Solving absolute value equations   NAME:

This worksheet is designed to help you make sense of the methods we use to algebraically solve absolute value equations.

1. Consider the equation $|w| = 7$. Why can we algebraically follow this with $w = 7$ or $w = -7$? (In other words, what about absolute value tells us that w would have to be 7 or -7? What does the absolute value of a number really tell us?)

2a. Use this idea to rewrite $|4x - 2| = 7$ as two equations. (Notice the absolute value signs are gone at this point.) Then solve these equations separately to find the two solutions to $|4x - 2| = 7$.

2b. Check your two solutions *in the original equation*. Show your work. Label which solution you are checking so I can follow your work. Do the solutions make the original equation true?

3. Solve the equation $|6 + 3x| - 4 = 10$ algebraically. *Isolate the absolute value part* before you use the procedure above and show your work. Write your solutions as fractions in simplest terms.

4. Why does the equation $|4x + 5| = -3$ not have a solution? In other words, what about absolute value tells you that this equation can have no solution?

5. If you know the absolute values of two algebraic expressions are equal, then what must be true of the expressions? There are two possibilities here. (An example of this would be $|x - 14| = |3x + 2|$. Here the two algebraic expressions are "x – 14" and "3x + 2". If their absolute values are the same, then what must be true of the numbers they represent?)