

INTERNATIONAL INDIAN SCHOOL BURAIDAH

Worksheet for the Academic Year 2026-27

CLASS: 12

SUBJECT: Mathematics

DATE: 04/07/26

LESSON : 10- VECTOR ALGEBRA

1. The modulus of the vector $19i + 5j - 6k$ is
[a) $\sqrt{322}$ b) $\sqrt{420}$ c) $\sqrt{421}$ d) $\sqrt{422}$]
2. The distance of the point $3i + 4j + 5k$ from the y-axis is
[a) 4units b) $\sqrt{34}$ units c) $5\sqrt{2}$ units d) 5 units]
3. If $a = 3i + 2j + 4k$ and $b = i + j - 3k$ and $c = 6i - j + 2k$ are three vectors , then $(2a.i)j - (b.j)j + (c.k)k$ is same as the vector
[a) a b) b+ c c) a - b d) c]
4. 5. If $a = i + j + 2k$ and $b = 3i + 2j - k$, then the value of $(a + 3b) \cdot (2a - b)$ is
[(a) 15 (b) 18 (c) -18 (d) -15]
5. The coordinates of the midpoint of the line segment joining the points (2, 3, 4) and (8, - 3, 8) are
[(a) (10, 0, 12) (b) (5, 6, 0) (c) (6, 5, 0) (d) (5, 0, 6)]
6. The points (5, 2, 4), (6, - 1, 2) and (8, - 7, k) are collinear, if k is equal to
[(a) -2 (b) 2 (c) 3 (d) -1]
7. Let a be the position vector whose is the point (2, -3) . If $AB = a$ whose coordinates point A are (-4,5), then coordinates of B are
[a) (-2, -2) b) (-2, 2) c) (2 , -2) d) (2, 2)]
8. The respective values of $|a|$ and $|b|$, if $(a + b) \cdot (a - b) = 512$, and $|a| = 3|b|$ are
[a) 48 and 16 b) 3 and 1 c) 6 and 2 d) 24 and 8]
9. If $a = (2, 3, -5)$ and $b = (2, 2, 2)$, then prove that a and b are mutually perpendicular.
10. If a and b are perpendicular vectors, $a + b = 13$ and $|a| = 5$, then find the value of $|b|$.
11. Write a unit vector in the direction of the sum of the vectors $a = 2i + 2j - 5k$ and $b = 2i + j - 7k$.
12. If $a = i - j + 7k$ and $b = 5i - j + mk$, then find the value of m , so that $a + b$ and $a - b$ are perpendicular
7. Let $a = i + 4j + 2k$, $b = 3i - 2j + 7k$ and $c = 2i - j + 4k$. Find a vector p , which is perpendicular to both a and b and $p \cdot c = 18$.
10. Write a unit vector perpendicular to both the vectors $a = i + j + k$ and $b = i + j$
11. The two vectors $i + j + 2k$ and $5i - j + 3k$ represents the two sides OA and OB respectively of a triangle OAB. The point P lies on the side AB such that OP is a median. Find the area of parallelogram formed by the two adjacent sides OA and OP.

12. If a , b and c be three vectors such that $a \cdot b = a \cdot c$ and $a \times b = a \times c$, show that $b = c$.
13. A man needs to hang two lanterns on a straight wire whose end points have the coordinates $A(4, 1, -2)$ and $B(6, 2, -3)$. Find the coordinates of the points where he hangs the lantern such that these points trisect the wire AB .
14. If the position vector of a point $(12, n)$ is such that $|a| = 13$, find the value of n .
15. If a and b are the position vectors of the points $(1, -1)$, $(-2, m)$ find the value of m for which a and b are collinear.
16. If a be the position vector whose tip is $(5, -3)$ find the co-ordinates of a point B such that $AB = a$, the co-ordinates of A being $(4, -1)$
17. If $a = i + 2j + 3k$ and $b = 2i + 4j - 5k$ represents two adjacent side of a parallelogram, find the unit vector parallel to the diagonals of the parallelogram.
18. If a vector makes angles α, β, γ with OX, OY and OZ axes respectively, prove that $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma = 2$.
19. A vector r is inclined equal acute angles to the axes. If $|r| = 6$ units, find r .
20. Dot product of a vector with the vectors $3i - 5k$, $2i + 7j$ and $i + j + k$ are respectively $-1, 6$, and 5 . Find the vector.
21. Let $a = 5i - j + 7k$ and $b = i - j + mk$. Find m such that $a + b$ is orthogonal to $a - b$.
22. Find a vector of magnitude 9, which is perpendicular to both the vectors $4i - j + 3k$ and $-2i + j - 2k$.
23. If a, b, c are three vectors such that $a + b + c = 0$ then prove that $a \times b = b \times c = c \times a$.
24. If $|a| = 13$, $|b| = 5$ and $a \cdot b = 60$, then find $|a \times b|$.
25. If $a = 3i - j - 2k$ and $b = 2i + 3j + k$, find $(a + 2b) \times (2a - b)$.
26. If $|a \times b|^2 + (a \cdot b)^2 = 144$ and $|a| = 4$, find $|b|$.
27. If a is a unit vector such that $a \times i = j$, find $a \times j$.