



## MATHS

### BOOKS - OMEGA PUBLICATION

### THE DIMENSIONAL GEOMETRY

#### Questions

1. A point is at X-axis. What is its co-ordinates ?



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2. A point is at  $xz$ -plane. What can you say about its coordinate ?



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3. Name the octants in which the following points lie.

$(1,2,3)$ ,  $(4,-2,-5)$ ,  $(-4,2,-5)$ ,  $(-3,-1,6)$ ,  $(4,2,-5)$



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4. The  $X$ -axis and  $Y$ -axis taken together determine a plane know as .....



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5. The co-ordinate of points in the  $xy$ -plane are of the form .....



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6. Co-ordinate planes divide the space into ..... Octants.



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7. In  $zx$ -plane, the co-ordinate is .....



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8. The point  $(-3,1,-2)$  lies in ..... octant.



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9. Find the distance between the following pairs of points

$(-3, 7, 2), (2,4,-1)$ .



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10. Find the distance between the following pairs of points

$(-1, 3, -4), (1, -3, 4)$



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11. Find the distance between the following pairs of points

$(2, -1, 3), (-2, -1, 3)$ .



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12. Show that the points  $(-2,3,5)$ ,  $(1,2,3)$  and  $(7,0,-1)$  are collinear.



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13. Verify that  $(0, 7, 10)$  ,  $(-1,6,6)$  and  $(-4, 9,6)$  are the vertices of a right angled triangle.

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14. Show that the points  $(-1,2,1)$ ,  $(1,-2,5)$ ,  $(4,-7,8)$  and  $(2,-3,4)$  are vertices of a parallelogram.

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15. Find the equation of the set of points P, the sum of whose distance from  $A(4,0,0)$  and  $B(-4,0,0)$  is equal to 10.

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**16.** Find the co-ordinates of the point which divides the line segment joining the points  $(-2,3,5)$  and  $(1,-4,6)$  in the ratio.

2 : 3 Internally

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**17.** Find the co-ordinates of the point which divides the line segment joining the points  $(-2,3,5)$  and  $(1,-4,6)$  in the ratio.

2 : 3 externally.

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18. Given that  $P(3,2,-4)$ ,  $Q(5,4,-6)$  and  $R(9,8,-10)$  are collinear find the ratio in which  $Q$  divides  $PR$



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19. Find the ratio in which the line segment joining the point  $(-2,4,7)$  and  $(3,-5,8)$  is divided by the  $yz$ -plane.



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20. Using section formula, show that the points  $A(2,-3,4)$ ,  $B(-1,2,1)$  and  $C\left(0, \frac{1}{2}, 2\right)$  are collinear.



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21. Find the co-ordinates of the centroid of the triangle whose vertices are  $(x_1, y_1, z_1)$ ,  $(x_2, y_2, z_2)$  and  $(x_3, y_3, z_3)$ .



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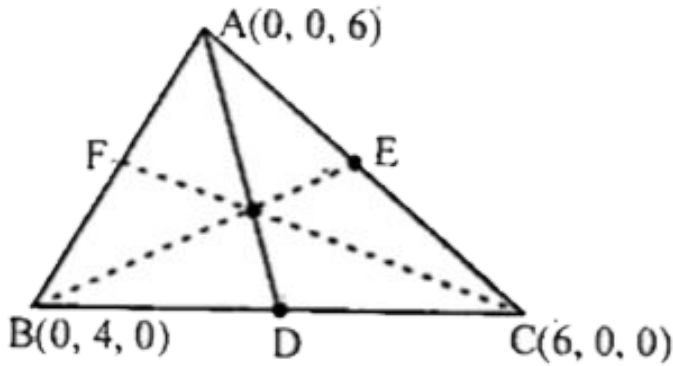
### Important Question From Miscellaneous Exercises

1. Three vertices of parallelogram ABCD are A(3,-1,2), B(1,2,-4), C(-1,1,2). Find the co-ordinate of the fourth vertex.



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2. Find the lengths of the medians of the triangle with vertices  $A(0,0,6)$ ,  $B(0,4,0)$  and  $C(6,0,0)$



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3. If the origin is the centroid of the triangle  $PQR$  with vertices  $P(2a,2,6)$ ,  $Q(-4,3b,-10)$  and  $R(8,14,2c)$ , then find the value of  $a, b$  and  $c$ .

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4. Find the co-ordinate of a point on y-axis which are at a distance of  $5\sqrt{2}$  from the point P(3,-2,5).

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5. A point R with x-co-ordinate 4 lies on the line segment joining the points P(2,-3,4) and Q(8,0,10). Find the co-ordinate of the point R.

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6. Find the equation of the circle which passes through points (2,-2) and (3,4) and whose centre lies on the line  $x + y = 2$ .



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7. Find the co-ordinate of the foci, the vertices, the lengths of major and minor axes and eccentricity of the ellipse  $9x^2 + 4y^2 = 36$ .



