# #49

$D = \det\begin{pmatrix} 1 & 2 & 3 & 1 & 2 \\ k & 4 & 3 & k & 4 \\ 3 & 6 & -2 & 3 & 6 \end{pmatrix}$

$= -8 + 18 + 18k - (36 + 18 - 4k)$

$= 10 + 18k - 54 + 4k$

$D = -44 + 22k = 0$

$k = 2$

Gaussian Elim.

$$\begin{pmatrix} 1 & 2 & 3 & 1 \\ 2 & 4 & 3 & 2 \\ 3 & 6 & -2 & 3 \end{pmatrix} \to \begin{pmatrix} 1 & 2 & 3 & 1 \\ 0 & 0 & -3 & 0 \\ 0 & 0 & -11 & 0 \end{pmatrix}$$

$-3 \quad -6 \quad -9 \quad -3$

$x = t$

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

$z = 0$

$\left(t, -\frac{1}{2}t - \frac{1}{2}, 0\right)$

$z = 0$

$x + 2y = 1$

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

some solutions

$(1, 0, 0)$

$(-1, 1, 0)$

$(4, -\frac{3}{2}, 0)$ ...

(# 2d)

$$(-18-48-18)-(12-108+12)$$

$$\det\begin{pmatrix} 3 & -4 & 3 \\ 1 & 2 & 6 \\ 2 & -6 & -3 \end{pmatrix} = 0$$

$$\begin{array}{r} 1 \\ 36 \\ 3 \\ \hline 108 \end{array}$$

## Gaussian Elimination

$$\begin{pmatrix} 3 & -4 & 3 & -2 \\ 1 & 2 & 6 & 6 \\ 2 & -6 & -3 & -8 \end{pmatrix} \rightarrow \begin{pmatrix} +6 & +8 & -6 & +4 \\ 6 & 12 & 36 & 36 \\ 6 & -18 & -9 & -24 \end{pmatrix}$$

$$\rightarrow \begin{pmatrix} 3 & -4 & 3 & -2 \\ 0 & 20 & 30 & 40 \\ 0 & -10 & -15 & -20 \\ & -20 & -30 & -40 \end{pmatrix} \Rightarrow \begin{pmatrix} 3 & -4 & 3 & -2 \\ 0 & 2 & 3 & 4 \\ 0 & 0 & 0 & 0 \end{pmatrix}$$

$3x - 4\left(2 - \frac{3}{2}z\right) + 3z = -2$

$3x + 9z = 6$

$x + 3z = 2$

$x = 2 - 3z$

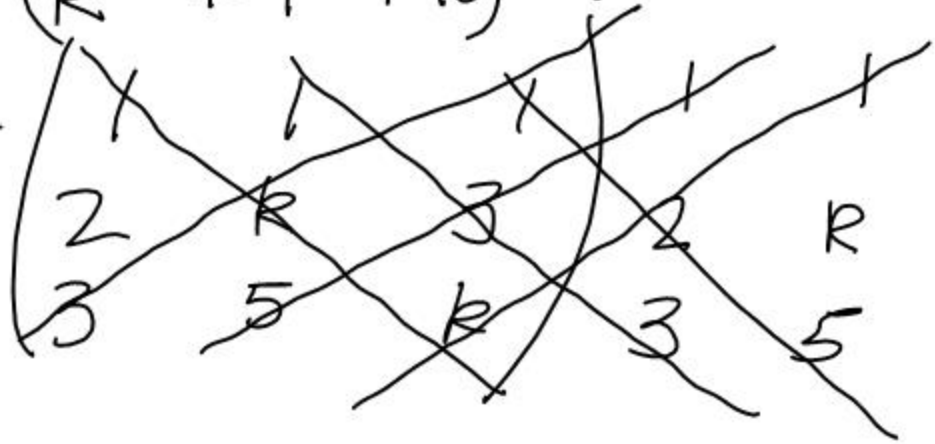
$2y + 3z = 4$

$2y = 4 - 3z$

$y = 2 - \frac{3}{2}z$

#4b $(k^2 + 9 + 10) - (3k + 15 + 2k)$

$\det$




$= k^2 - 5k + 4 = 0$

$(k - 4)(k - 1) = 0$

$k = 1$ or $4$

G.E.

$$\begin{pmatrix} 1 & 1 & 1 & 1 \\ 2 & 1 & 3 & -2 \\ 3 & 5 & 1 & -1 \end{pmatrix} \rightarrow \begin{pmatrix} -6 & -6 & -6 & -6 \\ 6 & 3 & 9 & -6 \\ 6 & 10 & 2 & -2 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 1 & 1 & 1 \\ 0 & -3 & 3 & -12 \\ 0 & -12 & 12 & -48 \\ 0 & 4 & -4 & -8 \\ & 12 & -12 & -24 \end{pmatrix} \rightarrow \begin{pmatrix} 1 & 1 & 1 & 1 \\ 0 & 1 & -1 & 4 \\ 0 & 0 & 0 & -72 \end{pmatrix}$$

not 0

No solution

if $k = 1$

# HW quiz 3R #4b

① Find a common denom

$$\frac{\beta^2\gamma^2}{\beta^2\gamma^2\alpha^2} + \frac{\alpha^2\gamma^2}{\alpha^2\gamma^2\beta^2} + \frac{\alpha^2\beta^2}{\gamma^2\alpha^2\beta^2} = \frac{\alpha^2\beta^2 + \alpha^2\gamma^2 + \beta^2\gamma^2}{\alpha^2\beta^2\gamma^2}$$

6 9

$$(\alpha\beta + \alpha\gamma + \beta\gamma)^2 = \alpha^2\beta^2 + \alpha^2\beta\gamma + \alpha\beta^2\gamma + \alpha^2\beta\gamma + \alpha^2\gamma^2 + \alpha\beta\gamma^2 + \alpha\beta^2\gamma + \alpha\beta\gamma^2 + \beta^2\gamma^2$$

$$(\alpha\beta + \alpha\gamma + \beta\gamma)^2 = (\alpha^2\beta^2 + \alpha^2\gamma^2 + \beta^2\gamma^2) + 2\alpha\beta\gamma(\beta + \alpha + \gamma)$$

6 5 3

$$6^2 = (\ ?\ ) + 2 \cdot 3 \cdot 5$$

$$6 = ?$$

3B

$\Delta = b^2 - 4ac$