Algebra II Absolute Value

Since Ms. Carlson's lesson in class was very unclear, here is my attempt to teach it in an easier-to-understand way. First I'm just gonna get some questions out of the way.

What is Absolute Value?

The absolute value of a number is defined as how far a number is from "0" on the number line. This is a lame way to explain it, basically it means make the number positive.

What is an Absolute Value Equation?

An absolute value equation is an equation where a variable, usually x is within absolute value bars, which are treated like parentheses. An example would be "$|x + 1| - 3 = 2 - 3x$".

How do I solve the equation?

To solve the equation $|x + 1| - 3 = 2 - 3x$, you have to simplify it as far as you can and isolate the absolute value part of the equation. Work:

$|x + 1| - 3 = 2 - 3x$

$\quad + 3 \quad + 3$

$|x + 1| = 5 - 3x$

This leaves us with an absolute value expression on one side of the equation and a regular expression on the other. Remember this equation, because this is what you will be checking the answers with. Now, make two separate equations without any absolute value. One with the regular side being the same, and one with the side being the opposite. Then simplify to get the values for x. Work:

$x + 1 = \mathbf{5 - 3x}$ | $x + 1 = \mathbf{-5 + 3x}$

$- 1 \quad - 1$ | $-1 \quad -1$

$x = 4 - 3x$ | $x = -6 + 3x$

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

$4x = 4$ | $-2x = -6$

4 | -2

$x = 1$ | $x = 3$

So now, we have both of our x values. We aren't done yet, however, because of how absolute value equations work. You can't have an absolute value equal to a negative number since absolute value numbers can't be negative. To do this, we'll just plug both numbers in for x in our simplified equation. Work: Sidenote: you can use the original equation but it will take longer

$|\mathbf{1} + 1| = 5 - 3(\mathbf{1})$ | $|\mathbf{3} + 1| = 5 - 3(\mathbf{3})$

$|2| = 2$ | $|4| = -4$

True | **False**

This means our final answer is $x = 2$. No, you don't have to check if $x = 4$ five times. If you have more than one answer that's true, write both of them out.

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