

Write scalar equations of planes

- 1** State the normal vector of the plane.

$$-4x + y - 2z = 8$$

A

$$\begin{pmatrix} -4 \\ 1 \\ -2 \end{pmatrix}$$

B

$$\begin{pmatrix} -4 \\ 1 \\ 8 \end{pmatrix}$$

C

$$\begin{pmatrix} 4 \\ -1 \\ 2 \end{pmatrix}$$

D

$$\begin{pmatrix} -2 \\ -4 \\ 1 \end{pmatrix}$$

- 2** Write a possible scalar equation of a plane with the given normal vector.

$$\vec{n} = \begin{pmatrix} 3 \\ -4 \\ 3 \end{pmatrix}$$

A

$$3x - 4y + 3z = 5$$

B

$$-3x + 4y - 3z = 5$$

C

$$3x + 3y - 4z = 5$$

D

$$4x - 5y + 3z = 5$$

- 3** Does the given point lie on the plane?
 $-4y - 3z = 1$ Point $(-1, -4, 5)$

A

Yes

B

No

- 4** Write the plane in point-normal form.

Point $(-2, 4, -1)$ Normal $\begin{pmatrix} 1 \\ 4 \\ 3 \end{pmatrix}$

A $(x + 2) + 4(y - 4) + 3(z + 1) = 0$

B $(x - 2) + 4(y + 4) + 3(z - 1) = 0$

C $-(x + 2) - 4(y - 4) - 3(z + 1) = 0$

- 5** Find the scalar equation of the plane through the point, parallel to the given plane.
Point $(-4, 4, 0)$ Parallel plane $-3x + 3y + 2z = 3$

A $-3x + 3y + 2z = 26$

B $-3x + 3y + 2z = 24$

C $3x - 3y - 2z = 24$

D $2x - 3y + 3z = 24$

- 6** Find the scalar equation of the plane through the three points.

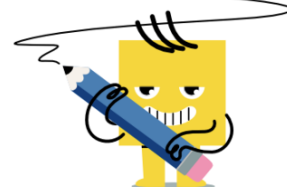
A $(1, -1, 4)$ B $(2, -2, 0)$ C $(1, 4, -3)$

A $-27x - 7y - 5z = 40$

B $27x + 7y + 5z = 44$

C $5x + 27y + 7z = 40$

D $27x + 7y + 5z = 40$



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Find the scalar equation of the plane.

Point $(-2, 2, -2)$ Normal $\begin{pmatrix} -1 \\ 4 \\ 3 \end{pmatrix}$

A

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

B

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

C

$$-x + 4y + 3z = 5$$

D

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

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Find the scalar equation of the plane through the point, perpendicular to the given line.

Point $(0, 3, 3)$ Perpendicular line $\vec{r} = \begin{pmatrix} 3 \\ 3 \\ -1 \end{pmatrix} + t \begin{pmatrix} 4 \\ 3 \\ -1 \end{pmatrix}$

A

$$-4x - 3y + z = 6$$

B

$$-x + 4y + 3z = 6$$

C

$$4x + 3y - z = 6$$

D

$$4x + 3y - z = 8$$

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Find the scalar equation of the plane containing both lines.

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

A $-5x - 6y + 13z = 2$

B $-6x + 13y - 5z = 2$

C $6x - 13y + 5z = 2$

D $-6x + 13y - 5z = 3$

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Find the scalar equation of the plane containing the point and the line.

Point $(1, -4, 1)$ Line $\vec{r} = \begin{pmatrix} -2 \\ -4 \\ -2 \end{pmatrix} + t \begin{pmatrix} 3 \\ -1 \\ -3 \end{pmatrix}$

A

$$-x - 6y + z = 27$$

B

$$x + 6y - z = 24$$

C

$$-x - 6y + z = 24$$

D

$$x - y - 6z = 24$$