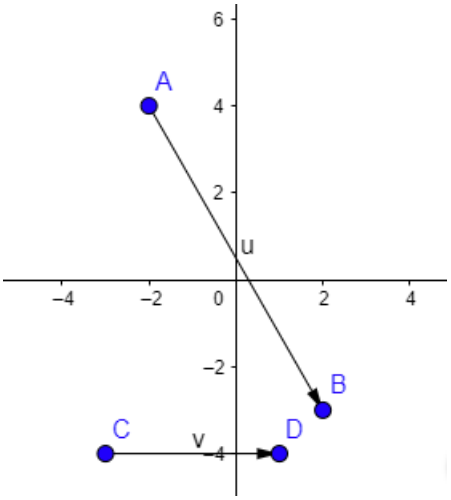
Date Completed: _____
Mentor Initials: _____

Vectors

1. The component forms of vectors **u** and **v** are given by **u** = $\langle 4, -7 \rangle$ and **v** = $\langle 1, -5 \rangle$**.** Given that $3\boldsymbol{u} + (-4\boldsymbol{v}) + \boldsymbol{w} = 0$, what is the component form of **w**?

A. $\langle -6, 10 \rangle$
B. $\langle 3, -2 \rangle$
C. $\langle 5, 0 \rangle$
D. $\langle -8, 1 \rangle$
E. $\langle 4, 6 \rangle$

2. Vectors $\overrightarrow{AB}$ and $\overrightarrow{CD}$ are shown in the standard (x, y) coordinate plane below. One of the following is the unit vector notation of the vector $\overrightarrow{AB} + \overrightarrow{CD}$. Which one?



A. $8\mathbf{i} - 7\mathbf{j}$
B. $-8\mathbf{i} + 5\mathbf{j}$
C. $4\mathbf{i} - 3\mathbf{j}$
D. $-8\mathbf{i} + 7\mathbf{j}$
E. $-4\mathbf{i} + 3\mathbf{j}$

3. When the vector $a\boldsymbol{i} + 6\boldsymbol{j}$ is added to the vector $-4\boldsymbol{i} + b\boldsymbol{j}$, the sum is $7\boldsymbol{i} - 4\boldsymbol{j}$. What are the values of a and b?

A. $a = -8$ and $b = 4$
B. $a = -7$ and $b = 3$
C. $a = -3$ and $b = 7$
D. $a = 11$ and $b = -10$
E. $a = 8$ and $b = -4$

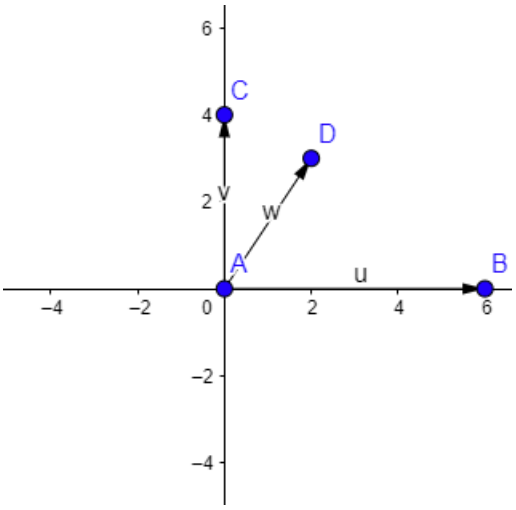
4. The vector **i** represents 1 mile per hour east, and the vector **j** represents 1 mile per hour north. According to her GPS, at a particular instant, Micah is biking 60° west of north at 12 miles per hour. One of the following vectors represents Micah's velocity, in miles per hour, at that instant. Which one?

A. $6\mathbf{i} - 6\sqrt{3}\mathbf{j}$
B. $6\mathbf{i} + 6\sqrt{3}\mathbf{j}$
C. $-6\mathbf{i} + 6\sqrt{3}\mathbf{j}$
D. $-6\sqrt{3}\mathbf{i} + 6\mathbf{j}$
E. $6\sqrt{3}\mathbf{i} + 6\mathbf{j}$

5. Given that **u** and **v** are vectors such that **u** = $\langle -2,4 \rangle$ and **v** = $\langle 5,2 \rangle$, what is the component form of the vector $\boldsymbol{u} + \boldsymbol{v}$ **?**

A. $\langle\ 2,\ 7 \rangle$
B. $\langle\ 7,\ 6 \rangle$
C. $\langle\ 3,\ 6 \rangle$
D. $\langle -8,10 \rangle$
E. $\langle -10,8 \rangle$

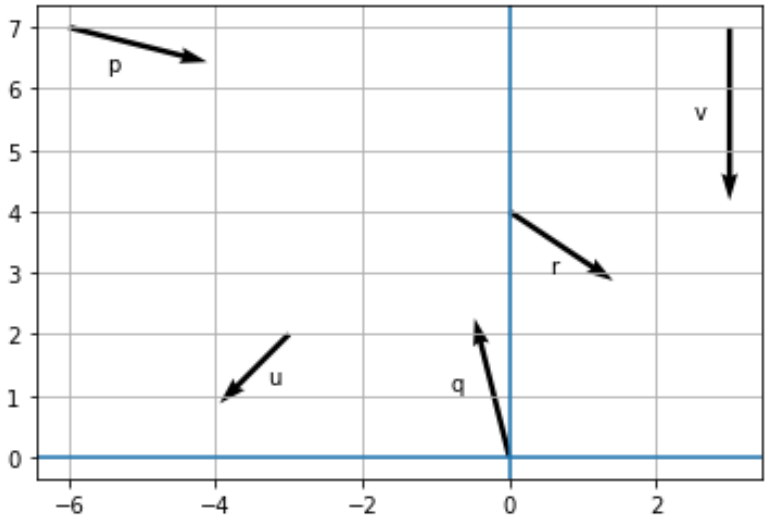
6. The vectors **u**, **v**, and **w** are represented in the standard (x, y) coordinate plane below.



In what general direction will the vector **u** + **v** – **w** point?

A. Up and to the left
B. Up and to the right
C. Down and to the left
D. Down and to the right
E. To the right but neither up nor down

7. Representatives of vectors **u, v, p, q,** and **r** are shown in the standard (x, y) coordinate plane below.



One of the following vectors is equal to the vector **q** + **r**. Which one?

A. **v**
B. $-$**u**
C. $-$**p**
D. **p**
E. **u**