

## Three Dimensional Vector Basics

**Write each vector in component form.**

1)  $\overrightarrow{CD}$  where  $C = (2, -3, 3)$   $D = (-7, 1, 2)$

2)  $\overrightarrow{AB}$  where  $A = (0, -2, -1)$   $B = (-2, -3, 7)$

**Write each vector as a linear combination.**

3)  $\overrightarrow{RS}$  where  $R = (-4, 9, -9)$   $S = (7, 9, 8)$

4)  $\overrightarrow{CD}$  where  $C = (1, -8, -7)$   $D = (1, 1, 0)$

**Find the magnitude of each vector.**

5)  $\vec{v} = 2\vec{i} + 7\vec{j} + 5\vec{k}$

6)  $\overrightarrow{RS}$  where  $R = (6, 5, -8)$   $S = (1, 3, -9)$

7)  $\vec{u} = \langle -4, -6, 9 \rangle$

8)  $\vec{u} = -7\vec{i} - \vec{j} - \vec{k}$

**Critical thinking questions:**

9) Find the head and tail points for  $\overrightarrow{AB} = \langle 8, -1, 2 \rangle$  that starts in octant VI and ends in octant V.

10) What are the possible integer  $x$ ,  $y$ , and  $z$  components of a three-dimensional vector with a magnitude of 6?

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Write each vector in component form.

1)  $\overrightarrow{CD}$  where  $C = (2, -3, 3)$   $D = (-7, 1, 2)$

$\langle -9, 4, -1 \rangle$

2)  $\overrightarrow{AB}$  where  $A = (0, -2, -1)$   $B = (-2, -3, 7)$

$\langle -2, -1, 8 \rangle$

Write each vector as a linear combination.

3)  $\overrightarrow{RS}$  where  $R = (-4, 9, -9)$   $S = (7, 9, 8)$

$11\vec{i} + 17\vec{k}$

4)  $\overrightarrow{CD}$  where  $C = (1, -8, -7)$   $D = (1, 1, 0)$

$9\vec{j} + 7\vec{k}$

Find the magnitude of each vector.

5)  $\vec{v} = 2\vec{i} + 7\vec{j} + 5\vec{k}$

$\sqrt{78} \approx 8.832$

6)  $\overrightarrow{RS}$  where  $R = (6, 5, -8)$   $S = (1, 3, -9)$

$\sqrt{30} \approx 5.477$

7)  $\vec{u} = \langle -4, -6, 9 \rangle$

$\sqrt{133} \approx 11.533$

8)  $\vec{u} = -7\vec{i} - \vec{j} - \vec{k}$

$\sqrt{51} \approx 7.141$

Critical thinking questions:

9) Find the head and tail points for  $\overrightarrow{AB} = \langle 8, -1, 2 \rangle$  that starts in octant VI and ends in octant V.

Multiple Answers:

$A = (-7, 6, -4)$   $B = (1, 5, -2)$

10) What are the possible integer  $x$ ,  $y$ , and  $z$  components of a three-dimensional vector with a magnitude of 6?

$x = \pm 4, y = \pm 4, z = \pm 2$

$x = \pm 4, y = \pm 2, z = \pm 4$

$x = \pm 2, y = \pm 4, z = \pm 4$

$x = \pm 6, y = 0, z = 0$

$x = 0, y = \pm 6, z = 0$

$x = 0, y = 0, z = \pm 6$