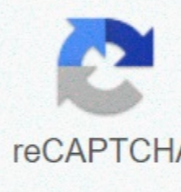I'm not robot

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Solving compound and absolute value inequalities answers

Learning outcomes Solving compound inequalities. Solve absolute value inequalities. A compound inequality includes two inequalities in a single statement. Statement such as [latex]4 <x\le 6[/latex]= means=></x\le> <x| atex]= and= [latex]x\le= 6[/latex].= there= there= two= ways= to= solve= compound= inequalities:= separating= them= into= two= separate= inequalities= or= leaving= the= compound= inequality= intact= and= performing= operations= on= all= three= parts= at= the= same= time.= we= will= illustrate= both= methods.= solve= the= compound= inequality:= [latex]3\le=></x[> <6[atex].= solve= the= compound= inequality=></6[> <2x -= 8\le= 10[/latex].= solve= the= compound= inequality= with= variables= in= all= three= parts:= [latex]3+x=><7x - 2>5x - 10[/latex]. Solve compound inequality: [latex]3y <4 -=></4> <5+3y[atex].= solving= absolute= value= inequalities= as= we= know,= the= absolute= value= of= a= quantity= is= as= positive= number= or= zero.= from= the= origin,= a= point= located= at= [latex]left(-x,0\right)[/latex]= has= an= absolute= value= of = [latex]x[/latex]= as= it= is= x= units= away.= consider= absolute= value= as= the= distance= from= one= point= to= another= point.= regardless= of= direction,= positive= or= negative,= the= distance= between= the= two= points= is= represented= as= a= positive= number= or= zero.= an= absolute= value= inequality= is= an= equation= of= the= form=></5+3y[> <B,| A|\le b,|a|=>B,\text[or]| A|\ge B[/latex], where A, and sometimes B, represents an algebraic expression dependent on an x variable. Solving inequality means finding the set of all the [lattice]x[/latex] values that satisfy the problem. Usually this set will be a range or the union of two ranges and will include a range of values. There are two basic approaches to solving absolute value inequalities: graph and algebraic. The advantage of the graphic approach is that we can read the solution by interpreting the graphs of two equations. The advantage of the algebraic approach is that the solutions are accurate, since precise solutions are sometimes difficult to read from a graph. Let's say we want to know all the possible returns of an investment if we could earn a certain amount of money within $200 from $600. We can solve the set of x values algebraically so that the distance between [latex]x[/latex] and 600 is less than 200. We represent the distance between [latex]x[/latex] and 600 as [latex]|x - 600| [/latex], and then, [latex]|x - 600|\le 200[/latex] or [lattice]\begin{array}{c}-200\le x - 600\le 200\\ - 200+600\le x - 600+600\le 200+600\\ 400\le x\le 800\end{array}[/latex] This means our returns would be between $400 and $800. solving absolute value inequalities, just like with absolute value equations, we write two inequalities and then solve them independently. For an algebraic expression X and [latex]k>0[/latex], an absolute value inequality is an inequality in form: [latex]\begin{array}{l}| X| < k\text{= which= is= equivalent= to=> <> k\hfill= \text{= or= }\= |x|=> k\text{ equivalent to)X < ></ > </B,| A|\le> </2x> </2x> o)X> k\hfill \end{array}[/latex] These statements also apply to [latex]| X|\le k[/latex] and [latex]| X|\ge k[/latex]. Describe all [lattice]x[/latex] values within a distance of 4 from the number 5. Describe all x values within a distance of 3 from the number 2. Resolve [latex]|x - 1|\le 3[/latex]. Given the equation [latex]y=\frac{1}{2}|4x - 5|+3[/latex], determine the x values for which the y-values are negative. Resolve [latex]-2|x - 4|\le -6[/latex]. Sometimes an image is worth a thousand words. You can turn a single variable inequality into an inequality of two variables and create a graph. The chart's x intercepts will match the solution to inequality that you can find by hand. Let's use the last example to prove it. We will change the variable to x to facilitate entry into Desmos. To transform [latex]-2|x - 4|\le -6[/latex] into a two-variable equation, move everything to one side and place the variable y on the other side like this: [latex]-2|x - 4|\le -6[/latex] [latex]-2|x - 4|+6\le y[/latex] Enter this inequality in Desmos now and hover over the x intercepts. If you need instructions on how to insert inequalities into Desmos, watch this tutorial. Are the x values of the intercepts the same values as the solution found above? Now you try to turn this inequality of a single variable into an inequality of two variables: [latex]5|9-2x|\ge10[/latex] Inequality graph with an online graph tool and write the solution range. Help! Did you have an idea to improve this content? We'd love your input. Improving this pageLearn More Algebra Compound Inequalities are two inequalities presented as one problem. The variable for which you are resolving may have to satisfy only one of the inequalities, or both, depending on whether the word e or or is used. There can be many correct answers, or even none. Example: 2x - 4 > 2 or 30/x > 15 2x > 6 or 30 > 15x x > 3 or x < 2 The answer can then be graphed as two spokes on a numeric line. If we are interested in real solutions we can choose numbers just smaller than 2 or just over 3 as we want and