INVESTIGATION: SOLVING EQUATIONS INEQUALITIES CONTAINING THE ABSOLUTE VALUE FUNCTION/T188 pdf

1: Eleventh grade Lesson The Overtime Problem | BetterLesson

The absolute number of a number a is written as $$\left | a \right |$$ And represents the distance between a and 0 on a number line. An absolute value equation is an equation that contains an absolute value expression.

These techniques involve rewriting problems in the form of symbols. For example, the stated problem "Find a number which, when added to 3, yields 7" may be written as: We call such shorthand versions of stated problems equations, or symbolic sentences. The terms to the left of an equals sign make up the left-hand member of the equation; those to the right make up the right-hand member. The value of the variable for which the equation is true 4 in this example is called the solution of the equation. We can determine whether or not a given number is a solution of a given equation by substituting the number in place of the variable and determining the truth or falsity of the result. The first-degree equations that we consider in this chapter have at most one solution. The solutions to many such equations can be determined by inspection. Example 2 Find the solution of each equation by inspection. However, the solutions of most equations are not immediately evident by inspection. Hence, we need some mathematical "tools" for solving equations. In solving any equation, we transform a given equation whose solution may not be obvious to an equivalent equation whose solution is easily noted. The following property, sometimes called the addition-subtraction property, is one way that we can generate equivalent equations. If the same quantity is added to or subtracted from both members of an equation, the resulting equation is equivalent to the original equation. The next example shows how we can generate equivalent equations by first simplifying one or both members of an equation. We want to obtain an equivalent equation in which all terms containing x are in one member and all terms not containing x are in the other. Sometimes one method is better than another, and in some cases, the symmetric property of equality is also helpful. Also, note that if we divide each member of the equation by 3, we obtain the equations whose solution is also 4. In general, we have the following property, which is sometimes called the division property. If both members of an equation are divided by the same nonzero quantity, the resulting equation is equivalent to the original equation. Solution Dividing both members by -4 yields In solving equations, we use the above property to produce equivalent equations in which the variable has a coefficient of 1. Also, note that if we multiply each member of the equation by 4, we obtain the equations whose solution is also In general, we have the following property, which is sometimes called the multiplication property. If both members of an equation are multiplied by the same nonzero quantity, the resulting equation Is equivalent to the original equation. Example 1 Write an equivalent equation to by multiplying each member by 6. Solution Multiplying each member by 6 yields In solving equations, we use the above property to produce equivalent equations that are free of fractions. There is no specific order in which the properties should be applied. Any one or more of the following steps listed on page may be appropriate. Steps to solve first-degree equations: Combine like terms in each member of an equation. Using the addition or subtraction property, write the equation with all terms containing the unknown in one member and all terms not containing the unknown in the other. Combine like terms in each member. Use the multiplication property to remove fractions. Use the division property to obtain a coefficient of 1 for the variable. We can solve for any one of the variables in a formula if the values of the other variables are known. We substitute the known values in the formula and solve for the unknown variable by the methods we used in the preceding sections. Solution We can solve for t by substituting 24 for d and 3 for r. We use the same methods demonstrated in the preceding sections. Solution We may solve for t in terms of r and d by dividing both members by r to yield from which, by the symmetric law, In the above example, we solved for t by applying the division property to generate an equivalent equation. Sometimes, it is necessary to apply more than one such property. Solution We can solve for x by first adding -b to each member to get then dividing each member by a, we have.

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2: Algebra - Absolute Value Inequalities (Assignment Problems)

