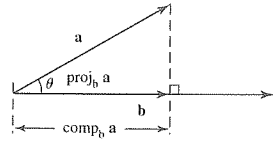


56. N 53.1° E 57. S 84.26° W
 58. $\left(\frac{5\sqrt{2}}{2} + 3\right)\mathbf{i} + \left(\frac{5\sqrt{2}}{2}\right)\mathbf{j}$ 59. (a) 40j (b) 425i
 (c) 425i + 40j (d) 427 mi/h, N 84.6° E
 60. (a) $\left\langle\frac{55}{2}, \frac{55\sqrt{3}}{2}\right\rangle$ (b) $\left\langle\frac{765\sqrt{2}}{2}, \frac{765\sqrt{2}}{2}\right\rangle$
 (c) $\langle 568.44, 588.57 \rangle$ (d) 818 mi/h, N 44° E
 61. 794 mi/h, N 26.6° W 62. N 2.1° W
 63. (a) 10i (b) 10i + 17.32j (c) 20i + 17.32j
 (d) 26.5 mi/h, N 49.1° E 64. N 30° W
 65. (a) 22.8i + 7.4j (b) 7.4 mi/h, 22.8 mi/h
 66. 25.08 mi/h, N 4.57° W 67. (a) $\langle 5, -3 \rangle$ (b) $\langle -5, 3 \rangle$
 68. (a) $\langle 0, 0 \rangle$ (b) None 69. (a) $-4\mathbf{j}$ (b) $4\mathbf{j}$
 70. (a) j (b) $-\mathbf{j}$ 71. (a) $\langle -7.57, 10.61 \rangle$
 (b) $\langle 7.57, -10.61 \rangle$ 72. (a) $\langle 2, -4 \rangle$ (b) $\langle -2, 4 \rangle$
 73. $\mathbf{T}_1 \approx -56.5\mathbf{i} + 67.4\mathbf{j}$, $\mathbf{T}_2 \approx 56.5\mathbf{i} + 32.6\mathbf{j}$
 74. $\mathbf{T}_1 \approx -14,116\mathbf{i} + 5,789\mathbf{j}$, $\mathbf{T}_2 \approx 14,116\mathbf{i} + 12,488\mathbf{j}$

SECTION 9.2 ■ PAGE 595

1. $a_1a_2 + b_1b_2$; real number or scalar 2. $\frac{\mathbf{a} \cdot \mathbf{b}}{|\mathbf{a}||\mathbf{b}|}$; perpendicular

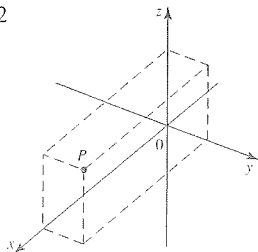
3. (a) $\frac{\mathbf{a} \cdot \mathbf{b}}{|\mathbf{b}|}$ (b) $\left(\frac{\mathbf{a} \cdot \mathbf{b}}{|\mathbf{b}|^2}\right)\mathbf{b}$



