# ©゙" doubtnut 

India's Number 1 Education App

## MATHS

## BOOKS - CHHAYA PUBLICATION MATHS <br> (BENGALI ENGLISH)

## DIRECTION COSINES AND DIRECTION <br> RATIOS

## Example

1. Find the direction cosines of the straight line joining the points ( $4,-3,-1$ ) and ( $1,-1,5$ ).

## - Watch Video Solution

2. Can the numbers $\frac{1}{2},-\frac{1}{\sqrt{2}}, \frac{1}{2}$ be the direction cosines of a straight line?

## - Watch Video Solution

3. Prove that the straight line joining the points $A(4$,
$-3,2$ ) and $B(2,-1,-1)$ is parallel to the straight line joining the point $C(7,-3,5)$ and $D(1,3,-4)$.

## - Watch Video Solution

4. The direction angles of a straight line are $30^{\circ}, 60^{\circ}$ and $150^{\circ}$. Is the statement true?

## - Watch Video Solution

5. Find the direction cosines and direction ratios of the vector $2 \hat{i}+3 \hat{j}+5 \hat{k}$.

## - Watch Video Solution

6. Points $A$ and $B$ have position vector
$\vec{a}=-3 \hat{i}+2 \hat{j}+7 \hat{k} \quad$ and $\quad \vec{b}=3 \hat{i}+4 \hat{j}-5 \hat{k}$ respectively. Find : $\overrightarrow{A B}$
7. Points $A$ and $B$ have position vector $\vec{a}=-3 \hat{i}+2 \hat{j}+7 \hat{k} \quad$ and $\quad \vec{b}=3 \hat{i}+4 \hat{j}-5 \hat{k}$ respectively. Find : $|\overrightarrow{A B}|$

## - Watch Video Solution

8. Points $A$ and $B$ have position vector $\vec{a}=-3 \hat{i}+2 \hat{j}+7 \hat{k} \quad$ and $\quad \vec{b}=3 \hat{i}+4 \hat{j}-5 \hat{k}$ respectively. Find : The direction ratios of $\overrightarrow{A B}$
9. Points $A$ and $B$ have position vector $\vec{a}=-3 \hat{i}+2 \hat{j}+7 \hat{k} \quad$ and $\quad \vec{b}=3 \hat{i}+4 \hat{j}-5 \hat{k}$ respectively. Find : The direction cosines $l, m, n$ of $\overrightarrow{A B}$

## D Watch Video Solution

10. Points $A$ and $B$ have position vector $\vec{a}=-3 \hat{i}+2 \hat{j}+7 \hat{k} \quad$ and $\quad \vec{b}=3 \hat{i}+4 \hat{j}-5 \hat{k}$ respectively. Show that $l^{2}+m^{2}+n^{2}=1$ where $\mathrm{I}, \mathrm{m}, \mathrm{n}$ are the direction cosine of $\overrightarrow{A B}$
11. Find the direction cosines of the straight line which makes equal angles with the coordinate axes.

## D Watch Video Solution

12. A straight line in the yz-plane makes an angle
$60^{\circ}$ with the positive z-axis. Find the direction cosines of the line.

## - Watch Video Solution

13. A straight line makes angles $45^{\circ}$ and $60^{\circ}$ with the positive directions of $y$-axis and $z$-axis respectively. Find the acute angle made by the line with the $x$-axis.

## - Watch Video Solution

14. The acute angle between the $z$-axis and the
straight line joining the points $(3,2,3)$ and $(-3,-1,5)$
is -

## - Watch Video Solution

15. The acute angle between the straight lines whose direction numbers are 1, 1, 2 and $(\sqrt{3}-1),(-\sqrt{3},-1), 4$ is -

## - Watch Video Solution

16. Determine the values of $a$ and $b$ for which the straight line joining the points $A(3,4,-1)$ and $B(4, a$,
2) is parallel to the straight line joining the points $P(2,1, b)$ and $Q(4,-3,1)$.