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Understand patterns, relations, and functions Relate and compare different forms of representation for a relationship; Represent and analyze mathematical situations and structures using algebraic symbols develop an initial conceptual understanding of different uses of variables; explore relationships between symbolic expressions and graphs of lines, paying particular attention to the meaning of intercept and slope; use symbolic algebra to represent situations and to solve problems, especially those that involve linear relationships; recognize and generate equivalent forms for simple algebraic expressions and solve linear equations Common Core State Standards CCSS 8. Determine the rate of change and initial value of the function from a description of a relationship or from two x, y values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. Graph the solution set of the inequality and interpret it in the context of the problem. Write an inequality for the number of sales you need to make, and describe the solutions. Solve simple cases by inspection. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Student Misconceptions Student Misconceptions and Common Errors When writing solutions to inequalities, students will show that the answer is greater than 4, but then they will record their answer as 5 or greater. Students think the answer is the next whole number, ignoring all the numbers between 4 and 5 that are also part of the solution. Students may think that the inequality symbols indicate the direction of the shading of the number line. Students may forget to switch the direction of the inequality symbol aka "flip" the inequality symbol when multiplying or dividing by a negative number when solving. Students will forget to find both solutions when solving with absolute values. Students forget that the solution for a system of linear equations is the point of intersection of the two lines on a graph and only solve for one variable. Vignette In the Classroom In this problem, students will be exploring possible pledge plans for walking in a walk-a-thon to raise money for their student council. They will be comparing two different plans. Yesterday we talked about deciding when one is better than the other. So according to these equations, which pledge plan is better? It depends on how far you walk. So when is Plan A better? Anytime after 4 miles because the amount of money collected is higher. But before that Plan B is better because the money collected for that Plan is higher. How did you come up with 4 miles? That point is where the two plans are equal. They will collect the same amount of money if they walk 4 miles. How much money will they collect? Ok, so we can look at the graph and find the intersection point to help us find when the two plans are equal. We have also solved this symbolically by making the two plans equal to each other. Try that and see if your answers match. When is plan A better than Plan B? Like we said before, anytime after 4 miles. The graph for line A is higher than the graph for line B after that point. We need a way to write "anytime after 4 miles" mathematically to include all the possible solutions. The miles walked are greater than 4 so I could use the "greater than" symbol: So I wrote it like this: Are these two solutions the same? Are they the same? So it works to be 5 miles or greater. What if the students walked 4. Will Plan A still be better? Do both of your solutions include 4. So I guess they are not the same. But I guess we could walk part of a mile. When we were finding the point where the two plans were equal, we used the graph and then checked it by making the equations equal to each other and solving it symbolically. So then what, do we just solve it like the equation? See if we get an answer that matches the answer we got using the graph. I got the same answer as the graph. So I just do the same thing I do to solve an equation. What did I do wrong? I still got 4 miles but the sign is wrong. What do you notice about the work of these two students? Well they both did their work correctly. They just started with a different step. So which is correct? Start with this comparison Students "yes" Now multiply both numbers by 3. Divide both numbers by Is this still true? What keeps making the statement false? It seems like something with negative numbers. We circled the places where we ran into trouble. The only times were when we multiplied and divided by a negative number. The first operation we did was multiply by 3 and there was no problem. So I think it gets messed up whenever we multiply or divide by a negative number. Start with a true inequality statement. Make sure at least one of your operations divides or multiplies by a negative number. Yeah it works for all of them! When you multiply or divide by a negative number, you have to make it "work" by changing the sign. How does this help us understand what Annie and Stan did symbolically to prove that the pledge Plan A is better than Plan B when they walk more than 4 miles in the walk-a-thon? If you look at their work, Annie never had to divide by a negative number and Stan did. So he should make it "work" by changing the sign. We even said that earlier. We said Stan would be right if he could change the sign. We will have to pay close attention to the operations we use to solve so we make sure we consider the discovery you just made as to what happens when you divide or multiply by a negative number.

3: Solving compound inequalities (Algebra 1, Linear inequalitites) â€“ Mathplanet

Free absolute value inequality calculator - solve absolute value inequalities with all the steps. Type in any inequality to get the solution, steps and graph.

4: Solve Absolute Value Equations & Inequalities

This algebra 1 & 2 video tutorial shows you how to graph absolute value functions with inequalities using transformations from the parent function.

5: Inequalities Calculator - Symbolab

Before we get into solving equations containing absolute values, we must first have a firm grasp at what "absolute value" actually means. See our article on the absolute value function for more information, as well.

6: Section 5 - Solve Absolute Value Inequalities

A system of linear equations contains two or more equations e.g. y=x+2 and y=x The solution of such a system is the ordered pair that is a solution to both equations. To solve a system of linear equations graphically we graph both equations in the same coordinate system.

7: Absolute Value Inequalities Calculator - Symbolab

74 CHAPTER 2 Equations, Inequalities, and Problem Solving As we explore in this section, an expression such as is not as simple as possible,becauseâ€”even without replacing x by a valueâ€”we can perform the indicated.

8: Equation Worksheets

58 Chapter 2 Solving Systems of Equations and Inequalities Using a Graphing Calculator Use a graphing calculator to fi nd the solution, if it exists, of the system of linear inequalities.

9: Solving absolute value equations and inequalities (Algebra 1, Linear inequalitites) â€“ Mathplanet

Equations Inequalities System of Equations System of Inequalities Calculator, Radical Inequalities. we went over how to

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solve absolute value inequalities. For.

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