**Write vector equations of lines****1**

Write the vector form of the line through the two points.

$$A (-4, -4, 4) \quad B (1, -4, 1)$$

A

$$\vec{r} = \begin{pmatrix} -4 \\ -4 \\ 4 \end{pmatrix} + t \begin{pmatrix} -3 \\ -8 \\ 5 \end{pmatrix}$$

B

$$\vec{r} = \begin{pmatrix} -4 \\ -4 \\ 4 \end{pmatrix} + t \begin{pmatrix} 1 \\ -4 \\ 1 \end{pmatrix}$$

C

$$\vec{r} = \begin{pmatrix} -4 \\ -4 \\ 4 \end{pmatrix} + t \begin{pmatrix} 5 \\ 0 \\ -3 \end{pmatrix}$$

D

$$\vec{r} = \begin{pmatrix} -3 \\ -8 \\ 5 \end{pmatrix} + t \begin{pmatrix} 5 \\ 0 \\ -3 \end{pmatrix}$$

2

Write the vector form of the line through the point with the given direction vector.

$$\text{Point } (1, 2, 2) \quad \text{Direction } \begin{pmatrix} 2 \\ 0 \\ -4 \end{pmatrix}$$

A

$$\vec{r} = \begin{pmatrix} 1 \\ 2 \\ 2 \end{pmatrix} + t \begin{pmatrix} 2 \\ 0 \\ -4 \end{pmatrix}$$

B

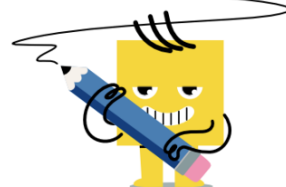
$$\vec{r} = \begin{pmatrix} 3 \\ 2 \\ -2 \end{pmatrix} + t \begin{pmatrix} 2 \\ 0 \\ -4 \end{pmatrix}$$

C

$$\vec{r} = \begin{pmatrix} 2 \\ 0 \\ -4 \end{pmatrix} + t \begin{pmatrix} 1 \\ 2 \\ 2 \end{pmatrix}$$

D

$$\vec{r} = \begin{pmatrix} 1 \\ 2 \\ 2 \end{pmatrix} + t \begin{pmatrix} -2 \\ 0 \\ 4 \end{pmatrix}$$

**Write vector equations of lines****3**

Find the vector equation of the normal line to the plane that passes through the external point.

$$+y - z = -4 \quad \text{External point } (-3, 4, 6)$$

A

$$\vec{r} = \begin{pmatrix} -3 \\ 4 \\ 6 \end{pmatrix} + t \begin{pmatrix} -3 \\ 4 \\ 6 \end{pmatrix}$$

B

$$\vec{r} = \begin{pmatrix} 0 \\ 1 \\ -1 \end{pmatrix} + t \begin{pmatrix} -3 \\ 4 \\ 6 \end{pmatrix}$$

C

$$\vec{r} = \begin{pmatrix} -3 \\ 4 \\ 6 \end{pmatrix} + t \begin{pmatrix} 0 \\ 1 \\ -1 \end{pmatrix}$$

D

$$\vec{r} = \begin{pmatrix} -3 \\ 4 \\ 6 \end{pmatrix} + t \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$$

4

Find the vector equation of the normal line to the plane through the given point.

$$2x + z = 5 \quad \text{Point on plane } (-2, 3, 9)$$

A

$$\vec{r} = \begin{pmatrix} -2 \\ 3 \\ 9 \end{pmatrix} + t \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}$$

B

$$\vec{r} = \begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix} + t \begin{pmatrix} -2 \\ 3 \\ 9 \end{pmatrix}$$

C

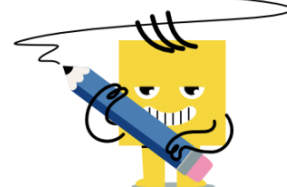
$$\vec{r} = \begin{pmatrix} -2 \\ 3 \\ 9 \end{pmatrix} + t \begin{pmatrix} -2 \\ 3 \\ 9 \end{pmatrix}$$

D

$$\vec{r} = \begin{pmatrix} -2 \\ 3 \\ 9 \end{pmatrix} + t \begin{pmatrix} -2 \\ 0 \\ 1 \end{pmatrix}$$

E

$$\vec{r} = \begin{pmatrix} -2 \\ 3 \\ 9 \end{pmatrix} + t \begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix}$$

**Write vector equations of lines****5**

Write the vector form of the line through the two points.

A (4, -2, 2) B (1, -4, 1)

A

$$\vec{r} = \begin{pmatrix} 5 \\ -6 \\ 3 \end{pmatrix} + t \begin{pmatrix} -3 \\ -2 \\ -1 \end{pmatrix}$$

B

$$\vec{r} = \begin{pmatrix} 4 \\ -2 \\ 2 \end{pmatrix} + t \begin{pmatrix} -3 \\ -2 \\ -1 \end{pmatrix}$$

C

$$\vec{r} = \begin{pmatrix} 4 \\ -2 \\ 2 \end{pmatrix} + t \begin{pmatrix} 1 \\ -4 \\ 1 \end{pmatrix}$$

D

$$\vec{r} = \begin{pmatrix} 4 \\ -2 \\ 2 \end{pmatrix} + t \begin{pmatrix} 5 \\ -6 \\ 3 \end{pmatrix}$$

6

Write the vector form of the line through the point with the given direction vector.

