Day 06 Notes on Solving Absolute Value Inequalities

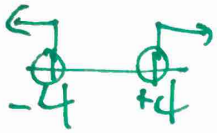
Master E.

Remember: The absolute value of x: $|x|$ = the distance the number is from zero on a number line. Since this value is a distance it can never be negative!

Activity Cards: With a Partner...
Flip each card that is a solution to each inequality.

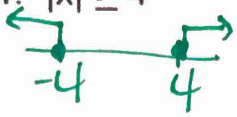
1. $|x| = 4$

2. $|x| > 4$



3. $|x| < 4$

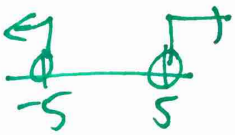
4. $|x| \geq 4$



5. $|x| \leq 4$

6. $|x| - 3 > 2$

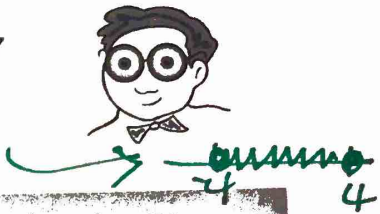
$|x| > 5$



7. $2|x| - 1 \leq 7$

$2|x| \leq 8$

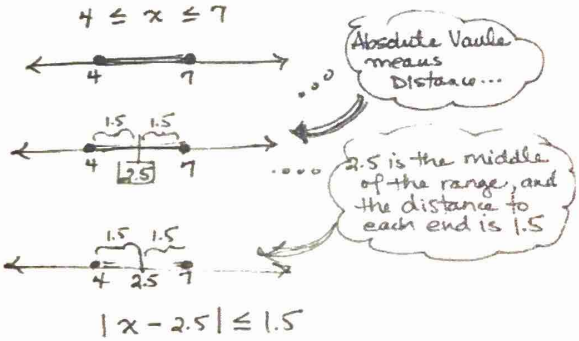
$|x| \leq 4$



Compare each outcome...

$|x| = -3$ $|x| > -3$ $|x| < -3$

So, how could we write this compound expression using an absolute value?...



What is the inequality for those who can't ride the rollercoaster?

Steps to Solving Absolute Value Inequalities:

1. Isolate the absolute value on the left side of the inequality.
2. Check to see if a solution is possible and decide what type of compound sentence it is...
   $|x| >$ # great**OR** .... $|x| <$ # is less th**AND**
3. Set up two inequalities:
   - Drop the absolute value and keep everything the same.
   - Drop the absolute value and switch the sign of the inequality AND the expression on the right.
4. Solve both inequalities and graph your result.
5. Write your FINAL answer according to the type of solution (AND or OR).

PRACTICE 1-6: Solve each absolute value inequality.

1. $3|y+5| < 6$

$\frac{3}{3} \quad \frac{3}{3}$

$|y+5| < 2$

$y+5 < 2 \quad y+5 > -2$

$-5 \quad -5 \quad -5 \quad -5$

$y < -3 \quad y > -7$

$-7 \quad -3$

$-7 < y < -3$

2. $|2x-5| > 9$

$2x-5 > 9 \quad 2x-5 < -9$

$+5 \quad +5 \quad +5 \quad +5$

$\frac{2x}{2} > \frac{14}{2} \quad \frac{2x}{2} < \frac{-4}{2}$

$x > 7 \quad x < -2$

$-2 \quad 7$

$x < -2$ or $x > 7$

3. $|x| < -10$

$\emptyset$

No distance will be a neg #, so it can't be less than -10!

4. $|x| > -10$

$\mathbb{R}$

All distance is +, so no matter what # you put in, it will be greater than -10

5. $|x+2| \leq 2x+7$ AND

$x+2 \leq 2x+7 \quad x+2 \geq -2x-7$

$-x \quad -x \quad +2x \quad +2x$

$2 \leq x+7 \quad 3x+2 \geq -7$

$-7 \quad -7 \quad -2 \quad -2$

$-5 \leq x \quad \frac{3x}{3} \geq \frac{-9}{3}$

$x \geq -3$

$-5 \quad -3$

FA $x \geq -3$

6. $-|x-7| + 5 \geq 3x - 2$

$-5 \quad -5$

$-|x-7| \geq 3x-7$

$|x-7| \leq -3x+7$ AND

$x-7 \leq -3x+7 \quad x-7 \geq 3x-7$

$+3x \quad +3x \quad -x \quad -x$

$4x-7 \leq 7 \quad -7 \geq 2x-7$

$+7 \quad +7 \quad +7 \quad +7$

$\frac{4x}{4} \leq \frac{14}{4} \quad \frac{0}{2} \geq \frac{2x}{2}$

$x \leq \frac{7}{2} \quad 0 \geq x$

$0 \quad \frac{7}{2}$

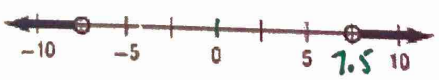
$x \leq 0$ FA

7-8: Write an absolute value inequality to represent the graph shown.

7.

$|x| \leq 5$

8.



$|x| \geq 7.5$