

Topic: Vector from two points**Question:** Find the vector that connects the points.

$$\overrightarrow{ST}$$

$$S(1,5)$$

$$T(-1, -4)$$

Answer choices:

A $\langle -2, -9 \rangle$

B $\langle -2, 9 \rangle$

C $\langle 2, 9 \rangle$

D $\langle 2, -9 \rangle$



Solution: A

To find the vector that connects two points $A(x_A, y_A)$ and $B(x_B, y_B)$, use the formula

$$\overrightarrow{AB} = \langle x_B - x_A, y_B - y_A \rangle$$

or for points in three-dimensional space $A(x_A, y_A, z_A)$ and $B(x_B, y_B, z_B)$, use

$$\overrightarrow{AB} = \langle x_B - x_A, y_B - y_A, z_B - z_A \rangle$$

The important thing to remember here is that vectors indicate direction, so the vector \overrightarrow{AB} is the vector that starts at A and ends at B . Therefore A is called the “initial point” and B is called the “terminal point”. You want to make sure you’re subtracting values in the initial point from values in the terminal point. You can think about it as

$$\overrightarrow{AB} = B - A$$

$$\overrightarrow{AB} = \text{terminal} - \text{initial}$$

So the vector \overrightarrow{ST} , where S is $S(1, 5)$ and T is $T(-1, -4)$ is

$$\overrightarrow{ST} = \langle -1 - 1, -4 - 5 \rangle$$

$$\overrightarrow{ST} = \langle -2, -9 \rangle$$



Topic: Vector from two points**Question:** Find the vector that connects the points.

$$\overrightarrow{RQ}$$

$$Q(0, -1, 4)$$

$$R(4, 0, -9)$$

Answer choices:

A $\langle 4, 1, -13 \rangle$

B $\langle -4, -1, -5 \rangle$

C $\langle -4, -1, 13 \rangle$

D $\langle 4, 1, 5 \rangle$



Solution: C

To find the vector that connects two points $A(x_A, y_A)$ and $B(x_B, y_B)$, use the formula

$$\overrightarrow{AB} = \langle x_B - x_A, y_B - y_A \rangle$$

or for points in three-dimensional space $A(x_A, y_A, z_A)$ and $B(x_B, y_B, z_B)$, use

$$\overrightarrow{AB} = \langle x_B - x_A, y_B - y_A, z_B - z_A \rangle$$

The important thing to remember here is that vectors indicate direction, so the vector \overrightarrow{AB} is the vector that starts at A and ends at B . Therefore A is called the “initial point” and B is called the “terminal point”. You want to make sure you’re subtracting values in the initial point from values in the terminal point. You can think about it as

$$\overrightarrow{AB} = B - A$$

$$\overrightarrow{AB} = \text{terminal} - \text{initial}$$

So the vector \overrightarrow{RQ} , where R is $R(4, 0, -9)$ and Q is $Q(0, -1, 4)$ is

$$\overrightarrow{RQ} = \langle 0 - 4, -1 - 0, 4 - (-9) \rangle$$

$$\overrightarrow{RQ} = \langle -4, -1, 13 \rangle$$



Topic: Vector from two points**Question:** Find the vector that connects the points.

$$\overrightarrow{SR}$$

$$R(11, 6, -9)$$

$$S(-8, -9, -14)$$

Answer choices:

A $\langle 3, -3, -25 \rangle$

B $\langle 19, 15, 5 \rangle$

C $\langle -3, 3, 25 \rangle$

D $\langle -19, -15, -5 \rangle$



Solution: B

To find the vector that connects two points $A(x_A, y_A)$ and $B(x_B, y_B)$, use the formula

$$\overrightarrow{AB} = \langle x_B - x_A, y_B - y_A \rangle$$

or for points in three-dimensional space $A(x_A, y_A, z_A)$ and $B(x_B, y_B, z_B)$, use

$$\overrightarrow{AB} = \langle x_B - x_A, y_B - y_A, z_B - z_A \rangle$$

The important thing to remember here is that vectors indicate direction, so the vector \overrightarrow{AB} is the vector that starts at A and ends at B . Therefore A is called the “initial point” and B is called the “terminal point”. You want to make sure you’re subtracting values in the initial point from values in the terminal point. You can think about it as

$$\overrightarrow{AB} = B - A$$

$$\overrightarrow{AB} = \text{terminal} - \text{initial}$$

So the vector \overrightarrow{SR} , where S is $S(-8, -9, -14)$ and R is $R(11, 6, -9)$ is

$$\overrightarrow{SR} = \langle 11 - (-8), 6 - (-9), -9 - (-14) \rangle$$

$$\overrightarrow{SR} = \langle 19, 15, 5 \rangle$$

