– **absolute value inequality** → solved by rewriting it as a Compound Inequality "AND" / "OR"

- After isolating the absolute value, follow these rules to determine which compound inequality to use:
- greater than "great**OR**" ($>, \geq$) → If $|x| > b$, then $x > b$ or $x < -b$
- less than "less**AND**" ($<, \leq$) → If $|x| < b$, then $x < b$ and $x > -b$ $\{-b < x < b$
- Special Cases with absolute value inequalities → a.) $|x| < -b$ then answer is $\varnothing$ ($+ < -$ False)
  occur After you isolate the absolute value.
  b.) $|x| > -b$ then answer is TR $(-\infty, \infty)$ ($+ > -$ TRUE)

Example 4: Solve each absolute value inequality. Write your answer in interval notation.

a.) $|2x+4| \geq 12$ OR
Is isolated
$2x+4 \geq 12$ or $2x+4 \leq -12$
$-4 \quad -4 \qquad -4 \quad -4$
$\frac{2x}{2} \geq \frac{8}{2}$ or $\frac{2x}{2} \leq \frac{-16}{2}$
$x \geq 4$ or $x \leq -8$
$x \leq -8$ or $x \geq 4$
$(-\infty, -8] \cup [4, \infty)$

b.) $|6x-3| < 21$ AND
$6x-3 < 21$ and $6x-3 > -21$
$+3 \quad +3 \qquad +3 \quad +3$
$\frac{6x}{6} < \frac{24}{6}$ | $\frac{6x}{6} > \frac{-18}{6}$
$x < 4$ and $x > -3$
$x > -3$ and $x < 4$
$-3 < x < 4$
$(-3, 4)$

c.) $6 - |2-6x| \geq 2$
$-6 \quad -6$
$\frac{-|2-6x|}{-1} \leq \frac{-4}{-1}$ AND
$|2-6x| \leq 4$
$2-6x \leq 4$ and $2-6x \geq -4$
$-2 \quad -2 \qquad -2 \quad -2$
$\frac{-6x}{-6} \leq \frac{2}{-6}$ | $\frac{-6x}{-6} \geq \frac{-6}{-6}$
$x \geq -\frac{1}{3}$ and $x \leq 1$
$[-\frac{1}{3}, 1]$

d.) $7 - 2|7+10x| < 53$
$-7 \quad -7$
$\frac{-2|7+10x|}{-2} > \frac{46}{-2}$
$|7+10x| > -23$
$+ > -$
TRUE
TR
$(-\infty, \infty)$

e.) Deion estimates that he will need between 55 and 60 ceramic tiles to retile his kitchen. Deion hires a company to install the tiles for $6 per tile and a flat installation fee of $20. How much money will Deion potentially spend to get his kitchen retiled?

+20
x – total cost of tiles.

$55 \leq \frac{x}{6} + 20 \leq 60$
$-20 \qquad -20 \qquad -20$
$(6)35 \leq \frac{x}{6}(6) \leq 40(6)$
$210 \leq x \leq 240$

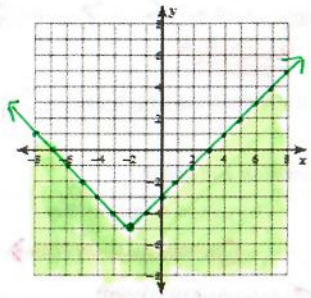
Deion will potentially spend between $210 and $240.

Graphing an Absolute Value Inequality Function is similar to graphing other inequality functions.

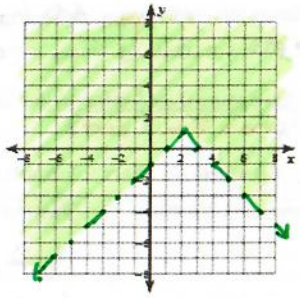
- Determine if the Boundary Line ($<$ - $>$ dashed (dotted) or $\leftrightarrow$ solid) is dashed (dotted) or solid
- Graph the function. Use the Calculator to get the points. Must find the vertex
- Determine where to shade: $>$ or $\geq$ above the line or $<$ or $\leq$ below the line.
- Shade the region where all the solutions are located.

Example 5: Graph each inequality.

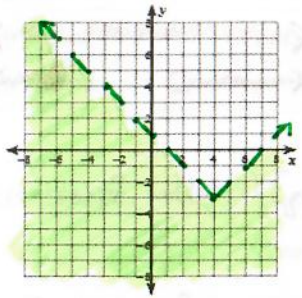
a.) $y \leq |x+2| - 5$ → vertex $(-2, -5)$
↳ solid line, shade below



b.) $y > -|x-2| + 1$ → vertex $(2, 1)$
flips over x-axis!
↳ dotted line, shade above



c.) $y < |x-4| - 3$ → vertex $(4, -3)$
↳ dotted line, shade below



d.) $y \geq -\frac{1}{2}|x+1| + 4$ → vertex $(-1, 4)$
flips over x-axis
↳ solid line, shade above