

**Determine intersections of two planes**

- 1** How many solutions does this system of linear equations have?



A Infinitely many solutions B One solution C Zero solutions

- 2** Does the given point lie on the plane?
 $x + 2y - 3z = 5$ Point $(0, -2, -3)$

A

No

B

Yes

- 3** Given the normal vectors of two planes, are the planes parallel or coincident?

$$\vec{n}_1 = \begin{pmatrix} -1 \\ -4 \\ -4 \end{pmatrix} \quad \vec{n}_2 = \begin{pmatrix} 1 \\ 2 \\ 2 \end{pmatrix}$$

A Neither

B Parallel or coincident

- 4** Find the point of intersection of the two lines.

$$\vec{r} = \begin{pmatrix} -1 \\ -4 \\ 3 \end{pmatrix} + t \begin{pmatrix} -3 \\ -2 \\ -2 \end{pmatrix}$$
$$\vec{r} = \begin{pmatrix} 2 \\ -4 \\ 5 \end{pmatrix} + t \begin{pmatrix} 3 \\ 0 \\ 2 \end{pmatrix}$$

A $(-2, -7, 7)$ B $(-1, -4, 3)$ C $(-4, -6, 1)$ D $(-1, -4, 3)$

- 5** Find the direction vector of the line of intersection.

$$\begin{aligned} -2x - y + 3z &= 1 \\ -3x - 4y - 3z &= -4 \end{aligned}$$

A

$$\begin{pmatrix} -1 \\ -1 \\ 0 \end{pmatrix}$$

B

$$\begin{pmatrix} 1 \\ 3 \\ 6 \end{pmatrix}$$

C

$$\begin{pmatrix} -3 \\ -3 \\ 1 \end{pmatrix}$$

D

$$\begin{pmatrix} 3 \\ -3 \\ 1 \end{pmatrix}$$

**Determine intersections of two planes****6**

Write the vector equation of the line of intersection.

$$-x + 3y - z = 0$$

$$2x + y = 6$$

A

$$\vec{r} = \begin{pmatrix} 2 \\ 2 \\ 4 \end{pmatrix} + t \begin{pmatrix} 1 \\ -2 \\ -7 \end{pmatrix}$$

B

$$\vec{r} = \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix} + t \begin{pmatrix} 1 \\ -2 \\ -7 \end{pmatrix}$$

7

Write the vector equation of the line of intersection.

$$x + 3y + z = -6$$

$$-x - y - z = 2$$

A

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

B

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

**Determine intersections of two planes****8**

Write the vector equation of the line of intersection.

$$-x + 3y + 4z = -22$$

$$x - 4y + z = 10$$

A

$$\vec{r} = \begin{pmatrix} 1 \\ -3 \\ -3 \end{pmatrix} + t \begin{pmatrix} 19 \\ 5 \\ 1 \end{pmatrix}$$

B

$$\vec{r} = \begin{pmatrix} -3 \\ 1 \\ -5 \end{pmatrix} + t \begin{pmatrix} 19 \\ 5 \\ 1 \end{pmatrix}$$

9

Write the vector equation of the line of intersection.

$$-x - y - 2z = 9$$

$$x - 4y = 0$$

A

$$\vec{r} = \begin{pmatrix} -4 \\ -1 \\ -2 \end{pmatrix} + t \begin{pmatrix} 0 \\ -5 \\ -2 \end{pmatrix}$$

B

$$\vec{r} = \begin{pmatrix} -4 \\ -1 \\ -2 \end{pmatrix} + t \begin{pmatrix} -8 \\ -2 \\ 5 \end{pmatrix}$$

**Determine intersections of two planes****10**

Write the vector equation of the line of intersection.

$$-4x - 4y - 3z = -16$$

$$-x - 4y + 3z = -16$$

A

$$\vec{r} = \begin{pmatrix} -3 \\ 5 \\ -1 \end{pmatrix} + t \begin{pmatrix} -8 \\ 5 \\ 4 \end{pmatrix}$$

B

$$\vec{r} = \begin{pmatrix} 0 \\ 4 \\ 0 \end{pmatrix} + t \begin{pmatrix} -8 \\ 5 \\ 4 \end{pmatrix}$$

11

Write the vector equation of the line of intersection.

$$-2x - y - 4z = 22$$

$$x - 3y - 2z = -2$$

A

$$\vec{r} = \begin{pmatrix} -4 \\ 2 \\ -4 \end{pmatrix} + t \begin{pmatrix} -1 \\ -4 \\ -6 \end{pmatrix}$$

B

$$\vec{r} = \begin{pmatrix} -4 \\ 2 \\ -4 \end{pmatrix} + t \begin{pmatrix} -10 \\ -8 \\ 7 \end{pmatrix}$$