## - Watch Video Solution

17. Using direction ratio show that the points ( 2,6 ,
3), (1, 2, 7) and (3, 10, -1) are collinear.

## - Watch Video Solution

18. If $A, B, C, D$ are the points $(2,3,-1),(5,2,3),(4,3$,
$-5)$ and ( $-2,1,-8$ ) respectively, then find the projection of $A B$ on $C D$.

- Watch Video Solution

19. The direction cosines of the line which is perpendicular to the lines with direction ratios $1,-2$,
-2 and $0,2,1$ are -

## - Watch Video Solution

20. The coordinates of the foot of the perpendicular
drawn from the point $P(1,2,1)$ to the straight line
joining the points $Q(1,4,6)$ and $R(5,4,4)$ are -

## - Watch Video Solution

21. If $A(1,4,2), B(-2,1,2)$ and $C(2,-3,4)$ are the vertices of the triangle $A B C$, then find the angles of the triangle ABC.

## - Watch Video Solution

22. $A(2,3,1), B(-2,2,0)$ and $C(0,1,-1)$ are the vertices
of the triangle $A B C$. Show that the triangle $A B C$ is
right -angled.
23. If $l_{1}, m_{1}, n_{1}$ and $l_{2}, m_{2}, n_{2}$ are direction cosines
of two mutually perpendicular straight lines, then prove that the direction cosines of the straight line which is perpendicular to both the given lines are

$$
\pm\left(m_{1} n_{2}-m_{2} n_{1}\right), \pm\left(n_{1} l_{2}-n_{2} l_{1}\right), \pm\left(l_{1} m_{2}-l_{2} m_{1}\right)
$$

## - Watch Video Solution

24. Show that the pair of straight lines whose direction cosines are given by the equations
$2 l-m+2 n=0$ and $m n+n l+l m=0$ are at right angles.
25. Find the acute angle vetween two straight lines whose direction cosines are given by the equations
$l-5 m+3 n=0$ and $7 l^{2}+5 m^{2}-3 n^{2}=0$

## - Watch Video Solution

26. Prove that the straight lines whose direction cosines are given by the equations
$a l+b m+c n=0$ and $f m n+g n l+h l m=0$ are
at right angles if $\frac{f}{a}+\frac{g}{b}+\frac{h}{c}=0$
27. Prove that the straight lines whose direction cosines are given by the equations
$a l+b m+c n=0$ and $f m n+g n l+h l m=0$ are
parallel
$a^{2} f^{2}+b^{2} g^{2}+c^{2} h^{2}-2(a b f g+b c g h+c a h f)=0$

## - Watch Video Solution

28. Prove that the acute angle between two diagonals of a cube is $\cos ^{-1}\left(\frac{1}{3}\right)$.
29. A straight line L makes angles $\alpha, \beta, \gamma$ and $\delta$ with the four diagonals of a cube, prove that,
$\sin ^{2} \alpha+\sin ^{2} \beta+\sin ^{2} \gamma+\sin ^{2} \delta=\frac{4}{3}$

## - Watch Video Solution

30. A variable line in two adjacent positions has direction cosines $l, m, n$ and
$l+\delta l, m+\delta m, n+\delta n$. Prove that the small angle $\delta \theta$ between the two positions of the variable line is given by, $(\delta \theta)^{2}=(\delta l)^{2}+(\delta m)^{2}+(\delta n)^{2}$

## - Watch Video Solution

31. Let $\vec{P}=2 \hat{i}+\hat{j}-2 \hat{k}$ and $\vec{Q}=4 \hat{i}-3 \hat{k}$. Find the acute angle between $\vec{P}$ and $\vec{Q}$.

