

**Exercise 2**

1. Find the distance of the following points from the origin.  
 (i)  $(0, -4, 4)$                       (ii)  $(2, 4, -3)$                       (iii)  $(4, -5, 3)$
2. What is the distance of the y-axis from the point  $(3, -4, 0)$ ?
3. Find the distances between the following pair of points.  
 (i)  $(4, 3, -6)$  and  $(-2, 1, -3)$                       (ii)  $(-4, -2, 3)$  and  $(3, 3, 5)$
4. If the distance between the points  $(x, 2, 0)$  and  $(1, 3, 1)$  be  $\sqrt{6}$ , find the value of  $x$ .
5. Show that the points  $(1, -2, -3)$ ,  $(2, -3, -1)$  and  $(3, -1, -2)$  are the vertices of an equilateral triangle.
6. Show that the triangle whose vertices are  $(6, 10, 10)$ ,  $(1, 0, -5)$  and  $(6, -10, 0)$  is right angled.
7. Show that the points  $(1, 2, 3)$ ,  $(-1, -1, -1)$  and  $(3, 5, 7)$  are collinear.
8. Find the locus of the point which is equidistant from the points  $(1, -2, 3)$  and  $(-3, 4, 2)$ .
9. The distance of a point from the x-axis is twice its distance from the point  $(1, 2, -1)$ . Find the locus of the point.
10. A point moves in such a way that its distance from the X-axis is twice its distance from the Y-axis. Find the locus of the point.
11. Find the co-ordinates of the point which divides the join of  $(5, 8, -3)$  and  $(1, 0, -3)$  in the ratio 3 : 1.
12. In what ratio does the origin divides the line segment joining the points  $P(-1, -2, -3)$  and  $Q(4, 8, 12)$ .
13. Find the ratio in which the line segment joining the points  $(2, 4, 5)$  and  $(3, 5, -4)$  is divided by the YZ plane.
14. Find the co-ordinates of the centroid of the triangle whose vertices are  $(3, 1, 4)$ ,  $(-2, 5, 3)$  and  $(4, -5, 3)$ .

..... Co-ordinate Geometry of Three Dimensions .....

15. Find the point of intersection of the medians of the triangle whose vertices are  $(-1, -3, -4)$ ,  $(4, -2, -7)$  and  $(2, 3, -8)$ .
16. Find the lengths of the medians of the triangle whose vertices are  $A(2, -3, 1)$ ,  $B(-6, 5, 3)$  and  $C(8, 7, -7)$ .
17. Can there be any line which makes angles  $30^\circ$ ,  $45^\circ$  and  $60^\circ$  with the co-ordinate axes?
18. If a line makes angles  $60^\circ$  and  $135^\circ$  respectively with  $x$  and  $y$  axes find the value of  $\cos \gamma$ , where  $\gamma$  is the angle made by the line with the  $z$  axis.
19. If a line makes angles  $\alpha$ ,  $\beta$  and  $\gamma$  with the co-ordinate axes, find  $\cos \beta$ , if  $\cos \alpha = \frac{14}{15}$  and  $\cos \gamma = -\frac{1}{3}$ .
20. Find the direction cosines of the line whose direction ratios are  
 (i)  $2, -4, 6$     (ii)  $\sqrt{3}, 0, -1$     (iii)  $a-b, b-c, c-a$
21. If a line make angle  $30^\circ$  and  $60^\circ$  with the  $x$  and  $y$  axes, what angles does it make with the  $z$  axes?
22. Find the direction ratios and direction cosines of the lines joining the following points.  
 (i)  $(1, 2, 3)$  and  $(4, 5, 6)$     (ii)  $(5, 3, -2)$  and  $(3, -1, 4)$
23. Find the angle between the following pair of lines whose direction ratios are given  
 (i)  $1, 2, 3$ ;  $2, -4, 4$     (ii)  $-1, 2, 1$ ;  $2, 3, -1$
24. Show that the line joining the points  $(1, 2, 3)$  and  $(4, 5, 7)$  is parallel to the line joining the points  $(-4, 3, -6)$  and  $(2, 9, 2)$ .  $3, 3, 4$   $5, 6, 8$
25. For what value of  $x$  will the line joining the points  $(x, 6, -3)$ ,  $(5, 3, 2)$  will be  
 (i) Parallel    (ii) Perpendicular to the joining the points  $(2, 5, 1)$ ,  $(-6, 2, 6)$ ?
26.  $A(6, 3, 2)$ ,  $B(4, 1, 4)$ ,  $C(3, -4, 7)$  and  $D(0, 2, 5)$  are four given points. Find the projection of  $AB$  on  $CD$  and projection of  $CD$  on  $AB$ .
27. For what value of  $a$  will the numbers  $\frac{1}{\sqrt{2}}$ ,  $a$ ,  $\frac{1}{\sqrt{3}}$  be the direction cosines of a line?