due: 9/13/20 Krithika Patrachari

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

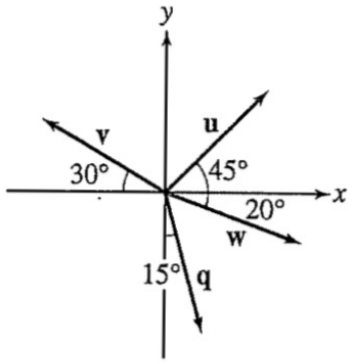
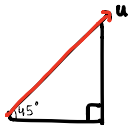


FIGURE 21

5) Find the components of u.

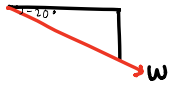


$\langle v\cos\theta, v\sin\theta \rangle$

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

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

7) Find the components of w.

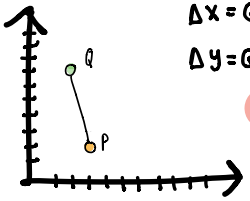


$\langle \cos\theta, \sin\theta \rangle$

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

$\langle 0.94, -0.34 \rangle$

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



$\Delta x = Q_x - P_x = 2-3 = -1$

$\Delta y = Q_y - P_y = 7-2 = 5$

$\langle -1, 5 \rangle$

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

$\Delta x = Q_x - P_x = 1-3 = -2$

$\Delta y = Q_y - P_y = -4-5 = -9$

$\langle -2, -9 \rangle$

15) $5\langle 6,2 \rangle$

$\langle 30, 10 \rangle$

21)

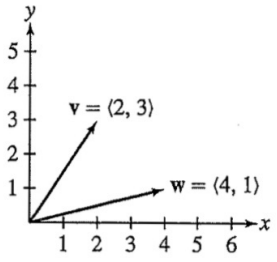


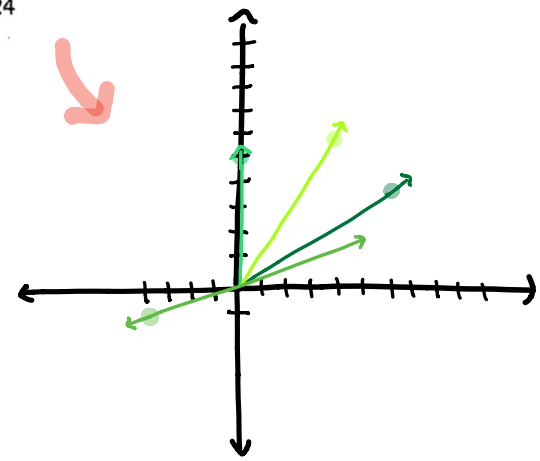
FIGURE 24

$2v \rightarrow 2\langle 2,3 \rangle = \langle 4,6 \rangle$

$-w \rightarrow -1\langle 4,1 \rangle = \langle -4,-1 \rangle$

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

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



41) Unit vector e_v; $v = \langle 3,4 \rangle$

$|v| = \sqrt{a^2+b^2}$

$|v| = \sqrt{3^2+4^2} = \sqrt{9+16}$

$= \sqrt{25} = 5$

$e_v = \left\langle \frac{a}{|v|}, \frac{b}{|v|} \right\rangle = \left\langle \frac{3}{5}, \frac{4}{5} \right\rangle$

47) Unit vector e making an angle of $\frac{4\pi}{7}$ with x-axis

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

$= \langle -0.22, 0.97 \rangle$

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

Let $R = (1,4,3)$

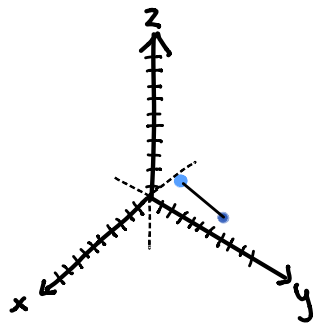
11) find point P; $w = \overrightarrow{PR}$ $\langle 3,-2,3\rangle$; sketch w

$R_1 - P_1 = 1 - P_1 = 3 \rightarrow P_1 = -2$

$R_2 - P_2 = 4 - P_2 = -2 \rightarrow P_2 = 6$

$R_3 - P_3 = 3 - P_3 = 3 \rightarrow P_3 = 0$

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



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

a) $\langle 2,4,6\rangle$
d) $\langle 6,10,14\rangle$
} parallel to v

19) calculate linear combinations

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

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

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

25) parallel?

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

Not parallel

27) parallel?

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

Not parallel

31) Unit vector in opposite direction to $V = \langle -4,4,2\rangle$

$e_v = \langle 4,-4,-2\rangle$

49) Find 2 diff. vector parametrizations of the line through $P = (5,5,2)$ with direction vector $v = \langle 0,-2,1\rangle$

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

or

$r(t) = (5,5,2) + t\langle 0,-10,5\rangle$

51) Show that lines

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

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

do not intersect

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

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

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

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

$\langle -2t,2t,0\rangle$ will never have a value of t that will make it equal to $\langle -1,1,1\rangle$