## - Watch Video Solution

## Exercise 3 Mcqs

1. The direction cosines of $x$-axis are-
A. $0,1,0$
B. $0,0,1$
C. $1,0,0$
D. $1,1,1$

## Answer: C

## D Watch Video Solution

2. The direction cosines of $y$-axis are-
A. $1,1,1$
B. $1,0,0$
C. $0,0,1$
D. $0,1,0$

Answer: D
3. The direction cosines of $z$-axis are-
A. $0,0,1$
B. $0,1,0$
C. $1,1,1$
D. $1,0,0$

Answer: A
4. If a line has the direction ratios $-18,12,-4$ then its
direction cosines will be -

$$
\begin{aligned}
& \text { A. } \frac{9}{11}, \frac{6}{11}, \frac{2}{11} \\
& \text { B. }-\frac{9}{11}, \frac{6}{11},-\frac{2}{11} \\
& \text { C. } \frac{9}{11},-\frac{6}{11},-\frac{2}{11}
\end{aligned}
$$

D. none of these

Answer: B

- Watch Video Solution

5. State which of the following statement is true?
A. If the direction angles of a line be $\alpha, \beta, \gamma$ then $\alpha+\beta+\gamma \neq 2 \pi$.
B. If the direction angles of a line be $\alpha, \beta, \gamma$ then $\alpha+\beta+\gamma=2 \pi$.
C. If the direction cosines of a line be $l, m, n$
then $l^{2}+m^{2}+n^{2} \neq 1$.
D. The direction cosine of the angle between
vectors is nothing but the cross product of their direction cosines.

## Answer: A

6. The angle between the lines whose direction ratios are proportional to $1,-2,1$ and $4,3,2$ is -
A. $\frac{3 \pi}{4}$
B. $\frac{\pi}{2}$
C. $\frac{\pi}{3}$
D. $\frac{\pi}{4}$

Answer: B
7. If O is the origin, $O P=3$ with direction ratios proportional to $-1,2,-2$ then the coordinates of $P$ are-
A. $(-1,2,-2)$
B. $(1,2,2)$
C. $\left(-\frac{1}{9}, \frac{2}{9},-\frac{2}{9}\right)$
D. $(3,6,-9)$

Answer: A

- Watch Video Solution

8. The angle between the two diagonals of a cube is-

> A. $\frac{\pi}{6}$
> B. $\frac{\pi}{4}$
> C. $\cos ^{-1}\left(\frac{1}{\sqrt{3}}\right)$
> D. $\cos ^{-1}\left(\frac{1}{3}\right)$

Answer: D

## - Watch Video Solution

9. The direction cosines of the line joining the points (1, 2, -3) and ( $-2,3,1$ ) are-
A. $-3,1,4$
B. $-1,5,-2$

$$
\begin{aligned}
& \text { C. }-\frac{3}{\sqrt{26}}, \frac{1}{\sqrt{26}}, \frac{4}{\sqrt{26}} \\
& \text { D. }-\frac{1}{\sqrt{30}}, \frac{5}{\sqrt{30}},-\frac{2}{\sqrt{30}}
\end{aligned}
$$

Answer: C

## - Watch Video Solution

10. If a line whose direction ratios are proportional to $0,1,-1$ then the inclination of the line with $z$-axis is-
A. $\frac{\pi}{2}$
B. $\pi$
C. $\frac{3 \pi}{2}$
D. $\frac{3 \pi}{4}$

## Answer: D

## - Watch Video Solution

11. If $P(x, y, z)$ is a point in the space at a distance $r$ from the origin O , then the direction cosines of the line OP are-
A. $\frac{r}{x}, \frac{r}{y}, \frac{r}{z}$
B. $r x, r y, r z$
C. $\frac{x}{r}, \frac{y}{r}, \frac{z}{r}$
D. none of these

Answer: C

## - Watch Video Solution

## Exercise 3 Very Short Type Questions

## 1. Define :

Direction angles of a straight line,

## 2. Define :

Direction cosines of a straight line,

- Watch Video Solution


## 3. Define :

Direction ratios of a straight line.

## D <br> Watch Video Solution

4. Can the numbers $1,2,3$ be the direction cosines of a straight line?

## - Watch Video Solution

5. Can the numbers $1,2,3$ be the direction ratios of a straight line?

## - Watch Video Solution

6. Find the direction cosines of the straight line joining the points: $(2,-1,4)$ and $(0,1,5)$
7. Find the direction cosines of the straight line joining the points : $(4,3,-5)$ and $(-2,1,-8)$

