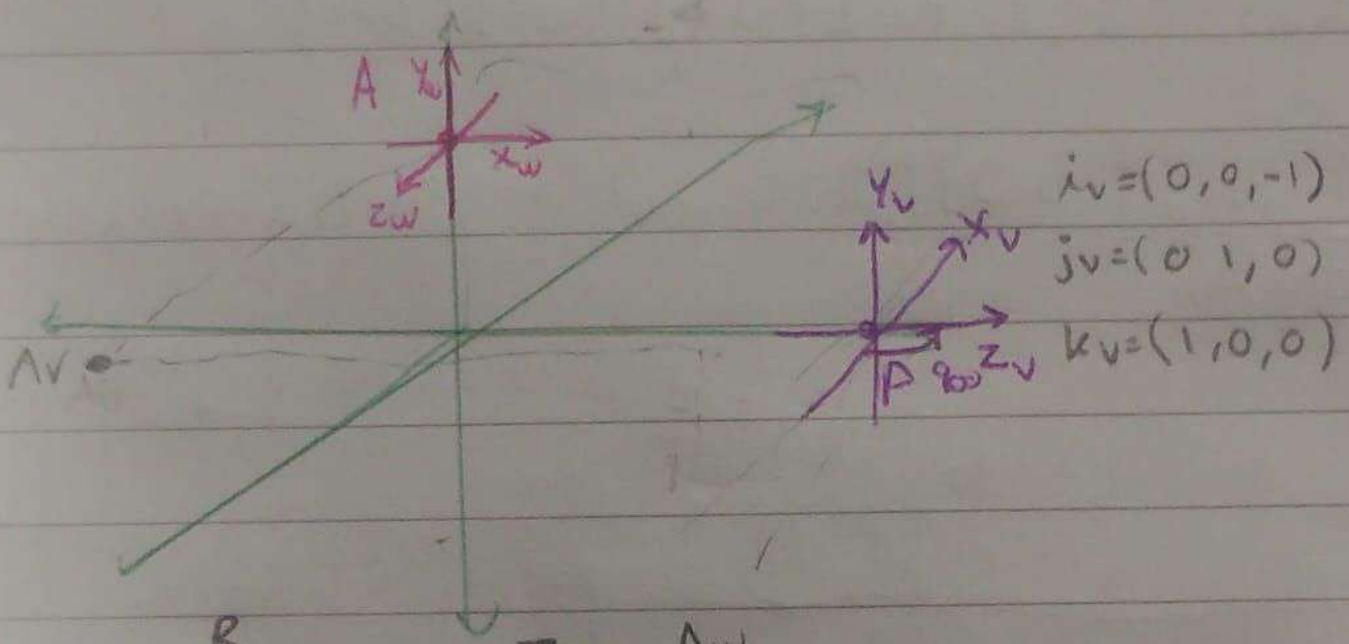
NO:
Date:

$A_W = [0, 2, 0]$ $P_V = [4, 0, 0]$

① P_V aligned with x_w, Y_V aligned with Y_W Get A_V



R T A_W

$$\begin{bmatrix} x' \\ y' \\ z' \\ 1 \end{bmatrix} = \begin{bmatrix} 0 & 0 & -1 & 0 \\ 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & -4 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0 \\ 2 \\ 0 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 0 & 0 & -1 & 0 \\ 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & -4 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0 \\ 2 \\ 0 \\ 1 \end{bmatrix}$$

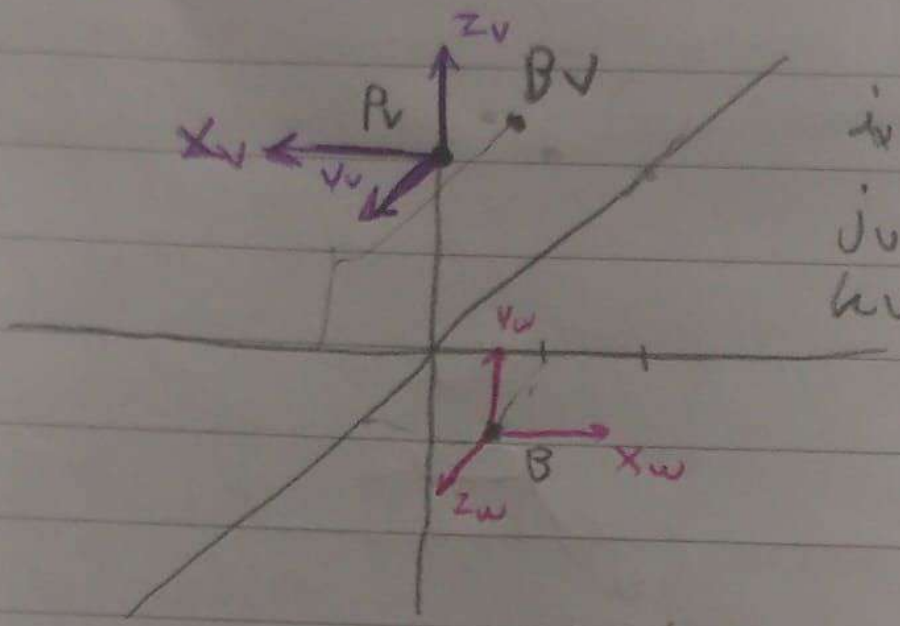
$$= \begin{bmatrix} 0 \\ 2 \\ -4 \\ 1 \end{bmatrix} \quad A_V$$

