6–12 Find parametric equations and symmetric equations for the line. #s 10-12, you don't need to do symmetric equations.

7. The line through the points $(1, 3, 2)$ and $(-4, 3, 0)$

10. The line through $(2, 1, 0)$ and perpendicular to both $\mathbf{i} + \mathbf{j}$ and $\mathbf{j} + \mathbf{k}$

11. The line through $(1, -1, 1)$ and parallel to the line $x + 2 = \frac{1}{2}y = z - 3$

12. The line of intersection of the planes $x + y + z = 1$ and $x + z = 0$

13. Is the line through $(-4, -6, 1)$ and $(-2, 0, -3)$ parallel to the line through $(10, 18, 4)$ and $(5, 3, 14)$?

14. Is the line through $(4, 1, -1)$ and $(2, 5, 3)$ perpendicular to the line through $(-3, 2, 0)$ and $(5, 1, 4)$?

15. (a) Find symmetric equations for the line that passes through the point $(1, -5, 6)$ and is parallel to the vector $\langle -1, 2, -3 \rangle$.
(b) Find the points in which the required line in part (a) intersects the coordinate planes.

16. (a) Find parametric equations for the line through $(2, 4, 6)$ that is perpendicular to the plane $x - y + 3z = 7$.
(b) In what points does this line intersect the coordinate planes?

17. Find a vector equation for the line segment from $(2, -1, 4)$ to $(4, 6, 1)$.

18. Find parametric equations for the line segment from $(10, 3, 1)$ to $(5, 6, -3)$.

19–22 Determine whether the lines L_1 and L_2 are parallel, skew, or intersecting. If they intersect, find the point of intersection.

19. L_1: $x = -6t, \quad y = 1 + 9t, \quad z = -3t$

L_2: $x = 1 + 2s, \quad y = 4 - 3s, \quad z = s$

21. L_1: $\dfrac{x}{1} = \dfrac{y - 1}{2} = \dfrac{z - 2}{3}$

L_2: $\dfrac{x - 3}{-4} = \dfrac{y - 2}{-3} = \dfrac{z - 1}{2}$

23–38 Find an equation of the plane.

23. The plane through the point $(6, 3, 2)$ and perpendicular to the vector $\langle -2, 1, 5 \rangle$

26. The plane through the point $(-2, 8, 10)$ and perpendicular to the line $x = 1 + t, y = 2t, z = 4 - 3t$

28. The plane through the point $(-1, 6, -5)$ and parallel to the plane $x + y + z + 2 = 0$

30. The plane that contains the line $x = 3 + 2t, y = t, z = 8 - t$ and is parallel to the plane $2x + 4y + 8z = 17$

31. The plane through the points $(0, 1, 1)$, $(1, 0, 1)$, and $(1, 1, 0)$

35. The plane that passes through the point $(6, 0, -2)$ and contains the line $x = 4 - 2t, y = 3 + 5t, z = 7 + 4t$

36. The plane that passes through the point $(1, -1, 1)$ and contains the line with symmetric equations $x = 2y = 3z$