1. **Question Details**

Determine which of the following are scalars, which are points, and which are vectors.

- a. 5  
  - Scalar [ ]  
  - Point [ ]  
  - Vector [ ]

- b. (1, -2)  
  - Scalar [ ]  
  - Point [ ]  
  - Vector [ ]

- c. -107  
  - Scalar [ ]  
  - Point [ ]  
  - Vector [ ]

- d. (1, -2)  
  - Scalar [ ]  
  - Point [ ]  
  - Vector [ ]

- e. k  
  - Scalar [ ]  
  - Point [ ]  
  - Vector [ ]

- f. (x₀, y₀)  
  - Scalar [ ]  
  - Point [ ]  
  - Vector [ ]

- g. (a, b)  
  - Scalar [ ]  
  - Point [ ]  
  - Vector [ ]
Use the diagram above to answer the following questions:

How many labeled points are shown?
1 2 3 4

How many labeled vectors are shown?
1 2 3 4

The point at the origin (0,0) is labeled:
P Q O R

The vector from Q to R is labeled:
P Q \vec{v} \vec{w}
Use the diagram above to answer the following questions:

The initial point (tail) of the vector \( \vec{v} \) is labeled:
- \( P \)
- \( Q \)
- \( O \)
- \( R \)

The terminal point (head) of the vector \( \vec{v} \) is labeled:
- \( P \)
- \( Q \)
- \( O \)
- \( R \)

The initial point (tail) of the vector \( \vec{w} \) is labeled:
- \( P \)
- \( Q \)
- \( O \)
- \( R \)

The terminal point (head) of the vector \( \vec{w} \) is labeled:
- \( P \)
- \( Q \)
- \( O \)
- \( R \)

4. Question Details

Compute the component form of the following vectors.

**Note:** You must use angle brackets for your answers. You can find them in the calcPad under Vectors.

The vector from the point \( P = (1,1) \) to the point \( Q = (3,4) \)
\[ \vec{PQ} = \]

The vector from the point \( Q = (3,4) \) to the point \( P = (1,1) \)
\[ \vec{QP} = \]

The vector with initial point \( R = (1.5,1) \) and terminal point \( S = (0.25,2) \)
\[ \vec{RS} = \]

The vector \( \vec{r} \) that starts at the origin \( O = (0,0) \) and ends at the point \( P = (a,b) \)
\[ \vec{r} = \]
5. Question Details

Suppose a vector \( \mathbf{v} \) has component form \( \mathbf{v} = (3,-1) \) and initial point \( P = (-5,-2) \). What is the terminal point \( Q \) of \( \mathbf{v} \)?

\[ Q = \]

6. Question Details

Find the position vector for each of the following points. (Remember to include angle brackets!)

\[ P = (1,-3) \]
\[ \mathbf{r} = \]

\[ Q = (0,6) \]
\[ \mathbf{r} = \]

\[ R = (-11.07,126) \]
\[ \mathbf{r} = \]
Use the diagram above to match the position vector $\mathbf{r}$ with the appropriate point.

$\mathbf{r} = (3,2)$ is the position vector for:

- $\bigcirc P$ $\bigcirc Q$ $\bigcirc R$ $\bigcirc S$

$\mathbf{r} = (-3,-1)$ is the position vector for:

- $\bigcirc P$ $\bigcirc Q$ $\bigcirc R$ $\bigcirc S$

$\mathbf{r} = \left(\frac{1}{2},-2\right)$ is the position vector for:

- $\bigcirc P$ $\bigcirc Q$ $\bigcirc R$ $\bigcirc S$

$\mathbf{r} = (-1,3)$ is the position vector for:

- $\bigcirc P$ $\bigcirc Q$ $\bigcirc R$ $\bigcirc S$
The vector $\vec{r}$ gives the position of what point $P$? (Remember parentheses!)

$$P = \text{[ ]}$$

Compute the magnitude of each vector. Give exact answers. Use square root symbols as needed.

$$\vec{v} = (2,3):$$

$$|\vec{v}| = \text{[ ]}$$

$$\vec{v} = (-2,-3):$$

$$|\vec{v}| = \text{[ ]}$$

$$\vec{r} = (a,b):$$

$$|\vec{r}| = \text{[ ]}$$

$\overrightarrow{PQ}$ with $P = (1,6)$ and $Q = (4,-5):$

$$|\overrightarrow{PQ}| = \text{[ ]}$$

$$\vec{w} = (5,0):$$

$$|\vec{w}| = \text{[ ]}$$

$$\vec{w} = (0,3):$$

$$|\vec{w}| = \text{[ ]}$$
Download and complete Worksheet #1. If you are working in class, get a copy from your instructor. After you complete the worksheet, answer the following questions. The third and fourth questions need exact values rather than decimal approximations.

