

Assignment on Lines

1. Find the vector and parametric equations for the line through the point $P = (2, 5, -1)$ and parallel to the vector $\mathbf{v} = \langle -3, 1, 2 \rangle$.
2. Find the vector and parametric equations for the line through the point $P = (5, 8, -6)$ and parallel to the vector $\mathbf{v} = 2\mathbf{i} - 3\mathbf{j} + 4\mathbf{k}$.
3. Find the vector and parametric equations for the line through the points $P = (4, 1, -8)$ and $Q = (2, 3, 5)$.
4. Find the angle between the lines l_1 and l_2 given by:
 $l_1 : \mathbf{r} = \langle 1 - 2t, 3 + t, 4 - 5t \rangle$ and $l_2 : \mathbf{r} = \langle 2 - s, 1 - 2s, 3 + 2s \rangle$.
5. Find the parametric equations of the line through $(3, -1, 2)$ and parallel to the line $\mathbf{r} = \langle 2 - 3t, 7 + t, 8 + 5t \rangle$.
6. Find the vector form of the line through the point $(5, 2, -3)$ and orthogonal to the lines $\mathbf{r} = \langle 2 + t, 3 - 2t, 4 - 5t \rangle$ and $\mathbf{r} = \langle 1 - t, 2t, 3 + 4t \rangle$.
7. Determine whether the lines l_1 and l_2 are parallel, skew, or intersecting. If they intersect, find their point of intersection.
 - (a) $l_1: x = 4 - t, y = 2t, z = 3 + 4t$, and $l_2: x = 2 + 3s, y = 1 - s, z = 4 + s$.
 - (b) $l_2: \mathbf{r} = \langle 3 - 4t, 2 + t, 2t \rangle$, and $\mathbf{r} = \langle 3 + 2s, 1 - s, 8 + 3s \rangle$