

ABSOLUTE VALUE INEQUALITIES + MATRIX ARITHMETIC

$$\begin{array}{l} |-5| = 5 \\ |5| = 5 \end{array} \quad \begin{array}{c} + \\ -5 \quad 0 \quad 5 \end{array}$$

$$\begin{array}{l} |x| = 4 \\ x = 4 \text{ OR } x = -4 \end{array}$$

$$\begin{array}{l} |x+6| = 9 \\ x+6 = 9 \quad x+6 = -9 \\ x = 3 \quad \quad x = -15 \end{array}$$

$$-2|x+2| + 12 = 0$$

$$\frac{-2|x+2|}{-2} = \frac{-12}{-2}$$

$$|x+2| = 6$$

$$x+2 = 6 \text{ OR } x+2 = -6$$

$$x = 4 \text{ OR } x = -8$$

1) Isolate the abs value.

2) Write + solve 2 equations.

$$\begin{array}{l} |x+2| = -6 \\ \text{No solution} \end{array}$$

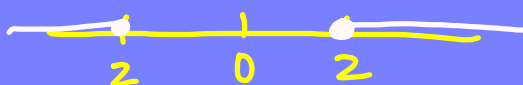
Abs. Value Inequalities

$$|x| < 3$$



Less than AND

$$|x| \geq 2$$



Greater OR

Absolute value must be isolated!

$$4|6x+2| + 20 > 12$$

$$\frac{4|6x+2|}{4} > \frac{-8}{4}$$

$$|6x+2| > -2$$

\mathbb{R}

$$|7x+3| < -5$$

No solution

$$-5|8-6x| + 45 > -15$$

1) Isolate

$$\frac{-5|8-6x|}{-5} > \frac{-60}{-5}$$

Switch!

$$|8-6x| < 12$$

Check this!

$$\begin{array}{r} 8-6x < 12 \\ -8 \quad -8 \\ \hline -6x < 4 \\ \hline -6 \quad -6 \\ \hline x > -2/3 \end{array}$$

AND

$$\begin{array}{r} 8-6x > -12 \\ +12 \quad +12 \\ \hline 20 > 6x \\ \hline 20/6 > x \end{array}$$

Switch!

$$x > -2/3$$

AND

$$10/3 > x$$



$$-2/3 < x < 10/3$$

MATRIX ARITHMETIC - +, -, *

Matrix - a rectangular array of numbers
 enclosed by brackets.

Row \rightarrow $\begin{bmatrix} -1 & 2 & 3 \\ 4 & 6 & 7 \end{bmatrix}$

Dimensions: # of rows \times # of columns
 2×3

$$\begin{bmatrix} 3 & -6 \\ 4 & 2 \\ 5 & -1 \end{bmatrix} + \begin{bmatrix} 8 & 0 \\ -4 & 3 \\ 5 & 7 \end{bmatrix} = \begin{bmatrix} 11 & -6 \\ -5 & 5 \\ 10 & 6 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 3 \\ 4 & -6 \end{bmatrix} + \begin{bmatrix} 1 & -7 \end{bmatrix} = \text{Not possible}$$

must be same dimensions

$$2 \begin{bmatrix} 5 & -3 \\ 4 & 7 \end{bmatrix} - \begin{bmatrix} 4 & 7 \\ -2 & 5 \end{bmatrix} = \begin{bmatrix} 10 & -6 \\ 8 & 14 \end{bmatrix} + \begin{bmatrix} -4 & -7 \\ 2 & -5 \end{bmatrix}$$

$$= \begin{bmatrix} 6 & -13 \\ 10 & 9 \end{bmatrix}$$

$$\begin{bmatrix} 3 & -2 & 4 \\ 1 & 0 & -5 \end{bmatrix} \cdot \begin{bmatrix} 5 & 0 \\ -2 & 6 \\ -1 & 3 \end{bmatrix} = \begin{bmatrix} 15+4+(-4) & 0+(-12)+12 \\ 5+0+5 & 0+0+(-15) \end{bmatrix} \\
 2 \times 3 \quad 3 \times 2 = 2 \times 2 \\
 \begin{bmatrix} 15 & 0 \\ 10 & -15 \end{bmatrix}$$