

Equations and Inequalities Involving Absolute Value

Equations Involving Absolute Value

Here's an example of an **absolute value equation**: $|x| = 5$

What are the solutions to the above equation? _____

Ex 1.

Solve and check: $|2x - 5| = 9$

Ex 2.

Solve: $4|3x + 2| - 44 = 0$

Ex 3.

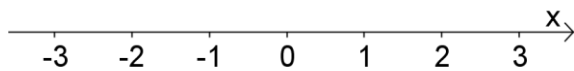
What the solution set of $|3x^2 + \sqrt{x} - 45| = -2$?

Ex 4.

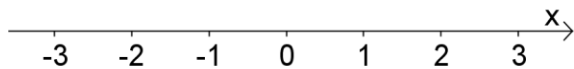
Solve: $|4x - 1| = |x + 5|$

Solving Inequalities Involving Absolute Value**Ex 5.**

What is the solution set of $|x| < 2$?

**Ex 6.**

What is the solution set of $|x| > 2$?

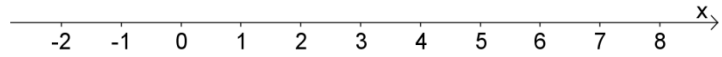
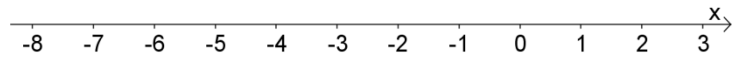
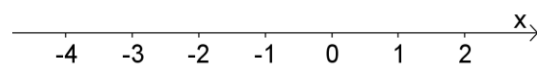


In general, if \square represents an algebraic expression (like $2x - 3$) and c is a positive #, then...

...solutions of $|\square| < c$ are the #'s that satisfy $-c < \square < c$

...solutions of $|\square| > c$ are the #'s that satisfy $\square < -c$ or $\square > c$

(Note: the above rules work with \leq and \geq as well)

Ex 7.Solve the inequality: $|x - 3| < 4$ **Ex 8.**Solve the inequality: $|2x + 5| \geq 9$ **Ex 9.**Solve the inequality: $-3|2x + 1| + 4 \geq -5$ 

Ex 10.

What's the solution set of $|x| < -2$?

Ex 11.

What's the solution set of $|x| > -2$?

In general ...

...solution set for $|\square| < \text{neg \#}$ is _____

...solution set for $|\square| > \text{neg \#}$ is _____

Ex 12.

Solve the inequality: $|4x + 5| > -3$

Practice

1. Solve and check: $|2x - 3| = 11$
2. Solve: $|3x - 2| + 4 = 4$
3. Solve: $|5x + 17| = -2$
4. Solve: $|4x - 9| = |2x + 1|$
5. Solve: $|2x - 3| \leq 4$. Graph your solution set. Write your solution in interval notation.
6. Solve: $\left|3 - \frac{3x}{4}\right| > 9$. Graph your solution set. Write your solution in interval notation.
7. Solve: $|x - 3| < -2$
8. Solve: $|x + 4| > -5$. Write your solution in interval notation.

Q: What word starts with "e" and has only one letter in it?