Jinquan Lin

12.1

5. u $\langle \cos 45^\circ \|u\|, \sin 45^\circ \|u\| \rangle$

$= \langle \frac{\sqrt{2}}{2}\|u\|, \frac{\sqrt{2}}{2}\|u\| \rangle$

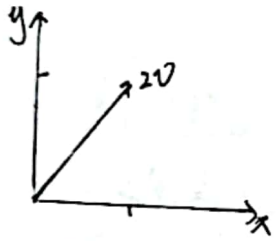
7. w $\langle \cos(-20^\circ)\|w\|, \sin(-20^\circ)\|w\| \rangle$

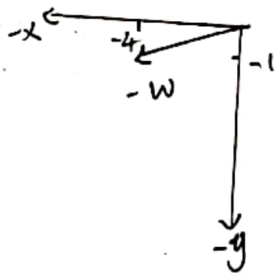
9. $\vec{PQ} = Q - P = (2-3, 7-2) = (-1, 5)$

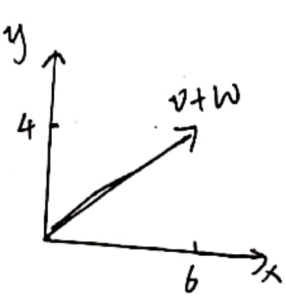
11. $\vec{PQ} = Q - P = (1-3, -4-5) = (-2, -9)$

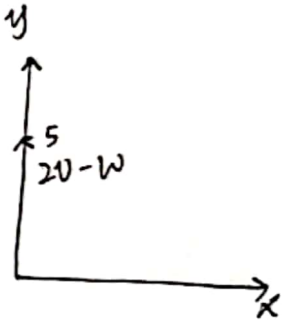
15. $5\langle 6, 2 \rangle = \langle 30, 10 \rangle$

21. $2v = \langle 4, 6 \rangle$, $-w = \langle -4, -1 \rangle$, $v+w = \langle 6, 4 \rangle$, $2v-w = \langle 0, 5 \rangle$









41. $v = \langle 3, 4 \rangle$

$\sqrt{3^2+4^2} = 5$

$e_v = \langle \frac{3}{4}, \frac{3}{5}, \frac{4}{5} \rangle$

47. $e = \langle \cos\frac{4\pi}{7}, \sin\frac{4\pi}{7} \rangle$

12.2

11. $\vec{R} = (1, 4, 3)$.

$\vec{PR} = R - P = (3, -2, 3)$

$P = (3-1, -2-4, 3-3) = (2, -6, 0)$

13. $v = \langle 4, 8, 12 \rangle$

(a) $\frac{1}{2}v$: parallel and same direction

(b) not parallel

(c). $-\frac{7}{4}v$: parallel and opposite direction

(d). not parallel.

19. $-2(8, 11, 3) + 4(2, 1, 1)$

$= (-16, -22, -6) + (8, 4, 4)$

$= (-8, -18, -2)$

25. $u = \langle 4, 2, -6 \rangle$, $v = \langle 2, -1, 3 \rangle$

not parallel

27. $u = \langle -3, 1, 4 \rangle$ $v = \langle 6, -2, 8 \rangle$

not parallel

31. $v = \langle -4, 4, 2 \rangle$

$\|v\| = \sqrt{(-4)^2 + 4^2 + 2^2} = 6$

$-e_v = \langle \frac{2}{3}, -\frac{2}{3}, -\frac{1}{3} \rangle$

49. $r_1(t) = (5, 5, 2) + t(0, -2, 1)$

$r_2(t) = (5, 5, 2) + t(0, -10, 5)$

51. $r_1(t) = (-1, 2, 2) + t(4, -2, 1) = (-1+4t, 2-2t, 2+t)$

$r_2(t) = (0, 1, 1) + t(2, 0, 1) = (2t, 1, 1+t)$

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

$1 + t \neq 2 + t$

Therefore $r_1(t)$ and $r_2(t)$ do not intersect.