

Name: _____

Date: _____

To **check** the values of an **absolute value equation** or **inequality** using your TI-83+ or TI-84+ calculator, follow these steps:

1. Isolate the absolute value (get the |.....| by itself).
2. Whatever is on the left of the =, <, >, ≤, or ≥, goes into Y₁ on your calculator.
 - a. If it is an absolute value expression (has |.....|), this is entered into your calculator by pressing `2ND` `0` (which is `abs`) and the first function is `abs` (which stands for absolute value. Place whatever is in between the |.....| exactly as you see it and close the parentheses)
3. Whatever is on the right of the =, <, >, ≥, or ≤ goes in Y₂ on your calculator.
4. Press # `6` to see if you can see where the graphs intersect.
 - a. If an equality:
 - i. If you can see the intersections, then you can determine the x-values where the equation is solved (è `Calculate` them!)
 - ii. If you cannot see the intersections, change your @ `Window` until you can, then see Step i. above.
 - b. If an inequality:
 - i. If they are asking for < or ≤, you are looking for values **below** the horizontal line and you will be using an **and** (`_____ < x < _____`)
 - ii. If they are asking for > or ≥, you are looking for values **above** the horizontal line and you will be using an **or** (`x < _____ or x > _____`)

Example 1:

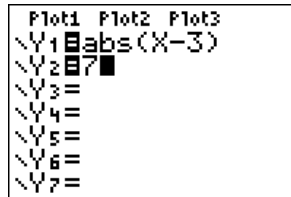
Solve $|x - 3| - 2 = 5$.

❶ Get $|x - 3|$ by itself:

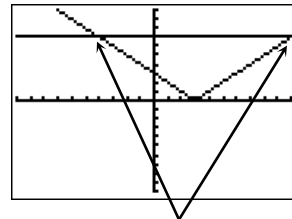
$$|x - 3| = 7$$

Put $|x - 3|$ in Y₁:

Put 7 in Y₂:

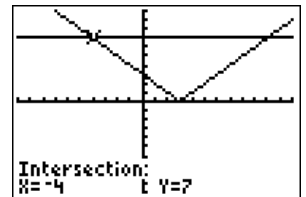
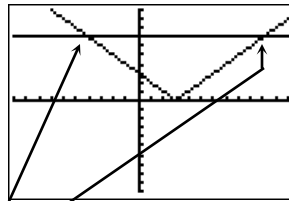
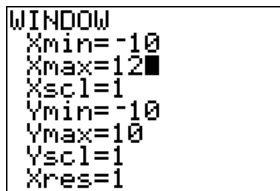


❷ Press # `6`

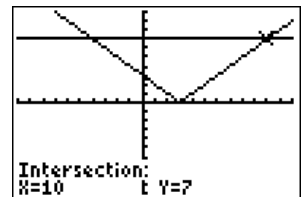


You can see where the graphs intersect, but let's change the @ `Window` to see them better.

❸ Set Xmax = 12 and press % `Window`.



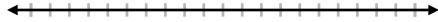
❹ You can see where the graphs intersect better now. Find the values using `2ND` `5` (`Calculate`). The values are $x = \underline{\hspace{1cm}}$ **and** $x = \underline{\hspace{1cm}}$.



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Graph the solution of $|x - 3| = 5$:



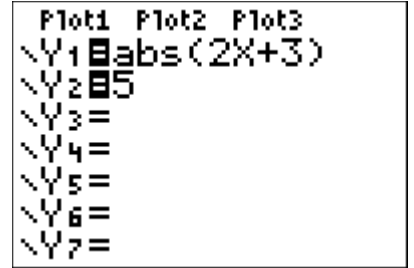
Example 2:

Solve: $3|2x + 3| - 1 \leq 14$

1 Remember, *isolate* the $|\dots|$ first!

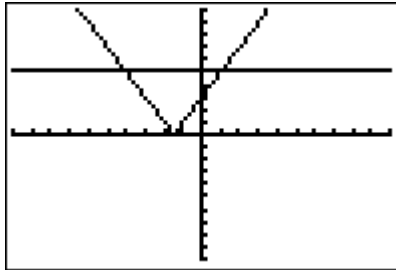
$$|2x + 3| \leq 5$$

2 Enter the left hand side into Y_1 and the right hand side into Y_2 :



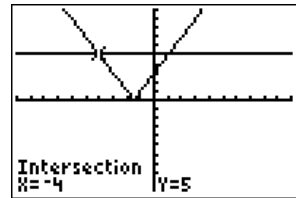
2

3 Press $\%$:



3

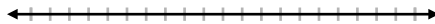
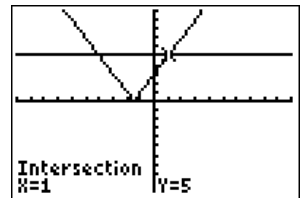
Only y-values less than or equal to 5 are being sought! These are indicated as those **under** the horizontal line*! Find where the graphs intersect:



For what values of x is the graph of the absolute value (the "V"-shaped graph) **below** the horizontal line*?

Between _____ and _____. Our solution then is:

$$\text{_____} \leq x \leq \text{_____} \text{ and the graph:}$$



*Conversely, if asked $|2x + 3| > 5$, we would look for the values of x when the absolute value graph is **above** the horizontal line.

Practice:

Solve and graph the solution set of:

a. $|x + 2| = 3$

b. $4|2x - 1| > 8$

c. $|1 - x| < 5$