the equation will be true. For example, if x =1.99 then 30/x = 15.08 (satisfies 30/x > 15) or if x = 3.01 then 2x-4 = 2.02 (satisfies 2x -4 > 2). If we are only interested in whole solutions than we can see that all integers except 2 or 3 will work. We can also express a compound inequality as a function. If we specify a function f(x) = (x > 3 or x < 2) we get a graph like this: The solution is still two spokes. But now the rays are on the line y=x, with a radius moving right and up from the number 3 and moves left and down from number 2. Exercise: Using the concept of slope, can you explain why a figure transferred from a number line to a Cartesian chart will always be displayed on the y=x line? How can I use compound inequalities? [edit] Example: Highway and City Gas Gas L'adesivo del chilometraggio del gas sulle auto dà due numeri: uno per la guida in città e uno per la guida in autostrada. Se un adesivo dice che l'auto ottiene 25 mpg in città e 32 mpg in autostrada fino a che punto puoi guidare? Per scoprirlo devo sapere quanta benzina ho nel mio serbatoio. So che posso guidare tra le 25 e le 32 miglia con un solo gallone di gas. Posso rappresentarlo con due equazioni dove x = quanto lontano posso guidare su un gallone di gas: 25 < x= and= x=> < 32.= or= i= can= combine= them= into= a= compound= inequality:= 25=> x=> < 32.= if= i= have= a= 10= gallon= gas= tank,= and= i= want= to= know= how= far= i= can= drive= i= change= the= equation= to= represent= the= 10= gallons= of= gas:= i= have= in= my= tank= by= multiplying= each= term= in= the= compound= inequality= by= 10.= 25= *= 10=> < 10*x=> < 32= *= 10.= 250=> < 10x=> < 320.= i= can= drive= between= 250= and= 320= miles= on= a= single= tank= of= gas.= example:= conversions[edit]= the= conversion= formula= for= fahrenheit= to= celsius= is= 5/9(f= -= 32).= we= know= that= water= freezes= at= 32= degrees= fahrenheit= and= boils= at= 212= degrees= fahrenheit.= if= we= want= to= know= the= freezing= point= and= boiling= point= of= water= in= celsius= we= could= set= the= equation= up= as= follows:= 32=> < f=> < 212= and= then= apply= the= formula= to= convert= the= values= in= degrees= f= to= degrees= c.= 5/9(32-32)=> < c=> < 5/9(212= -= 32)= so= water= freezes= and= boils= at = 0=> < c=> < 100= absolute= value[edit]= what= happens= when= we= need= to= multiply= by= x?= remember= that= subtraction= is= equivalent= to= adding= a= negative= number,= and= multiplication= is= the= same= as= adding= a= number= multiple= times.= so= when= we= add= a= negative= number= multiple= times= the= result= keeps= getting= smaller.= when= solving= a= problem= using= inequalities= we= need= to= decide= if= the= context= of= the= problem= makes= sense= for= negative= numbers.= a= special= type= of= compound= inequality= involves= the= absolute= value= sign.= the= absolute= value= sign= specifies= two= functions= such= that= f(x)=A implies= f(-x)=(-A)(-1). for= the= equal= sign= this= is= the= same= as= f(x)=f(-x)=A. but= when= we= use= an= inequality= sign= and= we= multiply= by= a= negative= number= we= have= to= switch= the= direction= of= the= sign.= so= if= f(x)=> A poi f(-x) < a.= this= is= simple= when= the= only= the= value= of= x= is= in= the= absolute= value= sign.= for= instance= given|x|=> 12 allora le possibili soluzioni sono x > 12 o x < -12.= three= examples= of= absolute= value= problems.= right= side= is= positive= right= side= is= zero= right= side= is= negative= |= x= |= -= 12=> 0 {\displaystyle |x|-12>0} | x | + 12 > 12 {\displaystyle |x|+12>12} | x | + 12 0 {\displaystyle |x|+12>0} | x | > 12 {\displaystyle |x|>12} | x | > 0 {\displaystyle |x|>0} all= numbers= x= satisfy= |= x= |=> -= 12 {\displaystyle {\text{all numbers }}x{\text{ satisfy }}|x|>-12} Gap compreso tra 12 e -12. Qualsiasi numero tranne 0. Qualsiasi numero. Esempio - convert |6x + 18| - 33 > 9 in un composto</0}> </-12}> </-12}> |6x + 18| > 36 6x + 18 > 36 or 6x + 18 < -36 6x > 18 or 6x < -54 x > 3 or x < -9 How can you use the absolute value? [edit] Example 1 A good way to use absolute value is to determine if the previous estimates are right. For example, given your car arriving between 25 and 32 miles per gallon. If you want to make sure my car is running well, you should keep track of my mileage using the formula: 25 < | m / g | < 32 {\displaystyle 25<\left|m/g\right\vert <32\ } when m = (miles at the last filling - miles at the pump) and g = amount of fuel I just pumped. If m/g is over than 25, make sure the car is working properly. If m/g is over 32 years old, maybe someone is putting extra gasoline in your car! Example 2 - Think like a teacher! Take five tests in a quarter. One student scored 80, 90 and 80 in the first three tests. The student asks you for an extra credit option. Should you give the student a chance? To get a B for the quarter the student must do 80*5 = 400. To get an A for the quarter the student needs to get a 450. If we let X be equal to the student scores in the last two tests we can see 400 <; 250 + x < 450 150 < x < 180 The average score for the last two tests will be x/2. So by dividing the equation above by 1/2 we get 75 < x < 90. Since the average score so far is about 83, the student would be encouraged to study more for the last two tests with a few extra credit points. Points.