



Lines and Planes

- 1** The line is parallel to the plane. Find the distance between them (to 2 decimal places).

A 0.69	B 1.04	C 0.34
D 0.32	E 0.06	

- 2** Find the shortest distance from the external point to the plane (to 2 decimal places).
 $x - 2y - 4z = -3$ External point $(-1, -2, -9)$

A 9.99	B 9.60	C 8.40
D 2.00	E 9.17	

- 3** Find the distance between the two parallel planes (to 2 decimal places).

A 0.45	B 0.22
C 0.03	D 0.85

- 4** Find the shortest distance between the two skew lines (to 2 decimal places).

A 2.25	B 3.04	C 2.15
D 0.10	E 2.14	

- 5** Find the shortest distance between the two skew lines (to 2 decimal places).

A 0.78	B 0.77	C 1.34
D 0.06	E 0.94	

- 6** Find the distance between the given (x,y) points

Point A : (0,3)

Point B : (1,5)

A 2.24	B 2	C 1.12
D 1.96	E 1	F 5.6

- 7** Find the distance between the given (x,y) points

Point A : (1,0)

Point B : (3,1)

A $\sqrt{3}$	B $\sqrt{5}$	C $\sqrt{7}$
D $\sqrt{13}$	E $\sqrt{11}$	F $\sqrt{12}$

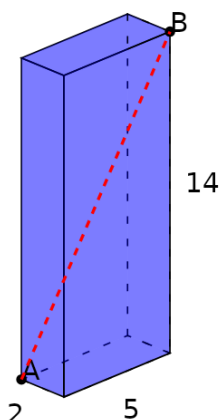
- 8** Find the point of intersection of the two lines.

A (4, 0, 3)
B (12, -4, 1)
C (8, -4, 3)
D (2, 4, 3)



Lines and Planes

- 9 What is the distance from point A to point B on this Rectangular Prism?



A	13	B	9	C	23
D	15	E	18	F	12

- 10 What is the relationship between the plane and the line?

A	Line lies in the plane
B	Parallel
C	Intersects

- 11 What is the relationship between the two lines?

A	Parallel
B	Coincident
C	Skew
D	Intersecting

- 12 Write the vector equation of the line of intersection.

A

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

B

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

C

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



Lines and Planes

13 State the normal vector of the plane.

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

A

$$\begin{pmatrix} -1 \\ -2 \\ -3 \end{pmatrix}$$

B

$$\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$$

C

$$\begin{pmatrix} -3 \\ -1 \\ -2 \end{pmatrix}$$

D

$$\begin{pmatrix} -1 \\ -2 \\ -3 \end{pmatrix}$$

14 Find the scalar equation of the plane through the three points.

A (4, 2, -4) B (-3, 2, 3) C (-2, 4, 4)

A

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

B

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

C

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

D

$$x - y + z = 2$$

15 Find the scalar equation of the plane containing both lines.

A

$$2x - 6y + 7z = 60$$

B

$$7x + 2y - 6z = 60$$

C

$$-2x + 6y - 7z = 60$$

D

$$2x - 6y + 7z = 61$$

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

$$4x - 3y - 3z = 3 \quad \text{Point on plane } (0, 2, -3)$$

A

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

B

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

C

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

D

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

E

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



Lines and Planes

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

$$\vec{r} = \begin{pmatrix} 4 \\ 1 \\ -2 \end{pmatrix} + s \begin{pmatrix} 0 \\ -3 \\ -3 \end{pmatrix} + t \begin{pmatrix} -18 \\ -6 \\ 6 \end{pmatrix} \quad \text{Point on plane } (4, -2, -5)$$

A

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

B

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

C

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

D

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

E

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

18 Find the scalar equation of the plane through the point parallel to both vectors.

Point $(0, -4, 2)$ $\vec{u} = \begin{pmatrix} 2 \\ -1 \\ -4 \end{pmatrix}$ $\vec{v} = \begin{pmatrix} -4 \\ 1 \\ -2 \end{pmatrix}$

A

$$3x + 10y - z = -41$$

B

$$-3x - 10y + z = -42$$

C

$$-x + 3y + 10z = -42$$

D

$$3x + 10y - z = -42$$

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

Point $(-5, -3, 5)$ Line $\vec{r} = \begin{pmatrix} -4 \\ -3 \\ 2 \end{pmatrix} + t \begin{pmatrix} 3 \\ 3 \\ 1 \end{pmatrix}$

A

$$9x - 10y + 3z = 3$$

B

$$9x - 10y + 3z = 0$$

C

$$-9x + 10y - 3z = 0$$

D

$$3x + 9y - 10z = 0$$



Lines and Planes

20 Find the intersection point of these two lines

$$y = 4x - 3$$

$$y = 3x - 3$$

A	$(-0, -3)$	B	$(-3, -4)$
C	$(3, -8)$	D	$(-1, 1)$
E	$(2, -6)$	F	$(1, -5)$

21 Find the intersection point of these two lines

$$y = -1x - 1$$

$$y = 0x + 7$$

A	$(-13, 11)$	B	$(-8, 7)$
C	$(-6, 11)$	D	$(-11, 11)$
E	$(-13, 8)$	F	$(-6, 5)$

22 Are the two lines skew?

A	B
Yes	No

23 Does the given point lie on the line through A and B?
A $(0, 0, -3)$ B $(-4, -1, 0)$ Point $(4, 1, -6)$

A	B
Yes	No

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

$$A (-2, 2, -4) \quad B (2, -1, 0)$$

A $\vec{r} = \begin{pmatrix} 0 \\ 1 \\ -4 \end{pmatrix} + t \begin{pmatrix} 4 \\ -3 \\ 4 \end{pmatrix}$	B $\vec{r} = \begin{pmatrix} -2 \\ 2 \\ -4 \end{pmatrix} + t \begin{pmatrix} 4 \\ -3 \\ 4 \end{pmatrix}$
C $\vec{r} = \begin{pmatrix} -2 \\ 2 \\ -4 \end{pmatrix} + t \begin{pmatrix} 2 \\ -1 \\ 0 \end{pmatrix}$	D $\vec{r} = \begin{pmatrix} -2 \\ 2 \\ -4 \end{pmatrix} + t \begin{pmatrix} 0 \\ 1 \\ -4 \end{pmatrix}$



Lines and Planes

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

Point $(2, -2, 3)$ Direction $\begin{pmatrix} 1 \\ 0 \\ -3 \end{pmatrix}$

A

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

B

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

C

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

D

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

26 Find the scalar equation of the plane.

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

A

$$x - 4z = -20$$

B

$$-x + 4z = -20$$

C

$$x - 4z = -16$$

D

$$-4x + y = -20$$

27 Find the scalar equation of the plane through the point, parallel to the given plane.
Point $(2, 4, 1)$ Parallel plane $2x + y - 4z = -1$

A

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

B

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

C

$$2x + y - 4z = 5$$

D

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