

Ma 233: Calculus III

Homework Assignment 1

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- Find the distance between the point $(1, -2, 2)$ and
 - the xy plane;
 - the xz plane;
 - the yz plane;
 - the x axis;
 - the y axis;
 - the z axis;
 - the origin;
- Find the center and radius of the sphere $S = \{(x, y, z) : x^2 + y^2 + z^2 + 2x - 3y + 10z = 3\}$
- Graph the set S described as follows: all the points at a distance of 7 from the origin that lie in a plane perpendicular to the y -axis containing the point $P = (1, 2, 3)$. Does S contain P ?
- Let $A = (3, -5, 1)$ and $B = (2, 4, -6)$ be two points.
 - Find the components of the vector \vec{AB} .
 - Find the coordinates of the head of the vector with tail at the origin and antiparallel to \vec{AB} .
- Let $\mathbf{a} = \mathbf{i} + \mathbf{j} + \mathbf{k}$ and $\mathbf{b} = 3\mathbf{j} - 5\mathbf{k}$. Find $|\mathbf{a}|$ and $|\mathbf{b}|$, and express the following in terms of $\mathbf{i}, \mathbf{j}, \mathbf{k}$:
 - $\mathbf{a} + \mathbf{b}$
 - $\mathbf{a} - \mathbf{b}$
 - $2\mathbf{a} - \mathbf{b}$
 - $2\mathbf{b} - \mathbf{a}$
- Express $\mathbf{a} = \mathbf{i} + 2\mathbf{j} - 2\mathbf{k}$ as the length of \mathbf{a} times a unit vector parallel to \mathbf{a} .