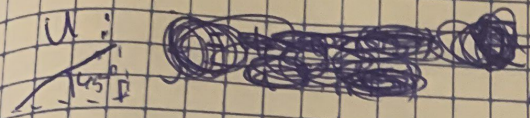
HW 12.1

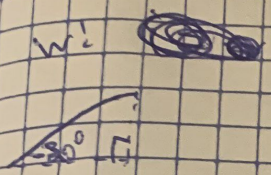
5. u:



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

or $\langle \cos(45)\|u\|, \sin(45)\|u\| \rangle$

7. w:



$\langle \cos(-20)\|w\|, \sin(-20)\|w\| \rangle$

9. $i = 2 - 3 = -1$
$j = 7 - 2 = 5$

$\vec{PQ} = \langle -1, 5 \rangle$

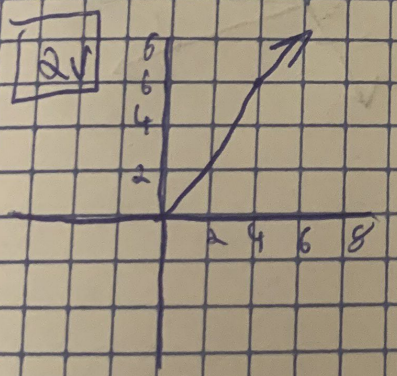
11. $i = 1 - 3 = -2$
$j = -4 - 5 = -9$

$\vec{PQ} = \langle -2, -9 \rangle$

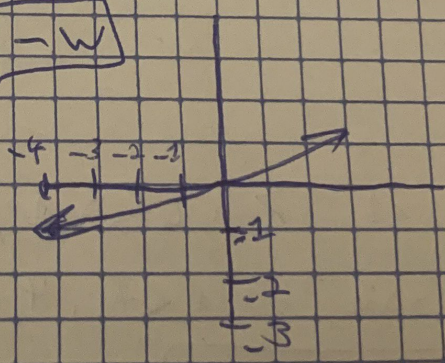
15. $5\langle 6, 2 \rangle = \langle (6)(5), (2)(5) \rangle$

$= \langle 30, 10 \rangle$

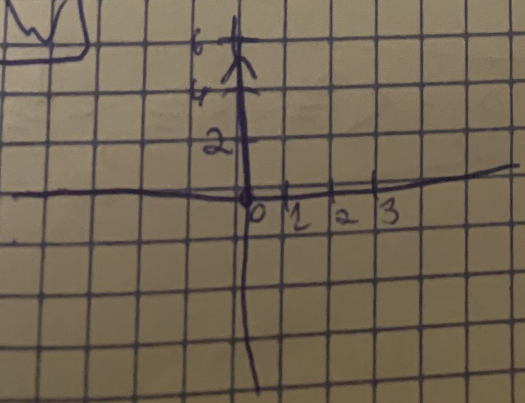
21. $2v$



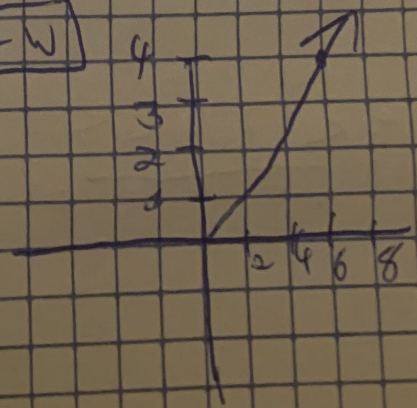
$-w$



$2v - w$



$v + w$



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

$e_v = \frac{v}{|v|}$

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

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

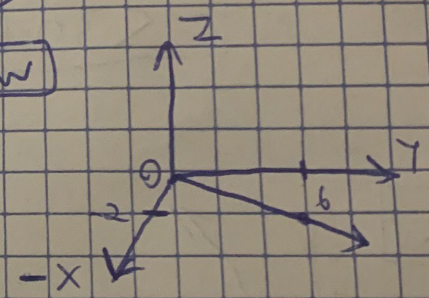
47. $e = \langle \cos\frac{4\pi}{7}, \sin\frac{4\pi}{7} \rangle = \langle -.22, .97 \rangle$

12.2

11. $R = (1, 4, 3)$ $\quad \langle 3, -2, 3 \rangle$

$\vec{PR} = \langle -2, 6, 0 \rangle$

W



19. $-2\langle 8, 11, 3 \rangle + 6\langle 2, 1, 1 \rangle$

$\langle -16, -22, -6 \rangle + \langle 8, 4, 4 \rangle$

$\boxed{= \langle -8, -18, -2 \rangle}$

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

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

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

49. $P(5,5,2)$ $v=\langle 0,-2,1\rangle$

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

$r_2(t) = \langle 5,5,0\rangle + t\langle 0,-2,1\rangle$

51. ~~$r(t) = \langle 1,2,2\rangle + t\langle 4,2,1\rangle$~~

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

$\langle 0,1,1\rangle + t\langle 2,0,1\rangle = \langle -1,2,2\rangle + t\langle 4,-2,1\rangle$

$\langle 1,-1,-1\rangle = t\langle 2,-2,0\rangle$

$x: 2t = 1$

$y: -2t = -1$

$z: 0t = -1$ → undefined = Does Not Intersect

13. (a) $\langle 4,8,12\rangle = 2\langle 2,4,6\rangle$ parallel & same direction

(b) $\langle 4,8,12\rangle \neq k\langle -1,-2,-3\rangle$ Not parallel

(c) $\langle 4,8,12\rangle = -\frac{1}{7}\langle -7,-14,-21\rangle$ Parallel opposite directions

(d) $\langle 4,8,12\rangle \neq k\langle 6,10,14\rangle$ Not parallel

25. $\langle 4,2,-6\rangle = k\langle 2,-1,3\rangle \Rightarrow k$ DNE

Not parallel

27. $\langle -3,1,4\rangle = k\langle 6,-2,8\rangle \Rightarrow k$ DNE

Not parallel