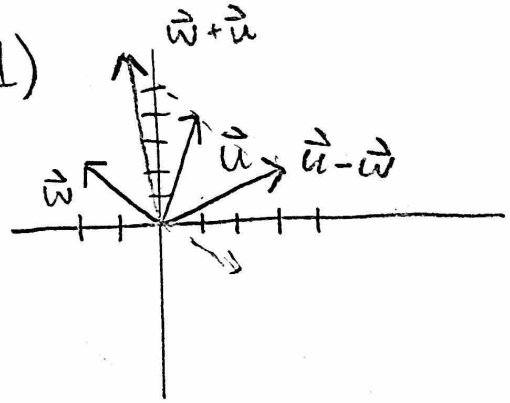
MA 232 - Linear Algebra // Assignment #1

#1)



#2) $(\vec{u}-\vec{w})+(\vec{u}+\vec{w}) \Rightarrow 2\vec{u} = \begin{bmatrix}6\\10\\14\end{bmatrix}$

$\rightarrow \boxed{\vec{u} = \begin{bmatrix}3\\5\\7\end{bmatrix}} \Rightarrow \boxed{\vec{w} = \begin{bmatrix}1\\0\\-1\end{bmatrix}}$

#3) $\boxed{u = \begin{bmatrix}0\\0\\-1\end{bmatrix} \quad \vec{w} = \begin{bmatrix}-1\\0\\0\end{bmatrix}}$

#4) $\sqrt{u \cdot u} = \|u\| = \boxed{\sqrt{5}}$

Honor Statement 2/4/21

~ "I pledge my honor that I have abided by the Stevens Honor System."

#5b)

Josh-Gaeban Elimination →

$$\left|\begin{array}{ccc|c|l} 2 & 3 & 1 & 8 & \div 2 \\ 4 & 7 & 5 & 20 & -4r_1 \\ 0 & -2 & 2 & 0 & \end{array}\right|$$

$$\left|\begin{array}{ccc|c|l} 1 & 3/2 & 1/2 & 4 & +3/2 \cdot r2 \\ 0 & 1 & 3 & 4 & \\ 0 & -2 & 2 & 0 & +2r2 \end{array}\right|$$

$$\left|\begin{array}{ccc|c|l} 1 & 0 & -4 & -2 & +4r3 \\ 0 & 1 & 3 & 4 & -3r3 \\ 0 & 0 & 8 & 8 & \div 8 \end{array}\right|$$

$$\left|\begin{array}{ccc|c} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \end{array}\right| \Rightarrow \boxed{\begin{bmatrix}x\\y\\z\end{bmatrix} = \begin{bmatrix}2\\1\\1\end{bmatrix}}$$

5) $2x+3y+z=8$
$4x+7y+5z=20$
$-2y+2z=0$

$\Rightarrow y=z$ by III

$\rightarrow (2x+4z=8 \text{ I}) \cdot -2$
$4x+12z=20 \text{ II}$

$\rightarrow 4z=4 \rightarrow \boxed{z=1}$ (I+II)

$\boxed{y=1}$ (III)

$\rightarrow \boxed{x=2}$ (I)

$\rightarrow \boxed{\begin{bmatrix}x\\y\\z\end{bmatrix} = \begin{bmatrix}2\\1\\1\end{bmatrix}}$