12.1 and 12.2 Homework Khush Patel

12.1 5, 7, 9, 11, 15, 21, 41, 47

5) u magnitude = $\|u\|$

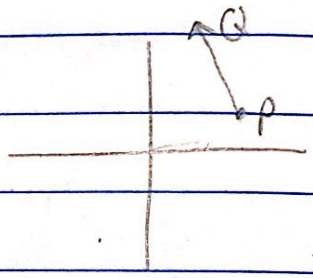
$\langle \|u\| \cos 45, \|u\| \sin 45 \rangle$

$= \langle 0.707\|u\|, 0.707\|u\| \rangle$

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

$= \langle 0.939\|w\|, -0.342\|w\| \rangle$

9) P = (3, 2) Q = (2, 7)



$\langle 2-3, 7-2 \rangle$

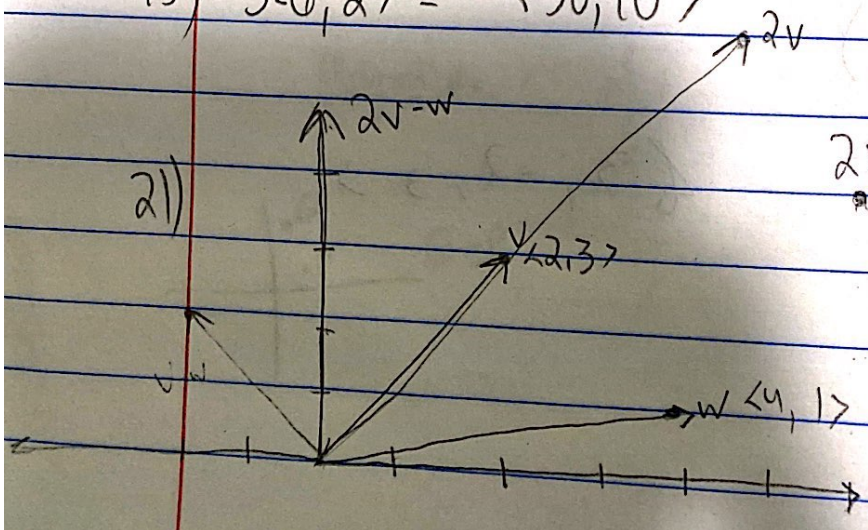
$= \langle -1, 5 \rangle = \overrightarrow{PQ}$

11) P = (3, 5) Q = (1, -4)

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

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

21)



$v+w = \langle 2, 3 \rangle + \langle 4, 1 \rangle = \langle 6, 4 \rangle$

$2v-w = \langle 4, 6 \rangle - \langle 4, 1 \rangle$

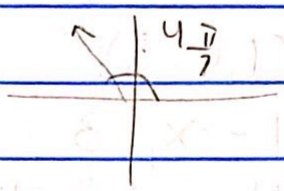
$= \langle 0, 5 \rangle$

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

$\|v\| = \sqrt{9+16} = 5$

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

47) $\|e\| = 1$



$\left\langle \cos \frac{4\pi}{7}, \sin \frac{4\pi}{7} \right\rangle$

12.2 on Next Page

12.2 11, 13, 19, 25, 27, 31, 49, 51

11) Point P

$w = \vec{PR} = \langle 3, -2, 3 \rangle$

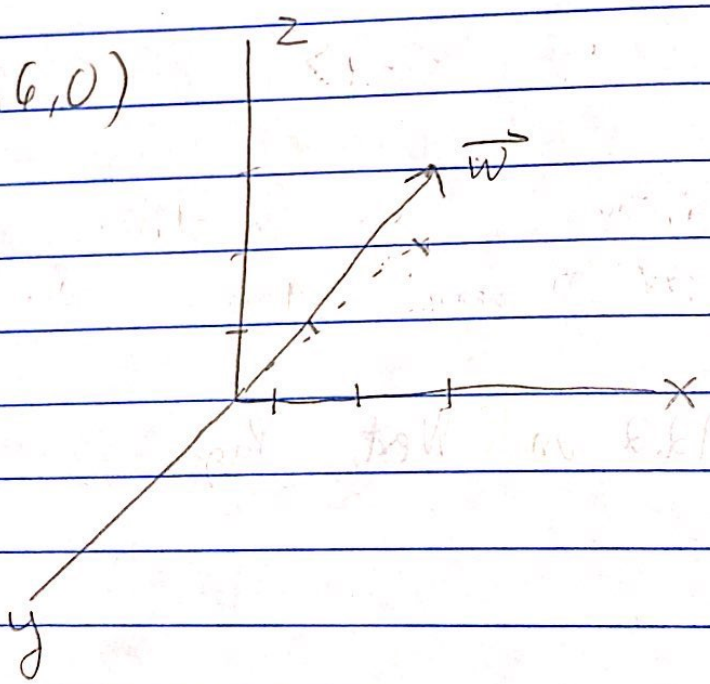
$R = (1, 4, 3)$

$1 - x_1 = 3 \quad x_1 = -2$

$4 - y_1 = -2 \quad y_1 = 6$

$3 - z_1 = 3 \quad z_1 = 0$

$P = (-2, 6, 0)$



$\langle 1, 2, 3 \rangle$

13) $\vec{v} = \langle 4, 8, 12 \rangle = 4\langle 1, 2, 3 \rangle$

(a) $\langle 2, 4, 6 \rangle = 2\vec{v}$. Yes, this is parallel to $\vec{v}$ and points in the same direction

(c) $\langle -7, -14, -21 \rangle = -7\langle 1, 2, 3 \rangle$

Yes, this points in the opposite direction and is parallel.

19) $-2\langle 8, 11, 3 \rangle + 4\langle 2, 1, 1 \rangle$

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

$= \langle -8, -18, -2 \rangle$

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

No, these 2 vectors cannot be written as linear combination of one another.

27) $U = \langle -3, 1, 4 \rangle \quad v = \langle 6, -2, 8 \rangle$

$-2\vec{v} = v$

Yes, these vectors are parallel.

31) $\langle -4, 4, 2 \rangle = -\langle 4, -4, 2 \rangle$

Magnitude $= \sqrt{16 + 16 + 4} = 6$

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

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

① $\langle 5, 5-2t, 2+t \rangle$

or scale $\vec{v} = \langle 0, -20, 10 \rangle$

$\langle 5, 5-20t, 2+20t \rangle$

51) $r_1(t) = \langle -1, 2, 2 \rangle + t\langle 4, -2, 1 \rangle$

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

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

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

As the 2-coordinates are different when setting these vector coordinates equal, the vectors do not intersect.