## - Watch Video Solution

8. The direction angles of a straight of a straight line are $120^{\circ}, 45^{\circ}, 30^{\circ}$. Is the statement true? Give reasons for your answer.
9. Find the acute angle between the pair of straight
lines whose direction cosines are
$\frac{\sqrt{3}}{4},-\frac{1}{4},-\frac{\sqrt{3}}{2}$ and $-\frac{\sqrt{3}}{4}, \frac{1}{4},-\frac{\sqrt{3}}{2}$

## - Watch Video Solution

10. Find the cosine of the angle between the lines
$B A$ and $B C$ where $A, B, C$ are the points $(1,2,3),(2,5$,
$-1)$ and ( $-1,1,2$ ) respectively.
11. Find the angle between the lines whose direction ratios are
$2,3,6$ and $1,2,2$

- Watch Video Solution

12. Find the angle between the lines whose direction ratios are 5, $-12,13$ and $-3,4,5$

## 13. Find the angle between the lines whose direction

ratios are
$p, q, r$ and $q-r, r-p, p-q$

## - Watch Video Solution

14. Find the angle between the lines whose direction
ratios are
$2,1,-2$ and $3,-4,5$.

- Watch Video Solution

Exercise 3 Short Answer Type Questions

1. Find the direction ratios of a straight line which makes equal angles with the coordinate axes. How many such straight line are there?

## D Watch Video Solution

2. A straight line in the $z x$-plane makes an angle of
$\frac{\pi}{3}$ with the z -axis, find the direction cosines of the line.

- Watch Video Solution

3. If $\alpha, \beta, \gamma$ be the direction angles of a straight line, then prove that $\sin ^{2} \alpha+\sin ^{2} \beta+\sin ^{2} \gamma=2$

## - Watch Video Solution

4. A line makes an acute angle with the positive direction of $x$-axis and passes through the points (6,
$-7,-1)$ and ( $2,-3,1$ ), find the direction cosines of the
line.
5. A straight line in the xy-plane makes an angle $\frac{\pi}{4}$ with $y$-axis. Find the direction cosines of the straight line.

## - Watch Video Solution

6. Calculate the direction cosines of the sides of the
triangle whose vertices are $A(4,5,0), B(2,6,2)$ and
$C(2,3,-1)$.

- Watch Video Solution

7. Using direction ratios show that the points $\mathrm{P}(2,3$,
4) $Q(-1,-2,1)$ and $R(5,8,7)$ are collinear.

## - Watch Video Solution

8. A staright line makes angles $\frac{\pi}{4}$ and $\frac{\pi}{3}$ with the positive directions of $y$-axis and $z$-axis respectively.

Find the acute angle made by the line with $x$-axis.

## - Watch Video Solution

9. If $O$ is the origin and $A(2,3,1), B(1,1,-5)$ are two given points then show that the straight line OA is perpendicular to the straight line OB.

## - Watch Video Solution

10. Show that the staright line joining the points ( -1 ,
$0,-2$ ) and ( $1,3,-1$ ) is perpendicular to the straight
line joining the points ( $9,1,-6$ ) and ( $7,2,-5$ )

## - Watch Video Solution

11. Prove that the straight line joining the points (4,
$5,0)$ and $(5,3,3)$ is parallel to the straight line joining the point ( $4,3,-3$ ) and ( $6,-1,3$ ).

## - Watch Video Solution

12. Calculating the angle of the triangle, prove that the points $A(3,4,-1), B(1,5,1)$ and $C(1,2,-2)$ are the vertices of an isosceles triangle.

## - Watch Video Solution

13. Find the acute angle between $x$-axis and the straight line joining the points ( $1,1,3$ ) and ( $3,2,1$ ).

## D Watch Video Solution

14. Calculating direction ratios show that the triangle formed by joining the points (2, 3, 1), ( $-2,2$, 0 ) and ( $0,1,-1$ ) in right-angled.

## - Watch Video Solution

15. Straight lines $O A$ and $O B$ are drawn from the origin O , if the direction ratios of the lines $O A$ and OB are $1,-1,-1$ and $2,-1,1$ respectively then find the direction cosines of the normal to the plane AOB.

