MATRIX

$$\begin{bmatrix} 3 & 1 & 2 \\ 4 & 5 & 8 \end{bmatrix}$$

SIZE (ORDER) ROWS X COLS
2 X 3

1. $9x-3y+4z=15$
$x+2y-z=-23$
$-3x-y+z=18$

$$\left[\begin{array}{ccc|c} 9 & -3 & 4 & 15 \\ 1 & 2 & -1 & -23 \\ -3 & -1 & 1 & 18 \end{array}\right]$$

2. $x-4y+2z=3$
$5x+y=7$
$9x-3z=1$

$$\left[\begin{array}{ccc|c} x & y & z & \\ 1 & -4 & 2 & 3 \\ 5 & 1 & 0 & 7 \\ 9 & 0 & -3 & 1 \end{array}\right]$$

3.
$$\left[\begin{array}{ccc|c} x & y & z & \\ 2 & 0 & 3 & 7 \\ 0 & 2 & -4 & 5 \\ 3 & 4 & 0 & -1 \end{array}\right]$$

$2x+0y+3z=7$
$0x+2y-4z=5$
$3x+4y+0z=-1$

$2x+3z=7$
$2y-4z=5$
$3x+4y=-1$

MATRIX OPERATIONS

1. MULTIPLY OR DIVIDE EVERYTHING IN A ROW BY A NUMBER
2. ADD ONE ROW TO ANOTHER ROW
3. MULTIPLY OR DIVIDE A ROW BY A NUMBER AND THEN ADD TO A DIFF. ROW.

4.
$$\begin{matrix} R_1 \\ R_2 \\ R_3 \end{matrix}\left[\begin{array}{ccc|c} 5 & -20 & -10 & 2 \\ 7 & -1 & -3 & 4 \\ 2 & 8 & 2 & -2 \end{array}\right] \quad \frac{1}{5}R_1$$

$$\left[\begin{array}{ccc|c} 5\left(\frac{1}{5}\right) & -20\left(\frac{1}{5}\right) & -10\left(\frac{1}{5}\right) & 2\left(\frac{1}{5}\right) \\ 7 & -1 & -3 & 4 \\ 2 & 8 & 2 & -2 \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & -4 & -2 & \frac{2}{5} \\ 7 & -1 & -3 & 4 \\ 2 & 8 & 2 & -2 \end{array}\right]$$

5.
$$\left[\begin{array}{ccc|c} 4 & -2 & 3 & 1 \\ 5 & -1 & -2 & 9 \\ 1 & 2 & 7 & -3 \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 4 & -2 & 3 & 1 \\ -3 & 3 & -8 & 7 \\ 1 & 2 & 7 & -3 \end{array}\right]$$

$-2R_1+R_2=$ NEW R_2

$$-2\left[\begin{array}{ccc|c} 4 & -2 & 3 & 1 \end{array}\right]$$
$$\left[\begin{array}{cccc} -8 & 4 & -6 & -2 \end{array}\right] \quad -2R_1$$
$$+\left[\begin{array}{cccc} 5 & -1 & -2 & 9 \end{array}\right] \quad R_2$$
$$\left[\begin{array}{cccc} -3 & 3 & -8 & 7 \end{array}\right] \quad \text{NEW } R_2$$