MATHS

BOOKS - PSEB

INTRODUCTION TO THREE DIMENSIONAL GEOMETRY

Exercise

1. A point is on the x-axis. What are its y-coordinate and z-coordinates?

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2. A point is in the XZ-plane. What can you say about its y-coordinate?

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3. Name the octants in which the following points lie: (1, 2, 3),(4, -2, 3), (4, -2,-5), (4, 2, -5), (-4, 2, -5), (- 4, 2, 5), (-3,-1, 6) (2,-4, -7).

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4. Fill in the blanks: The x-axis and y-axis taken together determine a plane known as_____.

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5. Fill in the blanks: The coordinates of points in the XY-plane are of the form_____.

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6. Fill in the blanks: Coordinate planes divide the space into_____octants.

7. Find the distance between the following pair of points: (2, 3, 5) and (4, 3, 1)

8. Find the distance between the following pair of points: (-3, 7, 2) and (2, 4, -1)

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9. Find the distance between the following pair of points: (-1,3,-4) and (1,-3, 4)

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10. Find the distance between the following pair of points: (2, -1, 3) and (-2, 1, 3).

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

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12. Verify the following: (0, 7, -10), (1, 6, -6) and (4, 9,-6) are the vertices of an isosceles triangle.

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

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14. Verify the following: (-1, 2, 1), (1, -2, 5), (4, -7, 8) and (2, -3, 4) are the vertices of a parallelogram.

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15. Find the equation of the set of points which are equidistant from the points (1,2,3) and (3, 2, -1).

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

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17. Find the coordinates of the point which divides the line segment joining the points (-2, 3, 5) and (1,-4, 6) in the ratio (i) 2 : 3 internally, (ii) 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.

19. Find the ratio in which theYZ-plane divides the line segment formed by joining the points (-2, 4, 7) and (3,-5, 8).

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

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21. Find the coordinates of the points which trisect the line segment joining the points P (4, 2,-6) and Q (10,-16, 6).

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22. Three vertices of a parallelogram ABCD are A(3, - 1, 2), B (1, 2, - 4) and C (- 1, 1, 2). Find the coordinates of the fourth vertex.

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23. 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 values of a, b and c.

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24. Find the coordinates 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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25. A point R with x-coordinate 4 lies on the line segment joining the points P(2, -3, 4) and Q (8, 0, 10). Find the coordinates of the point R. [Hint Suppose R divides PQ in the ratio k :1. The coordinates of the point R are given by $\left(\frac{8k+2}{k+1}, \frac{-3}{k+1}, \frac{10k+4}{k+1}\right)$.

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26. If A and B be the points (3, 4, 5) and (-1,3, -7), respectively, find the equation of the set of points P such that $PA^2 + PB^2 = k^2$, where k is a constant.

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