## - Watch Video Solution

16. Find the coordinates of the foot of the perpendicular drawn from the point $A(1,8,4)$ on the straight line joining the points $B(0,-11,4)$ and $C(2,-3$,
1).
17. Determine the values of $a$ and $b$ for which the
straight line joining the points ( $7,4,2$ ) and ( $3,-2,5$ ) may be parallel to the line joining the points ( $2, a, 5$ ) and (b, -15, 11).

## - Watch Video Solution

18. If the straight line joining the points $(4,-3,2)$ and
$(3,-1,5)$ is perpendicular to the straight line joining the points ( $K,-2,1$ ) and ( $7,3,-2$ ) then find the value of $K$.
19. Find the acute angle between two straight lines whose direction number are $-4,3,5$ and $3,4,5$.

## - Watch Video Solution

20. Let $A(2,-3,-1), B(4,5,2), C(-3,4,1)$ and $D(2,3,5)$
are four given points. Find direction cosines of a straight line which is perpendicular to both the straight line $A B$ and $C D$.

## - Watch Video Solution

21. Using direction ratios prove that the points (4, 2,
$-6),(5,-3,1),(12,4,5)$ and (11, 9, -2) taken in order are the vertices of a rectangle.

## - Watch Video Solution

22. Using direction numbers show that points $P(4,7$,
8) and $Q(2,3,4), R(-1,-2,1)$ and $S(1,2,5)$ taken in
order, are the vertices of a parallelogram. Is the parallelogram a rectangle?
23. Let $l_{1}, m_{1}, n_{1}$ and $l_{2}, m_{2}, n_{2}$ be the direction ratios of two given straight lines. Find the direction ratios of a straight line which is perpendicular to both the given straight lines.

## - Watch Video Solution

24. Let $P(-9,4,5)$ and $Q(11,0,-1)$ be two given points.

If $O$ be the origin and $O N$ be perpendicular to $P Q$
then find the coordinates of N .

- Watch Video Solution

25. Let $A(-2,0,3), B(0,3,-3), C(3,3,5)$ and $D(5,4,3)$ be
four given points, find the acute angle between the lines $A B$ and $C D$.

## - Watch Video Solution

26. Find the acute angle between the two straight
lines whose direction cosines are given by
$l+m+n=0, l^{2}+m^{2}-n^{2}=0$
27. Find the angle between the two straight lines whose direction cosines are given by
$2 l+2 m-n=0, m n+n l+l m=0$

## - Watch Video Solution

28. Find the angle between the two straight lines
whose direction cosines are given by
$l+2 m+3 n=0,3 l m-4 \ln +m n=0$

- Watch Video Solution

29. Find the acute angle between the two straight
lines whose direction cosines are given by
$3 l+m+5 n=0,6 m n-2 n l+5 l m=0$

## - Watch Video Solution

## Exercise 3 Long Answer Type Question

1. Prove that the straight lines whose direction
cosines are given by $a^{2} l+b^{2} m+c^{2} n=0$ and $m n+n l+l m=0$ are parallel if $a+b+c=0$.
2. Show that the straight lines whose direction cosines are given by $a l+b m+c n=0$ and $p l^{2}+q m^{2}+r n^{2}=0 \quad$ are parallel if $\frac{a^{2}}{p}+\frac{b^{2}}{q}+\frac{c^{2}}{r}=0$.

## - Watch Video Solution

3. If $l_{1}, m_{1}, n_{1}, l_{2}, m_{2}, n_{2}, l_{3}, m_{3}, n_{3}$ be the direction cosines of three mutually perpendicular straight lines, then show that the straight line whose direction numbers are
$\left(l_{1}+l_{2}+l_{3}\right),\left(m_{1}+m_{2}+m_{3}\right),\left(n_{1}+n_{2}+n_{3}\right)$
makes equal angles with the given lines.
4. A, B, C, D are consecutive vertices of a parallelogram. If the coordinates of $\mathrm{A}, \mathrm{B}$ and C are
$(0,0,0),(3,-4,4)$ and ( $7,1,4$ ) respectively, find using direction ratios the coordinates of the vertex $D$.

