MATHS

NCERT - NCERT MATHEMATICS(BENGALI)

INTRODUCTION TO THREE DIMENSIONAL GEOMETRY

Example

1. In fig 12.3 if P is (2,4,5) find the coordinates of F

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2. Find the octant in which the points (-3,1,2) and (-3,1,-2) lie

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3. Find the distance bwtween the points P(1,-3,4) and Q(-4,1,2)

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4. Show that the points P(-2,3,5) ,Q (1,2,3) and R (7,0,-1) are collinear

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5. Are the points A(3,6,9) B(10,20,30) and C(25,-41,5)the vertices of a right angled triangle

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6. Find the equation of set of points P such that $PA^2 + PB^2 = 2k^2$ where A and B are the points (3,4,5) and (-1,3,-7) respectively

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

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8. Using section formula prove that the three points (-4,6,10) ,(2,4,6) and (14,0,-2) are collinear

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9. Find the coordinates of the centroid fof 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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10. Find the ratio in which the line segement joining the points (4,8,10) and (6,10,-10) is divided by the YZ plane

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11. Show that the points A(1,2,3) ,B(-1,-2,-1) ,C(2,3,2) and D(4,7,6) are the vertices of a parallelogram ABCD but it is not a rectangle

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12. Find the equation of the set of the point P such that its distances from the points A(3,4,-5) and B(-2,1,4) are equal

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13. The centroid of a triangle ABC is at the point (1,1,1) if the coordinates of A and B are (3,-5,7) and (-1,7,-6) respectively find the coordinates of the point C

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Exercise 12 1

1. A point is on the x axis what are its y coordinates 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

(i) The x axis and y axis taken together determine a plane known as _____

(ii) The coordinates of points in the XY plane are of the form _____

(iii) Coordinate planes divide the space into _____octants

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Exercise 12 2

1. Find the distance between the following pairs of points

(i) (2,3,5) and (4,3,1)

(ii) (-3,7,2) and (2,4,-1)

(iii) (-1,3,-4) and (1,-3,4)

(2,-1,3) and (-2,1,3)

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

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3. Verify the following

(i) (0,7,-10) ,(1,6,-6) and (4,9,-6) are the vertices of an isosceles triangle

(ii) (0,7,10),(-1,6,6) and (-4,9,6) are the vertices of a right angled triangle

(iii) (-1,2,1) ,(1,-2,5) ,(4,-7,8) and (2,-3,4) are the vertices of a parallelogram

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

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Exercise 12 3

1. Find the coordinates of the point which divides the line segement 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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2. 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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3. Find the ratio in which the YZ plane divides the line segement formed by joining the points (-2,4,7) and (3,-5,8)

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

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

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Miscellaneous Exercise

1. Three vertics of a parallelogram ABCD are A(3,-1,2) ,B (1,2,-4) and C(-1,1,2) find the coordinate of the fourth vertex

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2. Find the incentre 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 values of a ,b and c

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4. 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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5. A point R with X coordinate 4 lie on the line segment joining the points P(2,-3,4) and Q(8,0,10) find the coordinates of the pont R

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6. Find the equation of set of points P such that $PA^2 + PB^2 = 2k^2$ where A and B are the points (3,4,5) and (-1,3,-7) respectively

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