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## Multiple Choice Questions Mcqs

1. In a three -dimensional space, the equation  $3x - 4y = 0$  represents

A. A plane containing Z-axis

B. a plane containing X-axis

C. a plane containing Y-axis

D. none of these

**Answer: A**



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2. The shortest distance of the point  $(a,b,c)$  from the x-axis is

A.  $\sqrt{a^2 + b^2}$

B.  $\sqrt{b^2 + c^2}$

C.  $\sqrt{c^2 + a^2}$

D.  $\sqrt{a^2 + b^2 + c^2}$

**Answer: B**



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3. The points (5,-4,2), (4,-3,1), (7,6,4), (8,-7,5) are vertices of a

A. square

B. parallelogram

C. rectangle

D. None of these

**Answer: B**



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4. If  $A(1,2,3)$ ,  $B(-1,-1,-1)$  be two points, then the distance AB is

A.  $\sqrt{5}$

B.  $\sqrt{21}$

C.  $\sqrt{29}$

D. none of these

**Answer: C**



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5. If  $A(5,3,2)$ ,  $B(-1,0,-4)$ ,  $C(1,1,-2)$  are collinear, then the ratio in which  $B$  divides  $AC$  is

A.  $1:3$

B.  $2:3$

C.  $3:-1$

D.  $1:2$

**Answer: C**



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6. Find the direction cosines of a line which makes equal angles with the coordinate axes.



A.  $\pm \frac{1}{3}, \pm \frac{1}{3}, \pm \frac{1}{3}$

B.  $\pm \frac{6}{7}, \pm \frac{2}{7}, \pm \frac{1}{7}$

C.  $\pm \frac{1}{\sqrt{3}}, \pm \frac{1}{\sqrt{3}}, \pm \frac{1}{\sqrt{3}}$

D.  $\pm \sqrt{\frac{1}{7}}, \pm \sqrt{\frac{3}{14}}, \pm \sqrt{\frac{1}{14}}$

**Answer: C**



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7. If  $\cos \alpha, \cos \beta, \cos \gamma$  are the direction-cosines of a line, then the value of  $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma =$

A. 1

B. 2

C. 3

D. 4

**Answer: B**



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**8.** If the direction ratios of a line are 1, -3, 2, then its direction cosines are

A.  $\frac{1}{\sqrt{14}}, \frac{-3}{\sqrt{14}}, \frac{2}{\sqrt{14}}$

B.  $\frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}}$

C.  $\frac{-1}{\sqrt{14}}, \frac{-3}{\sqrt{14}}, \frac{-2}{\sqrt{14}}$

D.  $\frac{-1}{\sqrt{14}}, \frac{-2}{\sqrt{14}}, \frac{-3}{\sqrt{14}}$

**Answer: A**



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9. The co-ordinate of a point P are (3,12,4) w.r.t the origin O, then the direction cosines of OP are

A. 3,12,4

B.  $\frac{1}{4}, \frac{1}{3}, \frac{1}{2}$

C.  $\frac{3}{\sqrt{13}}, \frac{12}{\sqrt{13}}, \frac{4}{\sqrt{13}}$

D.  $\frac{3}{13}, \frac{12}{13}, \frac{4}{13}$

**Answer: D**



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10. Two lines with direction cosines  $\langle l_1, m_1, n_1 \rangle$  and  $\langle l_2, m_2, n_2 \rangle$  are at right angles if

A.  $l_1 = l_2, m_1 = m_2, n_1 = n_2$

B.  $\frac{l_1}{l_2} = \frac{m_1}{m_2} = \frac{n_1}{n_2}$

C.  $l_1 l_2 + m_1 m_2 + n_1 n_2 = 0$

D.  $l_1 l_2 + m_1 m_2 + n_1 n_2 = 1$

**Answer: C**



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11. The lines  
$$\frac{x - 1}{2} = \frac{y - 1}{3} = \frac{z - 3}{0} \text{ and } \frac{x - 2}{0} = \frac{y - 3}{0} = \frac{z - 4}{1}$$
are

- A. parallel
- B. coincident
- C. skew
- D. perpendicular

**Answer: D**



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12. The equation of a plane which cuts equal intercepts of unit length on the axes, is

A.  $x + y + z = 0$

B.  $x + y + z = 1$

C.  $x + y - z = 0$

D.  $\frac{x}{a} + \frac{y}{a} + \frac{z}{a} = 1$

**Answer: B**



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13. The straight line  $\frac{x - 3}{3} = \frac{y - 2}{1} = \frac{z - 1}{0}$  is

A.  $\parallel$  to x - axis

B.  $\parallel$  to y - axis

C.  $\parallel$  to z - axis

D.  $\perp$  to z - axis

**Answer: D**



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**14.** The equation of y-axis is :

A.  $z = 0$

B.  $x = 0$

C.  $y = 0, z = 0$

D.  $z = 0, x = 0$

**Answer: D**



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**15.** If the  $x$  - coordinate of a point  $P$  on the line joining points  $Q(2,2,1)$  and  $R(5,1,-2)$  is 4, then its  $z$ -coordinate is

A. 2

B. 1

C. -1

D. -2

**Answer: C**





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