

INTERNATIONAL INDIAN SCHOOL BURAIDAH

Worksheet for the Academic Year 2026-27

CLASS: 12

SUBJECT: Mathematics

DATE: 04/07/26

LESSON : THREE – DIMENSIONAL GEOMETRY

1. Let l_1, m_1, n_1 and l_2, m_2, n_2 be the direction cosines of two straight lines. Both the lines are perpendicular to each other, if

[a) $l_1l_2 + m_1m_2 + n_1n_2 = 0$ b) $l_1l_2 + m_1m_2 + n_1n_2 = 1$

c) $\frac{l_1}{l_2} = \frac{m_1}{m_2} = \frac{n_1}{n_2}$ d) $\frac{l_1}{l_2} = \frac{m_1}{m_2} = \frac{n_1}{n_2} = 0$

2. The direction cosines of the y -axis are

[(a) (0, 0, 0) (b) (1, 0, 0) (c) (0, 1, 0) (d) (0, 0, 1)]

3. The distance of the point P(a, b, c) from the x-axis is

[a) $\sqrt{b^2 + c^2}$ b) $\sqrt{a^2 + c^2}$ c) $\sqrt{b^2 + a^2}$ d) none of these]

4. The distance of the point (3, 4, 5) from x -axis is-

[(a) 3 (b) 5 (c) 41 (d) None of these]

5. The direction ratios of line parallel to z-axis is

[a) (1, 0, 0) b) (0, 1, 0) c) (0, 0, 1) d) (1, 1, 1)]

6. The angle between the lines $\frac{x+1}{2} = \frac{y-2}{5} = \frac{z+3}{4}$ and $\frac{x-1}{1} = \frac{y+2}{2} = \frac{z-3}{-3}$ is

[a) 45° b) 30° c) 60° d) 90°]

7. The lines $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ and $\frac{x-1}{-2} = \frac{y-2}{-4} = \frac{z-3}{-6}$ are

[a) coincident b) skew c) intersecting d) parallel]

8. Find the direction ratios of the line $x - y + z - 5 = 0 = x - 3y - 6$

9. Write the vector equation of a line passing through point (1, -1, 2) and parallel to the line whose equation is $\frac{x-3}{1} = \frac{y-1}{2} = \frac{z+1}{-2}$

10. Find the vector equation of a line passing through the point with position vector

$2i - j + k$ and parallel to the line joining the points $-i + 4j + k$ and $i + 2j + 2k$. Also find the Cartesian equation.

11. Find the point on the line $\frac{x+2}{3} = \frac{y+1}{2} = \frac{z-3}{2}$ at a distance of $3\sqrt{2}$ from the point (1, 2, 3).

12. Find the equation of the line passing through the point (-1, 3, -2) and perpendicular to the lines $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ and $\frac{x+2}{-3} = \frac{y-1}{2} = \frac{z+1}{5}$.

13. Find the equation of the line passing through the point (2, -1, 3) and perpendicular to the lines $r = (i + j - k) + \alpha(2i - 2j + k)$ and $r = (2i - j - 3k) + \beta(i + 2j + 2k)$.

14. Show that the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x-4}{5} = \frac{y-1}{2} = z$, intersect. Find their point of intersection.
15. Find the foot of perpendicular from the point (0, 2, 3) on the line $\frac{x+3}{5} = \frac{y-1}{2} = \frac{z+4}{3}$. Also find the length of perpendicular.
16. Find the foot of the perpendicular drawn from the point $2i-j+5k$ to the line $r = (11i-2j-8k) + m(10i-4j-11k)$. Also find the length of perpendicular.
17. By computing the shortest distance, determine whether $\frac{x-1}{2} = \frac{y+1}{3} = z$ and $\frac{x+1}{5} = \frac{y-2}{1} = \frac{z}{2}$ are intersecting or not.
18. The direction ratios of a straight line are 1,3,5. Find its direction cosines.
19. Write the direction ratios of the vector $3a + 2b$, where $a = i + j - 2k$ and $b = 2i - 4j + 5k$
20. Show that the line lines $r = (i+j-k) + p(3i-j)$ and $r = (4i-k) + \mu(2i+3k)$ intersect. Also, find their point of intersection.
21. Find the distance of the point (2, -1, 3) from the line $r = (2i - j + 2k) + p(3i + 6j + 2k)$ measured along the z-axis.
22. Find the point of intersection of the lines $r = (3i + k) + p(i + j + k)$ and the point (2, -1, 1) parallel to the z-axis. How far is the point from the z-axis.