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3. It is very important to be able to quickly and accurately visualize three-dimensional relationships. In three dimensions, describe how many lines are perpendicular to the unit vector $\vec{i}$. Describe all lines that are perpendicular to $\vec{i}$ and that pass through the origin. In three dimensions, describe how many planes are perpendicular to the unit vector $\vec{i}$. Describe all planes that are perpendicular to $\vec{i}$ and that contain the origin.

Plot the indicated points.
5a. (2, 1, 5)
5b. (3, 1, -2)
5c. (-1, 2, -4)

Find the distance between the given points.
9. (2, 1, 2), (5, 5, 2)
11. (-1, 0, 2), (1, 2, 3)

Compute $\vec{a}+\vec{b},\ \vec{a}-3\vec{b}$ **and** $\|4\vec{a}+2\vec{b}\|$.

15. $\vec{a}=\langle 2,1,-2\rangle,\ \vec{b}=\langle 1,3,0\rangle$

17. $\vec{a}=\langle -1,0,2\rangle,\ \vec{b}=\langle 4,3,2\rangle$

(a) Find two unit vectors parallel to the given vector and (b) write the given vector as the product of its magnitude and a unit vector.
21. $\langle 3,1,2\rangle$

23. $\langle 2,-4,6\rangle$

Find a vector with the given magnitude and in the same direction as the given vector.
29. Magnitude 6, $\vec{v}=\langle 2,2,-1\rangle$

31. Magnitude 2, $\vec{v}=\langle 2,0,-1\rangle$

Find an equation of the sphere with radius r **and center** (a,b,c).

35. $r=2,\ (a,b,c)=(3,1,4)$

37. $r=3,\ (a,b,c)=(2,0,-3)$

Identify the geometric shape described by the given equation.
41. $(x-1)^2+y^2+(z+2)^2=4$

43. $x^2+y^2-2y+z^2+4z=4$

Give an equation (e.g. $z = 0$) for the given figure.

53. *xz*-plane

55. *yz*-plane