## - Watch Video Solution

5. Find the projection of the line segment joining the points $(-1,0,3)$ and $(2,5,1)$ on the line whose direction ratios are 6, 2, 3 .
6. Show that the pair of staright lines whose direction cosines are given by $a l+b m+c n=0$ and $p l^{2}+q m^{2}+r n^{2}=0$ are perpendicular to each other if

$$
a^{2}(q+r)+b^{2}(r+p)+c^{2}(p+q)=0
$$

## D Watch Video Solution

## Mcqs

1. The direction cosines of a line equally inclined with the coordinates axes are-

$$
\begin{aligned}
& \text { A. } \frac{1}{\sqrt{3}},-\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}} \\
& \text { B. } \frac{1}{\sqrt{3}},-\frac{1}{\sqrt{3}},-\frac{1}{\sqrt{3}} \\
& \text { C. }-\frac{1}{\sqrt{3}},-\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}} \\
& \text { D. } \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}
\end{aligned}
$$

## Answer: A::B::C::D

# 2. A line segment has length 63 units and direction 

 ratios are $3,-2,6$. The components of the line vector are-$$
\begin{aligned}
& \text { A. }-27,18,54 \\
& \text { B. } 27,-18,-54 \\
& \text { C. } 27,-18,54 \\
& \text { D. }-27,18,-54
\end{aligned}
$$

## Answer: C::D

## - Watch Video Solution

## 3. The midpoints of the sides of a triangle are (1, 5 ,

$-1),(0,4,-2)$ and (2, 3, 4). The coordinates of its vertices are-
A. $(1,1,1)$
B. $(1,2,3)$
C. $(3,4,5)$
D. $(-1,6,-7)$

Answer: B::C::D

- Watch Video Solution

4. The coordinates of the foot of perpendicular drawn from the point $\mathrm{A}(1,2,1)$ to the joining $\mathrm{B}(1,4$,
6) and $C(5,4,4)$ is ( $x, y, z$ ), then values of $x, y, z$ will be-
A. 3
B. 4
C. 5
D. none of these

Answer: A::B::C
5. Find the direction cosines of the two lines which are connected by the relations $l-5 m+3 n=0$ and $7 l^{2}+5 m^{2}-3 n^{2}=0-$

$$
\begin{aligned}
& \text { A. } \frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}} \\
& \text { B. }-\frac{1}{\sqrt{6}}, \frac{1}{\sqrt{6}}, \frac{2}{\sqrt{6}} \\
& \text { C. }-\frac{1}{\sqrt{14}},-\frac{2}{\sqrt{14}}, \frac{-3}{\sqrt{14}} \\
& \text { D. } \frac{1}{\sqrt{6}},-\frac{1}{\sqrt{6}}, \frac{-2}{\sqrt{6}}
\end{aligned}
$$

Answer: A::B::C::D

## D Watch Video Solution

1. The distance of the point $(2,3,4)$ from the $x$-axis is $K$ units. Find the value of $K$.

## - Watch Video Solution

2. The inclination of a line with $z$-axis is $\frac{K \pi}{4}$, if its
direction ratios are proportional to $0,1,-1$, then find the value of $K$.

## - Watch Video Solution

3. The coordinates of the projection of the point $\mathrm{P}(2$,
$-3,5)$ on $y$-axis is $(0,-\beta, 0)$. Find the value of $\beta$.

## - Watch Video Solution

4. A parallelpiped is formed by planes drawn through the points $(2,3,5)$ and $(5,9,7)$ parallel to the coordinate planes. The length of diagonals of the parallelopiped is ' d ' units, find ' d '.
5. If the line makes angles $\alpha, \beta, \gamma, \delta$ with four diagonals of a cube, then the value of $\cos ^{2} \alpha+\cos ^{2} \beta+\cos ^{2} \gamma+\cos ^{2} \delta$ is equal to $\frac{m}{3}$.

Find $m$.

## - Watch Video Solution

## Comprehension Type

1. $A(-2,2,3)$ and $B(13,-3,13)$ are the points. $L$ is a line through A.