Point (2, 1, -4) Direction $\begin{pmatrix} 2 \\ -2 \\ -1 \end{pmatrix}$

A

$$\vec{r} = \begin{pmatrix} 4 \\ -1 \\ -5 \end{pmatrix} + t \begin{pmatrix} 2 \\ -2 \\ -1 \end{pmatrix}$$

B

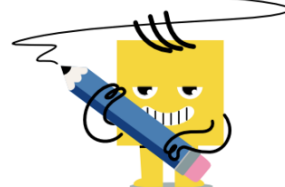
$$\vec{r} = \begin{pmatrix} 2 \\ -2 \\ -1 \end{pmatrix} + t \begin{pmatrix} 2 \\ 1 \\ -4 \end{pmatrix}$$

C

$$\vec{r} = \begin{pmatrix} 2 \\ 1 \\ -4 \end{pmatrix} + t \begin{pmatrix} 2 \\ -2 \\ -1 \end{pmatrix}$$

D

$$\vec{r} = \begin{pmatrix} 2 \\ 1 \\ -4 \end{pmatrix} + t \begin{pmatrix} -2 \\ 2 \\ 1 \end{pmatrix}$$

**Write vector equations of lines****7**

Find the vector equation of the normal line to the plane that passes through the external point.

$$-2x + 2y - 3z = -1 \quad \text{External point } (4, -3, -5)$$

A

$$\vec{r} = \begin{pmatrix} 4 \\ -3 \\ -5 \end{pmatrix} + t \begin{pmatrix} 4 \\ -3 \\ -5 \end{pmatrix}$$

B

$$\vec{r} = \begin{pmatrix} -2 \\ 2 \\ -3 \end{pmatrix} + t \begin{pmatrix} 4 \\ -3 \\ -5 \end{pmatrix}$$

C

$$\vec{r} = \begin{pmatrix} 4 \\ -3 \\ -5 \end{pmatrix} + t \begin{pmatrix} -2 \\ 2 \\ -3 \end{pmatrix}$$

D

$$\vec{r} = \begin{pmatrix} 4 \\ -3 \\ -5 \end{pmatrix} + t \begin{pmatrix} 3 \\ 0 \\ -2 \end{pmatrix}$$

E

$$\vec{r} = \begin{pmatrix} 4 \\ -3 \\ -5 \end{pmatrix} + t \begin{pmatrix} 2 \\ 2 \\ -3 \end{pmatrix}$$

8

Find the vector equation of the normal line to the plane through the given point.

$$-4x + y + 4z = 2 \quad \text{Point on plane } (-3, 2, -3)$$

A

$$\vec{r} = \begin{pmatrix} -4 \\ 1 \\ 4 \end{pmatrix} + t \begin{pmatrix} -3 \\ 2 \\ -3 \end{pmatrix}$$

B

$$\vec{r} = \begin{pmatrix} -3 \\ 2 \\ -3 \end{pmatrix} + t \begin{pmatrix} 4 \\ 1 \\ 4 \end{pmatrix}$$

C

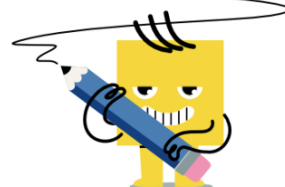
$$\vec{r} = \begin{pmatrix} -3 \\ 2 \\ -3 \end{pmatrix} + t \begin{pmatrix} -3 \\ 2 \\ -3 \end{pmatrix}$$

D

$$\vec{r} = \begin{pmatrix} -3 \\ 2 \\ -3 \end{pmatrix} + t \begin{pmatrix} -1 \\ 0 \\ -1 \end{pmatrix}$$

E

$$\vec{r} = \begin{pmatrix} -3 \\ 2 \\ -3 \end{pmatrix} + t \begin{pmatrix} -4 \\ 1 \\ 4 \end{pmatrix}$$

**Write vector equations of lines****9**

Write the vector form of the line through the two points.

$$A (3, 3, -3) \quad B (-2, 2, -3)$$

A

$$\vec{r} = \begin{pmatrix} 3 \\ 3 \\ -3 \end{pmatrix} + t \begin{pmatrix} 1 \\ 5 \\ -6 \end{pmatrix}$$

B

$$\vec{r} = \begin{pmatrix} 3 \\ 3 \\ -3 \end{pmatrix} + t \begin{pmatrix} -2 \\ 2 \\ -3 \end{pmatrix}$$

C

$$\vec{r} = \begin{pmatrix} 1 \\ 5 \\ -6 \end{pmatrix} + t \begin{pmatrix} -5 \\ -1 \\ 0 \end{pmatrix}$$

D

$$\vec{r} = \begin{pmatrix} 3 \\ 3 \\ -3 \end{pmatrix} + t \begin{pmatrix} -5 \\ -1 \\ 0 \end{pmatrix}$$

10

Write the vector form of the line through the point with the given direction vector.

$$\text{Point } (3, 3, 2) \quad \text{Direction } \begin{pmatrix} 3 \\ 3 \\ 4 \end{pmatrix}$$

A

$$\vec{r} = \begin{pmatrix} 6 \\ 6 \\ 6 \end{pmatrix} + t \begin{pmatrix} 3 \\ 3 \\ 4 \end{pmatrix}$$

B

$$\vec{r} = \begin{pmatrix} 3 \\ 3 \\ 2 \end{pmatrix} + t \begin{pmatrix} 3 \\ 3 \\ 4 \end{pmatrix}$$

C

$$\vec{r} = \begin{pmatrix} 3 \\ 3 \\ 2 \end{pmatrix} + t \begin{pmatrix} -3 \\ -3 \\ -4 \end{pmatrix}$$

D

$$\vec{r} = \begin{pmatrix} 3 \\ 3 \\ 4 \end{pmatrix} + t \begin{pmatrix} 3 \\ 3 \\ 2 \end{pmatrix}$$