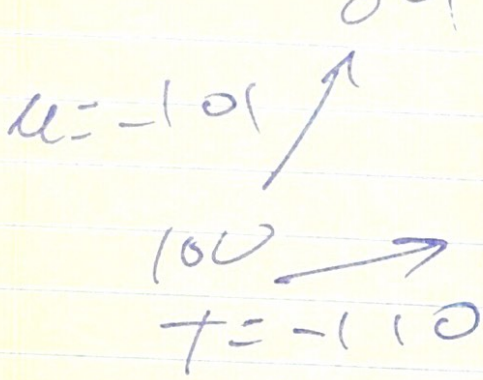
9/30/19 - 1



Txu $\quad -1+1,0 \quad (1,1,1)$

$-(.0'1 \quad \left(\frac{1}{\sqrt{3}}, - , -\right)$

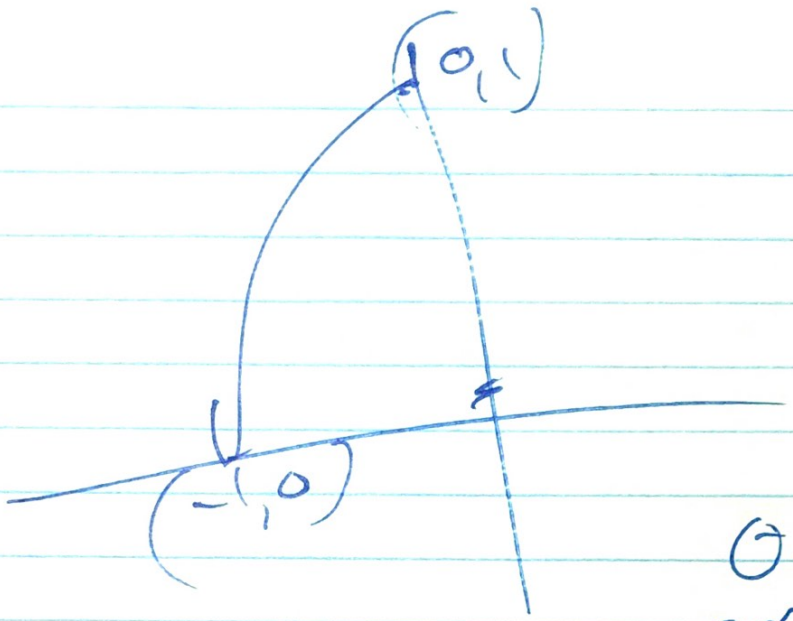
$+(1,2,3) \quad C: \left(\frac{1}{3}, \frac{2}{3}\right) + (1,2)$

$= \left(1\frac{1}{3}, 2\frac{2}{3}\right)$

$\left(\frac{4}{3}, \frac{8}{3}\right)$

H: (4,8,3)

$+(1,2) \quad \begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} = \begin{pmatrix} 4 \\ 8 \\ 3 \end{pmatrix}$



$\theta = 90°$

$\cos = 0$

$\sin = 1$

$$\begin{pmatrix} c & -s \\ s & c \end{pmatrix} \quad \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}\begin{pmatrix} 0 \\ 1 \end{pmatrix} = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

2D POINT $(3,4) \equiv 3+4i$

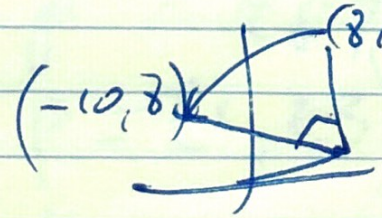
TRANSLATE BY $(5,6) \equiv +(5+6i)$

$(8,10) \qquad (8+10i)$

ROTATE BY $90° \equiv \times i$

$8i + 10i^2$

$(-10+8i)$



ROT BY θ $\equiv$ $e^{i\theta}$

$= \cos\theta + i\sin\theta$

$q_1 = 1 + i$

$q_2 = j + k$

$q_1 q_2 = (1+i)(j+k) = j + k + ij + ik$

$k \quad -j$

$q_2 q_1 = (j+k)(1+i) = 2k$

$j + ji + k + ki = 2j$

$-k \quad j$

ROT BY 180° ABOUT 2 AXIS

$\theta = 180°$ $\quad 0i + 0j + k$

$\frac{\theta}{2} = 90°$ $\quad a = k$

$\cos = 0$

$\sin = 1$

$q = 0 + 0i + 0j + 1k = k$

$q^* = -k$

$p' = qpq^*$

$p = (1, 2, 3)$ $\quad -k(i + 2j + 3k)k$

$p' = (-1, -2, 3)$ $\Leftarrow$ $= (-j + 2i + 3)k$

$= -i - 2j + 3k$

180° ABOUT Z $\quad q_1 = k$

180° ABOUT X $\quad q_2 = i$

COMBO $\quad q = q_2 q_1 = ik = -j$