What is the terminal point of the vector \( \vec{v}_1 \)?

What is the terminal point of the vector \( \vec{v}_2 \)?

What is the terminal point of the unit vector \( \vec{u}_1 \)?

What is the component form of the unit vector \( \vec{u}_2 \)?

Find the value of \( a \) so that the vector \( \vec{u} = \left< a, \frac{4}{5} \right> \) is a unit vector in the first quadrant.

\[ a = \]
Use the diagram above to answer the following questions. Each question may have more than one correct answer. (Select all that apply.)

Which of the vector(s) have the same magnitude as \( \vec{v}_1 \)?
- \( \vec{v}_1 \)  
- \( \vec{v}_2 \)  
- \( \vec{v}_3 \)  
- \( \vec{v}_4 \)  
- \( \vec{v}_5 \)  
- \( \vec{v}_6 \)  
- None

Which of the vector(s) have the same direction as \( \vec{v}_1 \)?
- \( \vec{v}_1 \)  
- \( \vec{v}_2 \)  
- \( \vec{v}_3 \)  
- \( \vec{v}_4 \)  
- \( \vec{v}_5 \)  
- \( \vec{v}_6 \)  
- None

Which of the vector(s) have opposite direction as \( \vec{v}_1 \)?
- \( \vec{v}_1 \)  
- \( \vec{v}_2 \)  
- \( \vec{v}_3 \)  
- \( \vec{v}_4 \)  
- \( \vec{v}_5 \)  
- \( \vec{v}_6 \)  
- None

Which of the vector(s) have both the same magnitude and direction as \( \vec{v}_1 \)?
- \( \vec{v}_1 \)  
- \( \vec{v}_2 \)  
- \( \vec{v}_3 \)  
- \( \vec{v}_4 \)  
- \( \vec{v}_5 \)  
- \( \vec{v}_6 \)  
- None

From the following list, select the largest set of vectors that all have identical magnitude and direction.
- \( \vec{v}_1 \)  
- \( \vec{v}_2 \)  
- \( \vec{v}_3 \)  
- \( \vec{v}_4 \)  
- \( \vec{v}_5 \)  
- \( \vec{v}_6 \)  
- None
13. Question Details
chapter 13 question 1 MEV [3623974]

Peter moves his calculus book 5 meters.

a. How much has the book's position changed?  

b. Do you know in which direction the book was moved?  
   - YES  
   - NO

c. Is the distance that the book was moved by Peter a scalar or a vector?  
   - Scalar  
   - Vector

14. Question Details
chapter 13 question 2 MEV [3623976]

Peter moves his calculus book 5 meters from point A to point B.

a. In which direction has the calculus book been moved?  
   - Left  
   - Right

b. The calculus book has been moved a distance of

c. Is the displacement of the book a scalar or a vector?  
   - Scalar  
   - Vector
Mary walks from her house 3 blocks East and 4 blocks North to School. Note: Part d requires a response in radians, measured counterclockwise from the positive x-axis.

a. How many blocks did Mary walk? 

b. The vector $\mathbf{v}$ is the position vector for the school. $\mathbf{v} =$ 

c. The length of $\mathbf{v}$ is? 

d. The direction of $\mathbf{v}$ is? (Round to 4 decimal places)
Mary walks from her house 3 blocks East and 4 blocks North to School.

a. Does the following question ask for a scalar or a vector?
   "How far did Mary walk?"
   [ ] Scalar  [ ] Vector

b. Does the following question ask for a scalar or a vector?
   "Where did Mary end up?"
   [ ] Scalar  [ ] Vector

c. How many blocks did Mary walk?

   

d. Where did Mary end up?

   \[ \vec{v} = \]