



MATHS

BOOKS - S CHAND MATHS (ENGLISH)

POINTS AND THEIR COORDINATES

Example

1. Locate the points

(i) $(2, 3, 4)$

(ii) $(-2, -2, 3)$

(iii) $(2, -2, -3)$ on coordinate axis



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2. Prove by using the distance formula that the points

$A(1, 2, 3)$, $B(-1, -1, -1)$ and $C(3, 5, 7)$ are collinear.



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3. Show that the points $A(0, 1, 2)$, $B(2, -1, 3)$ and $C(1, -3, 1)$ are vertices of an isosceles right-angled triangle.



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4. Find the coordinates of the point equidistant from the four points $A(0,0,0)$, $B(a,0,0)$, $C(0,b,0)$ and $D(0,0,c)$.



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5. If A and B be the points $(3, 4, 5)$ and $(-1, 3, -7)$ respectively, find the locus of P such that $PA^2 + PB^2 = k^2$.



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6. What loci do the equation represent in space?

$$z = 0$$



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7. What loci do the equation represent in space?

$$y = 0, z = 0$$



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8. Find the coordinates of a point which divides internally the points $(1, 3, 7)$, $(6, 3, 2)$ in the ratio $2:3$.



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9. Find the ratio in which the xy -plane divides the join of $(-3, 4, -8)$ and $(5, -6, 4)$. Also obtain the point of intersection of this line with the plane.



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



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11. $A(3, 2, 0)$, $B(5, 3, 2)$ $C(-9, 6, -3)$ are three points forming a triangle. AD, the bisector of angle BAC meets BC in D. Find the coordinates of the point D.



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12. Find the coordinates 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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13. The midpoints of the sides of a triangle are

$$\left(3, 2, \frac{3}{2}\right), \left(1, \frac{3}{2}, 3\right) \text{ and } \left(2, \frac{5}{2}, \frac{5}{2}\right) \quad \text{Find}$$

its vertices.



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14. Using section formula, prove that the three points

$$A(-2, 3, 5), B(1, 2, 3) \text{ and } C(7, 0, -1)$$

are collinear.



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15. Show that the point $(1, 2, 3)$ is common to the lines which join $A(4, 8, 12)$ to $B(2, 4, 6)$, and $C(3, 5, 4)$ to $D(5, 8, 5)$.



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Exercise 26 A

1. Find the distance from the origin to each of the point:

$(2, 2, 3)$



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2. Find the distance from the origin to each of the point:

$(4, -1, 2)$



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3. Find the distance from the origin to each of the point:

$$(0, 4, -4)$$



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4. Find the distance from the origin to each of the point:

$$(-4, -3, -2)$$



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5. Find the distance between each of pair of point:

$(2, 5, 3)$ and $(-3, 2, 1)$,



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6. Find the distance between each of pair of point:

$(0, 3, 0)$ and $(6, 0, 2)$



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7. Find the distance between each of pair of point:

$(-4, -2, 0)$ and $(3, 3, 5)$



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8. Show that the triangle with vertices $(6, 10, 10)$, $(1, 0, -5)$, $(6, -10, 0)$ is a right-angled triangle, and find its area.



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9. Show that the triangle with vertices $A(3, 5, -4)$, $B(-1, 1, 2)$ $C(-5, -5, -2)$ is isosceles.



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10. Show that $(4, 2, 4)$, $(10, 2, -2)$ and $(2, 0, -4)$ are the vertices of an equilateral triangle.



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11. Show that the point A (1,-1,3), B (2,-4,5) and C (5,-13,11) are collinear.



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12. Derive the equation of the locur of a point equidistant from the points (1, - 2, 3) and (- 3, 4, 2).



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13. Derive the equation of the locus of a point twice as far from $(-2, 3, 4)$ as from $(3, -1, -2)$.



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14. Find the equation of the locus of a point whose distance from the y-axis is equal to its distance from $(2, 1, -1)$.



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15. Find the equation of the locus of point whose distance from the xy -plane is equal to its distance from the point $(-1, 2, -3)$.



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16. A point moves so that the difference of the squares of its distance from the x -axis and the y -axis is constant. Find the equation of its locus.



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17. Find the equation of the locus of a point whose distance from the z-axis is equal to its distance from the xy-plane.



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Exercise 26 B

1. Find the coordinates of the points which divide the join of the points $(-2, -1, 3)$ and $(4, 3, 1)$ in the ratio 3:4 internally.



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2. Find the coordinates of the points which divide the line joining the points $(2,-4,3)$, $(-4,5,-6)$ in the ratio (i) 1: 4 (ii) 2:1.



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3. Find the ratio in which the line joining the points $(2, 4, 5)$, $(3,5,-4)$ is divided by the yz -plane.



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4. The three points A (0,0,0), B (2,-3, 3), C(-2,3,-3) are collinear. Find in what ratio each point divides the segment joining the other two.



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5. Find the coordinates of the points which trisect AB given that A (2, 1, -3) and B (5,- 8,3).



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6. Find the coordinates of the point which is three-fifths of the way from $(3, 4, 5)$ to $(-2, -1, 0)$.



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7. Show that the point $(1, 2, 3)$ is common to the lines which join $A(4, 8, 12)$ to $B(2, 4, 6)$, and $C(3, 5, 4)$ to $D(5, 8, 5)$.



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8. Find the lengths of the medians of the triangle whose vertices are $A(2, -3, 1)$, $B(-6, 5, 3)$, $C(8, 7, -7)$.



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9. Find the point of intersection of the medians of the triangle with vertices $(-1, -3, 4)$, $(4, -2, -7)$, $(2, 3, -8)$.



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10. Find the ratio in which the join of A (2,1,5) and B (3,4,3) is divided by the plane $2x + 2y - 2z = 1$. Also, find the coordinates of the point of division,



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11. The mid-points of the sides of a triangle are (1, 5, -1), (0, 4, -2) and (2, 3, 4). Find its vertices.



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12. 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 D.



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13. What is the locus of a point for which

(i) $x = 0, y = 0$

(ii) $y = 0, z = 0$

(iii) $z = 0, x = 0$

(iv) $x = a, y = b$

$$(v) y = b, z = 0$$

$$(vi) z = c, x = a ?$$



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$$(v) y = b, z = c$$

$$(vi) z = c, x = a?$$



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Chapter Test

1. Find the point on y -axis which is equidistant from the points $(3, 1, 2)$ and $(5, 5, 3)$,



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2. Show that the points (a, b, c) , (b, c, a) and (c, a, b) are the vertices of an equilateral triangle.



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3. Find out whether the points $(0, 7, 10)$, $(-1, 6, 6)$ and $(-4, 9, 6)$ are the vertices of a right angled triangle.



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4. Show that the points

$A(-2, 3, 5)$, $B(1, 2, 3)$ and $C(7, 0, -1)$

are collinear.



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5. Find the lengths of the medians of the

triangle $A(0, 0, 6)$, $B(0, 4, 0)$ and $C(6, 0, 0)$



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



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7. Find the ratio in which the y - z plane divides the line segment formed by joining the point $(-2, 4, 7)$ and $(3, -5, 8)$.



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