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Find (a) the parametric equations and (b) the symmetric equations of the line.

5. The line through (1, 2, -3) and parallel to $\langle 2,-1,4\rangle$

7. The line through (2, 1, 3) and (4, 0, 4)

9. The line through (1, 4, 1) and parallel to the line $x=2-3t,\ \ y=4,\ \ z=6+t$

11. The line through (3, 1, -1) and parallel to the line $\dfrac{x-2}{3}=\dfrac{y+1}{-4}=\dfrac{z}{2}$

13. The line through (2, 0, 1) and perpendicular to both $\langle 1,0,2\rangle$ and $\langle 0,2,1\rangle$

15. The line through (1, 2, -1) and normal to the plane $2x-y+3z=12$

State if the lines are parallel or perpendicular or find the angle between the lines.

17. $\begin{cases} x=1-3t \\ y=2+4t \\ z=-6+t \end{cases}$ and $\begin{cases} x=1+2s \\ y=2-2s \\ z=-6+s \end{cases}$

19. $\begin{cases} x=1+2t \\ y=3 \\ z=-1+t \end{cases}$ and $\begin{cases} x=2-s \\ y=10+5s \\ z=3+2s \end{cases}$

Determine if the lines are parallel, skew or intersect.

23. $\begin{cases} x=4+t \\ y=2 \\ z=3+2t \end{cases}$ and $\begin{cases} x=2+2s \\ y=2s \\ z=-1+4s \end{cases}$

25. $\begin{cases} x=1+2t \\ y=3 \\ z=-1-4t \end{cases}$ and $\begin{cases} x=2-s \\ y=2 \\ z=3+2s \end{cases}$

Find an equation of the given plane.

27. The plane containing the point (1, 3, 2) with normal vector $\langle 2,-1,5\rangle$

29. The plane containing the point (-2, 1, 0) with normal vector $\langle -3,0,2\rangle$

31. The plane containing points (2, 0, 3), (1, 1, 0) and (3, 2, -1)

33. The plane containing points (-2, 2, 0), (-2, 3, 2) and (1, 2, 2)

35. The plane containing the point (2, 1, -1) and parallel to the plane $3x-y+2z=1$

37. The plane containing the point (0, -2, -1) and parallel to the plane $-2x+4y=3$

Sketch the given plane.

41. $x+y+z=4$

43. $3x+6y-z=6$

Find the intersection of the planes.

53. $2x - y - z = 4$ and $3x - 2y + z = 0$

55. $3x + 4y = 1$ and $x + y - z = 3$

Find the distance between the given objects.

57. The point (2, 0, 1) and the plane $2x - y + 2z = 4$

61. The planes $2x - y - z = 1$ and $2x - y - z = 4$

67. Suppose two airplanes fly paths described by the parametric equations $P_1: \begin{cases} x = 3 \\ y = 6 - 2t \\ z = 3t + 1 \end{cases}$ and $P_2: \begin{cases} x = 1 + 2s \\ y = 3 + s \\ z = 2 + 2s \end{cases}$. Describe the shape of the flight paths. Determine whether the paths intersect. Determine if the planes collide.