*** (starting) point of the vector is point P. The ***terminal*** (ending) point of the vector is point Q. (Yes, it is kind of like a ray in geometry.)

The symbol, $\overrightarrow{QP}$, means the vector from point Q to point P.

$\overrightarrow{PQ}$ and $\overrightarrow{QP}$ are NOT the same vector!

In the figure at the right, $\overrightarrow{AB}$ is in ***standard form*** because its initial point, A, is at the origin.

$\overrightarrow{CD}$, $\overrightarrow{FE}$ and $\overrightarrow{PQ}$ are NOT in standard form because their initial points, C, F and P, are NOT at the origin.

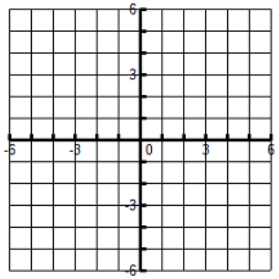


1. Using the axes to the right:
   a) Plot and label A: (0, 0) and B: (4, 2).
   b) Draw $\overrightarrow{AB}$.
   c) Drop a segment from point B that is perpendicular to the x-axis. Call the point where the segment intersects the x-axis, C.
   d) Find the length of $\overline{AC}$. We will call this the length of the ***horizontal component*** of $\overrightarrow{AB}$.
   e) Find the length of $\overline{BC}$. We will call this the length of the ***vertical component*** of $\overrightarrow{AB}$.
   f) Find the length of $\overline{AB}$. We will call this length the ***magnitude*** of $\overrightarrow{AB}$. The symbol for the magnitude of vector AB is $\left|\overrightarrow{AB}\right|$. Yes, it does look like the absolute value symbol. But here it means magnitude, or length, of $\overrightarrow{AB}$.
   g) Find the measure of $\angle BAC$. This is called the ***direction*** of $\overrightarrow{AB}$.
   h) Using a protractor, check that the measure that you found using trig in part g, is close to the measure using a protractor. Pretty cool, huh?

2. The answers to the first exercise are listed here:

D) 4 E) 2 F) $\sqrt{20} \doteq 4.4721$ G) $m\angle BAC = \tan^{-1}\left(\frac{2}{4}\right) \doteq 26°34'$

3. Using the axes at the right, plot and label C: (0, 0) D: (2, 5).
   a) Draw $\overrightarrow{CD}$.
   b) What is the length of the ***horizontal component*** of $\overrightarrow{CD}$?
   c) What is the length of the ***vertical component*** of $\overrightarrow{CD}$?
   d) What is the length of the ***magnitude*** of $\overrightarrow{CD}$, that is $\left|\overrightarrow{CD}\right| = ?$
   e) What is the measure of the ***direction*** of $\overrightarrow{CD}$?



4. Vectors are **equal** if they have the **same magnitude and direction**.

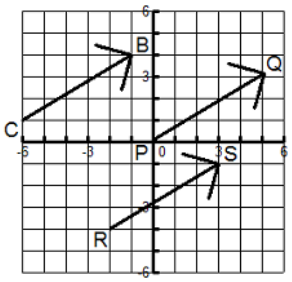
Vectors $\overrightarrow{PQ}$, $\overrightarrow{CB}$, $\overrightarrow{RS}$ are equal because they have the same magnitude (length), $\sqrt{34}$, and they have the same direction (in this case the 3 vectors are parallel and that means they have the same slope, too).

What is the slope of each of the 3 vectors? m = _____

Vector $\overrightarrow{PQ}$ is in standard form because its vertex is at the origin.

Vectors $\overrightarrow{CB}$ *and* $\overrightarrow{RS}$ are not in standard form. Can you think of a way to "move" a vector so that it is in standard form, and still have the same magnitude and direction?
We are confident that you can. Please proceed.

By the way, the common slope for each of the vectors is $\frac{3}{5}$. ☺



5. Vector $\overrightarrow{GH}$ is not in standard form. G: $(-6,-4)$ H: $(-1,-2)$

On the grid to the right, draw vector $\overrightarrow{AB}$ so that it is equal to vector $\overrightarrow{GH}$, but vector $\overrightarrow{AB}$ must be in standard position, that is, point A must be at the origin.

What is the horizontal component of vector $\overrightarrow{AB}$?_____

What is the vertical component of vector $\overrightarrow{AB}$?_____

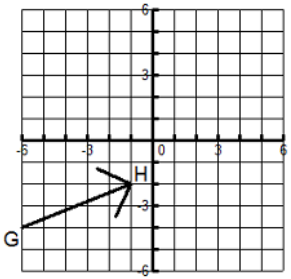
On your paper, calculate the exact magnitude and direction of vector

$\overrightarrow{AB}$:_____

What is the exact magnitude and direction of vector

$\overrightarrow{GH}$?_____

Answers: magnitude = $\left|\overrightarrow{AB}\right| = \sqrt{29} \doteq 5.3852$; direction = 21°48'.

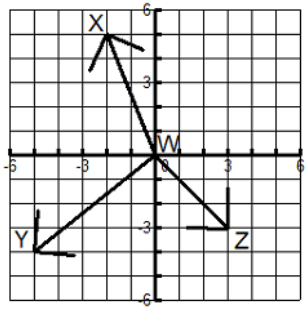


6. In the figure to the right, vectors $\overrightarrow{WX}$, $\overrightarrow{WY}$, *and* $\overrightarrow{WZ}$ are in standard position. Since vector $\overrightarrow{WX}$ is in the second quadrant, its direction needs to be an angle in the second quadrant.
Right now, on your paper, do the following:

a) calculate the magnitude and direction for vector $\overrightarrow{WX}$. We are going to tell you the answers, but you must have the supporting work on your paper.

Magnitude of vector $\overrightarrow{WX}$: exact $\left|\overrightarrow{WX}\right| = \sqrt{29} \doteq 5.3852$

Direction of vector $\overrightarrow{WX}$: $111°48'$ *or* $-248°12'$ (both are correct).



b) on your paper, calculate the magnitude and direction for $\overrightarrow{WY}$.
We will check to see if you are correct tomorrow, but we are confident that you can handle this pretty well.

c) on your paper, calculate the magnitude and direction for vector $\overrightarrow{WZ}$.
We will check to see if you are correct tomorrow, but we are confident that you can handle this pretty well, too.