

31. Unit Vector Opp. Direc. $v = \langle -4, 4, 2 \rangle \rightarrow \langle 4, -4, -2 \rangle \rightarrow \boxed{e_v = \langle \frac{2}{3}, -\frac{2}{3}, \frac{1}{3} \rangle}$

49. $P = \langle 5, 5, 2 \rangle$ $V = \langle 0, -2, 1 \rangle$

$$r_1(t) = \langle 5, 5, 2 \rangle + t \langle 0, -2, 1 \rangle$$

$$r_2(t) = \langle 5, 5, 2 \rangle + t \langle 0, -4, 2 \rangle$$

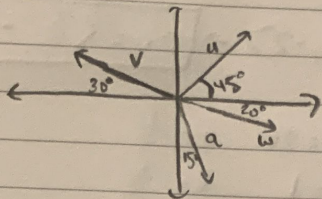
$$51) -1 + 4t = 2t \quad t = \frac{1}{2}$$

$$2 - 2t = 1 \quad t = \frac{1}{2}$$

$$2t = 1 + t \quad t = \text{N/A}$$

Not all values of t are equal, meaning the lines do not intersect.

5 and 7)



12.1

5. $\langle 0.707 \|u\|, 0.707 \|u\| \rangle$

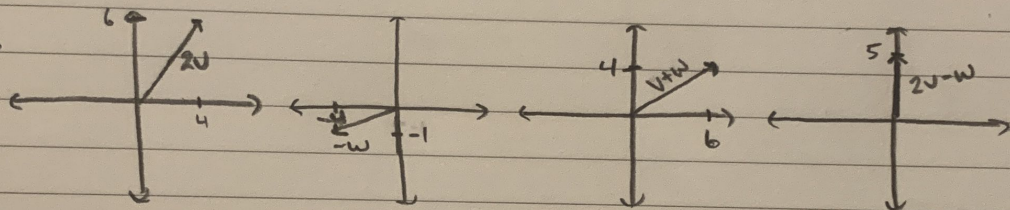
7. $\langle 0.94 \|w\|, -0.342 \|w\| \rangle$

9. $P = (3, 2), Q = (2, 7) \quad \vec{PQ} = \langle 2-3, 7-2 \rangle = \langle -1, 5 \rangle$

11. $P = (3, 5), Q = (1, -4) \quad \vec{PQ} = \langle 1-3, -4-5 \rangle = \langle -2, -9 \rangle$

15. $5\langle 6, 2 \rangle = \langle 30, 10 \rangle$

21.

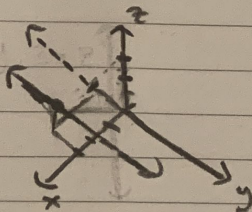


41. Unit Vector e_v , where $v = \langle 3, 4 \rangle \rightarrow e_v = \langle \frac{3}{5}, \frac{4}{5} \rangle$

47. Unit vector e making an angle of $\frac{4\pi}{7}$ with x-axis (take \sin, \cos of $\frac{4\pi}{7}$)
 $e = \langle -0.223, .975 \rangle$

12.2

11. Let $R = (1, 4, 3) \quad \vec{PR} = \langle 3, -2, 3 \rangle \rightarrow (1-x, 4-y, 3-z)$
 $\vec{PR} = \langle 1-x, 4-y, 3-z \rangle \rightarrow P = (-2, 6, 0)$


 13. $v = \langle 4, 8, 12 \rangle$ b) and c) are not parallel
 a) is parallel + same direction, c) is parallel + opp. direction

19. $-2\langle 8, 11, 3 \rangle + 4\langle 2, 1, 1 \rangle \rightarrow \langle -16, -22, -6 \rangle + \langle 8, 4, 4 \rangle \rightarrow \langle -8, -18, -2 \rangle$

25. Not Parallel

27. Not Parallel