Coordinates of the point P which divides the join of
$A$ and $B$ in the ratio 2:3 internally are-
A. $\left(\frac{33}{5}, \frac{-2}{5}, 9\right)$
B. $(4,0,7)$
c. $\left(\frac{33}{5}, \frac{-12}{5}, \frac{17}{5}\right)$
D. $(20,0,35)$

## Answer: B

## - Watch Video Solution

2. $A(-2,2,3)$ and $B(13,-3,13)$ are the points. $L$ is a line through A.

Direction ratios of the normal to the plane passing through the origin and the points $A$ and $B$ are-
A. $15,-5,10$
B. $11,-1,16$
C. $3,13,2$
D. $7,13,-4$

Answer: D

## - Watch Video Solution

3. $A(-2,2,3)$ and $B(13,-3,13)$ are the points. $L$ is a line through A.

A point $P$ moves in the space such that $3 P A=2 P B$, then the locus of P is-

> A. $x^{2}+y^{2}+z^{2}+28 x-12 y+10 z-247=0$
> B. $x^{2}+y+z^{2}-28 x+12 y+10 z-247=0$
> C. $x^{2}+y^{2}+z^{2}+28 x-12 y-10 z+247=0$
> D. $x^{2}+y^{2}+z^{2}-28 x+12 y-10 z+247=0$

Answer: A

## D Watch Video Solution

4. Consider the points $\mathrm{A}(0,0,0), \mathrm{B}(5,0,0), \mathrm{C}(3,0,4)$ and $D(0,4,3)$.

The points $\mathrm{A}, \mathrm{B}, \mathrm{C}$ and D are-
A. coplanar
B. the vertices of a square
C. non-coplanar
D. none of these

## Answer: C

## - Watch Video Solution

5. Consider the points $\mathrm{A}(0,0,0), \mathrm{B}(5,0,0), \mathrm{C}(3,0,4)$ and $D(0,4,3)$.

The line $A C$ and $B D$ are-
A. coplanar
B. skew
C. parallel
D. none of these

## Answer: B

## - Watch Video Solution

6. Consider the points $\mathrm{A}(0,0,0), \mathrm{B}(5,0,0), \mathrm{C}(3,0,4)$ and $D(0,4,3)$.

Area of triangle ABC (in square units) is -
A. 5
B. $5 \sqrt{2}$
C. 10
D. none of these

Answer: C

- Watch Video Solution

Assertion Reason Type

1. Consider the points $A(0,0,0), B(2,0,0)$,
$C(1, \sqrt{3}, 0)$ and $D\left(1, \frac{1}{\sqrt{3}}, \frac{2 \sqrt{2}}{\sqrt{3}}\right)$
Statement-I: ABCD is a square.
Statement - II : $|A B|=|B C|=|C D|=|D A|$.
A. Satement -I is True, Statement -II is True,

Statement -II is a correct explanation for

Statement -I
B. Satement -I is True, Statement -II is True,

Statement -II is not a correct explanation for

Statement -I
C. Stament -I is True, Statement -II is False.

## D. Statement II is False, Statement -II is True.

## Answer: D

## - Watch Video Solution

2. Statement -I: A line makes the same angle $\theta$ with each of the x and z -axis. If it makes an angle $\alpha$ with the $y$-axis, such that $\sin ^{2} \alpha=3 \sin ^{2} \theta$, then $\cos ^{2} \theta=\frac{3}{5}$.

Statement -II : If a line with direction ratios, $l, m, n$ makes angles $\alpha, \beta, \gamma$ respectively with x , y amd z axis then

$$
\cos \alpha=\frac{l}{\sqrt{l^{2}+m^{2}+n^{2}}}, \cos \beta=\frac{m}{\sqrt{l^{2}+m^{2}+n^{2}}}
$$

$$
\text { and } \cos \gamma=\frac{n}{\sqrt{l^{2}+m^{2}+n^{2}}}
$$

A. Satement -I is True, Statement -II is True,

Statement -II is a correct explanation for

Statement -I

B. Satement -I is True, Statement -II is True,

Statement -II is not a correct explanation for

Statement -I
C. Stament -I is True, Statement -II is False.
D. Statement $-I$ is False, Statement $-I I$ is True.

