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12.1

(5) $\langle \frac{\sqrt{2}}{2}u, \frac{\sqrt{2}}{2}u \rangle$

(7) $\langle +\cos 20^\circ |W|, -\sin 20^\circ |W| \rangle$ $\langle \cos(-20^\circ)\|W\|, \sin(-20^\circ)\|W\| \rangle$

(9) $\overrightarrow{PQ}\,(-1,5)$

(11) $\overrightarrow{PQ}\,(-2,-9)$

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

(21) $2v = \langle 4,6\rangle$

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

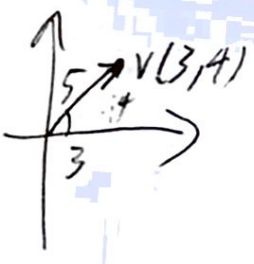
$v+w = \langle 6,4\rangle$

$2v-w = \langle 0,5\rangle$

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

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

Unit $e_v \langle \cos \frac{3}{5}, \sin\frac{3}{5} \rangle$



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

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

unit vector $e \langle -\cos\frac{3}{7}\pi, \sin\frac{3}{7}\pi \rangle$

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

2.2

1) Find the point P such that $w = \overrightarrow{PR}$ has components $\langle 3, -2, 3\rangle$, and sketch w.

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$R = (1, 4, 3)$

$P = R - w = \langle 1-3, 4-(-2), 3-3\rangle = \langle -2, 6, 0\rangle$

13) Let $v = \langle 4, 8, 12\rangle$. which of the following vectors is parallel to v? which point in the same direction? (a)

(a) $\langle 2, 4, 6\rangle$ (b) $\langle -1, -2, 3\rangle$

(c) $\langle -7, -14, -21\rangle$ (d) $\langle 6, 10, 14\rangle$

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

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

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

25) $\cancel{\frac{u}{v} = \frac{4}{2} = \frac{2}{}}$

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

$\frac{4}{2} = 2$ $\quad 2 \neq -2$

$\frac{2}{-1} = -2$ $\quad$ u, v are not parallel.

$\frac{-6}{3} = -2$

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

$\frac{-3}{6}=-\frac{1}{2}$

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

$\frac{4}{8}=\frac{1}{2}$

$\frac{1}{2}\neq-\frac{1}{2}$

u, v are not parallel.

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

$V_{opposite}=\langle 4,-4,-2\rangle \qquad -e_v=\langle \frac{2}{3},-\frac{2}{3},-\frac{1}{3}\rangle$

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

$L_1:=\langle 5,5,2\rangle+t\langle -5,-7,-1\rangle$

$\overrightarrow{PV}=\langle -5,-7,-1\rangle. \qquad L_2=\langle 5,5,2\rangle+t\langle 0,-20,10\rangle.$

(51) Show that the 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. (No Answer in check list

[illegible]

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

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

eq:={R1(1)=R2(1), R1(2)=R2(2), R1(3)=R2(3)};

$\{4t-1=2t,\ -2t+2=1,\ t+2=t+1\}.$

solve{eq, t}; no solve R_1, R_2 is ~~parallel~~ parallel.