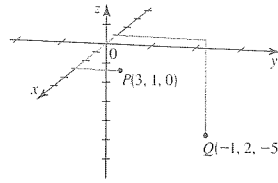
4. $\mathbf{F} \cdot \mathbf{D}$ 5. (a) 2 (b) 45° 6. (a) 0 (b) 90°
 7. (a) 13 (b) 56° 8. (a) -12 (b) 180°
 9. (a) -1 (b) 97° 10. (a) 4 (b) 60.3°
 11. (a) $5\sqrt{3}$ (b) 30° 12. (a) 0 (b) 90°
 13. (a) 1 (b) 86° 14. (a) -10 (b) 153°
 15. Yes 16. Yes 17. No
 18. Yes 19. Yes 20. No 21. 9
 22. 9 23. -5 24. -10 25. $-\frac{12}{5}$
 26. $\sqrt{2}$ 27. -24 28. $\frac{28}{5}$
 29. (a) $\langle 1, 1 \rangle$ (b) $\mathbf{u}_1 = \langle 1, 1 \rangle$, $\mathbf{u}_2 = \langle -3, 3 \rangle$
 30. (a) $\langle 4, 2 \rangle$ (b) $\mathbf{u}_1 = \langle 4, 2 \rangle$, $\mathbf{u}_2 = \langle 3, -6 \rangle$
 31. (a) $\langle -\frac{1}{2}, \frac{3}{2} \rangle$ (b) $\mathbf{u}_1 = \langle -\frac{1}{2}, \frac{3}{2} \rangle$, $\mathbf{u}_2 = \langle \frac{3}{2}, \frac{1}{2} \rangle$
 32. (a) $\langle 9, 6 \rangle$ (b) $\mathbf{u}_1 = \langle 9, 6 \rangle$, $\mathbf{u}_2 = \langle 2, -3 \rangle$
 33. (a) $\langle -\frac{18}{5}, \frac{24}{5} \rangle$ (b) $\mathbf{u}_1 = \langle -\frac{18}{5}, \frac{24}{5} \rangle$, $\mathbf{u}_2 = \langle \frac{28}{5}, \frac{21}{5} \rangle$
 34. (a) $\langle \frac{2}{5}, -\frac{1}{5} \rangle$ (b) $\mathbf{u}_1 = \langle \frac{2}{5}, -\frac{1}{5} \rangle$, $\mathbf{u}_2 = \langle \frac{3}{5}, \frac{6}{5} \rangle$
 35. -28 36. 80,400 37. 25 38. 280 44. $\mathbf{u} \cdot \mathbf{v}$
 45. 16 ft-lb 46. 82 ft-lb 47. 8660 ft-lb 48. 260,000 ft-lb
 49. 1164 lb 50. (a) 2822 lb (b) 2779 lb 51. 23.6°
 52. 54.6 lb

SECTION 9.3 ■ PAGE 602

1. x, y, z; (5, 2, 3); y = 2

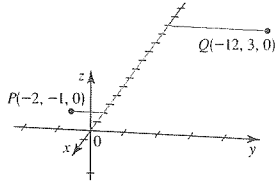


2. $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$;
 $\sqrt{38}; (x - 5)^2 + (y - 2)^2 + (z - 3)^2 = 9$
 3. (a)



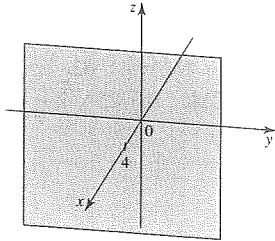
- (b) $\sqrt{42}$

5. (a)

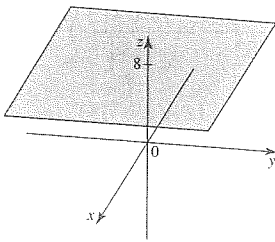


- (b) $2\sqrt{29}$

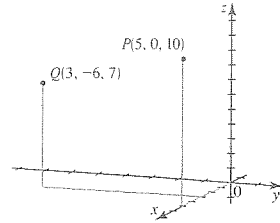
7. Plane parallel to the yz-plane



9. Plane parallel to the xy-plane

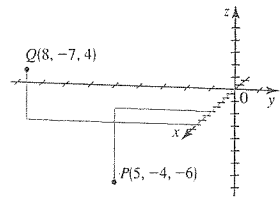


4. (a)



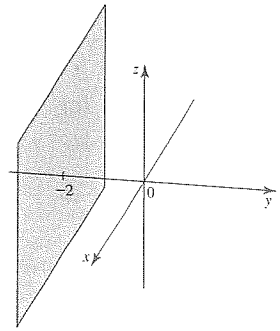
- (b) 7

6. (a)

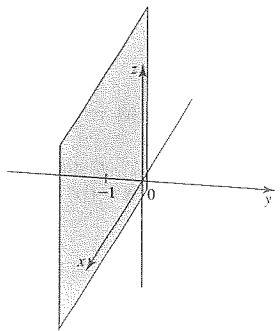


- (b) $\sqrt{118}$

8. Plane parallel to the xz-plane



10. Plane parallel to the xz-plane



11. $(x - 2)^2 + (y + 5)^2 + (z - 3)^2 = 25$
 12. $(x + 1)^2 + (y - 4)^2 + (z + 7)^2 = 9$
 13. $(x - 3)^2 + (y + 1)^2 + z^2 = 6$
 14. $(x + 10)^2 + y^2 + (z - 1)^2 = 11$
 15. Center: (5, -1, -4), radius: $\sqrt{51}$
 16. Center: (-2, 3, -1), radius: $2\sqrt{6}$