$A_V = (0, 2, -4)$

$B_w = [1\ 0\ 1]$

NO:
Date:

2. $P_V = [6\ 2\ 0]$, Z_V aligned with Y_W
Q+B Y_V aligned with Z_W



$i_V = (-1, 0, 0)$
$j_V = (0, 0, 1)$
$k_V = (0, 1, 0)$

R T B_W

$$\begin{bmatrix} x' \\ y' \\ z' \\ 1 \end{bmatrix} = \begin{bmatrix} -1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 1 \\ 1 \end{bmatrix}$$

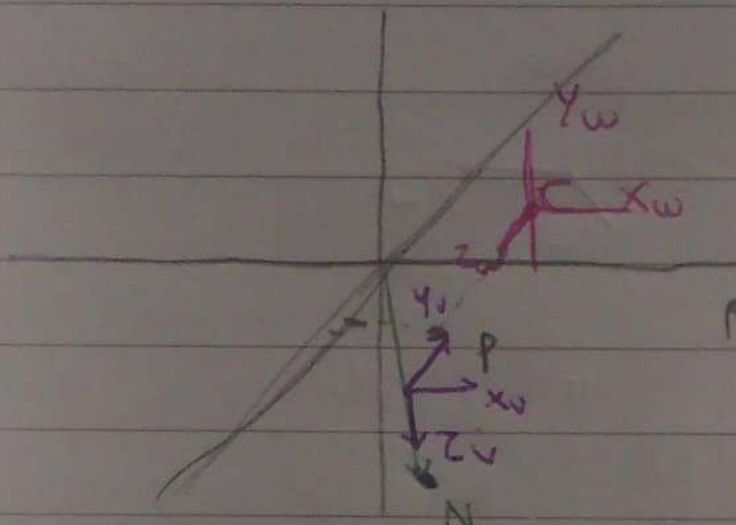
$$= \begin{bmatrix} -1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 1 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} -1 \\ 1 \\ -2 \\ 1 \end{bmatrix} \quad B_V = (-1, 1, -2)$$

$C_v = [1\ 0\ -1]$

NO:
Date:

3. $P_v = [1\ 0\ 1]$, Z_v aligned with vector $N = [1\ -2\ 1]$. Y_v has a positive Y_w component and lies in the same plane as points A_w and B_w. Get C_v



$i_v = \left(-\frac{1}{\sqrt{2}}, 0, -\frac{1}{\sqrt{2}}\right)_w$

$j_v = \left(\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right)_w$

$k_v = \left(\frac{1}{\sqrt{6}}, \frac{-2}{\sqrt{6}}, \frac{1}{\sqrt{6}}\right)_w$

$R^T C_w = C_v$

$B_w - A_w = (1\ 0\ 1) - (0\ 2\ 0) = (1\ -2\ 1)$

$$\begin{bmatrix} \frac{1}{\sqrt{2}} & 0 & -\frac{1}{\sqrt{2}} & 0 \\ \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} & 0 \\ \frac{1}{\sqrt{6}} & -\frac{2}{\sqrt{6}} & \frac{1}{\sqrt{6}} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & -1 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ -1 \\ 1 \end{bmatrix}$$

$$\begin{pmatrix} 0 \\ 0 \\ -2 \\ 1 \end{pmatrix} = \begin{pmatrix} 2/\sqrt{2} \\ -2/\sqrt{3} \\ -2/\sqrt{6} \\ 1 \end{pmatrix}$$

$C_v = \left(\frac{2}{\sqrt{2}}, \frac{-2}{\sqrt{3}}, \frac{-2}{\sqrt{6}}\right)$

NO:
Date:

4. Assuming an orthogonal projection where X_p is aligned with X_v, Y_p is Aligned with Y_v and P_v lies in the projection plane, obtain A_p, B_p and C_p for the corresponding problems above

1) $A_p = [0, 2]$
2) B_p $[-1, 1]$
3) $C_p = [2/\sqrt{2}, -2/\sqrt{3})$