Lesson 16: Solving and Graphing Inequalities Joined by “And” or “Or”

Classwork

Exercise 1

* 1. Solve $w^{2}=121$, for $w$. Graph the solution on a number line.
	2. Solve $w^{2}<121, $for $w$. Graph the solution on a number line and write the solution set as a compound inequality.
	3. Solve $w^{2}\geq 121$ for $w$. Graph the solution on a number line and write the solution set as a compound inequality.
	4. Quickly solve $\left(x+7\right)^{2}=121$, for $x$. Graph the solution on a number line.
	5. Use your work from part (d) to quickly graph the solution on a number line to each inequality below.
		1. $\left(x+7\right)^{2}<121$
		2. $\left(x+7\right)^{2}\geq 121$

Exercise 2

Consider the compound inequality $-5<x<4$

* 1. Rewrite the inequality as a compound statement of inequality.
	2. Write a sentence describing the possible values of$ x$.
	3. Graph the solution set on the number line below.



Exercise 3

Consider the compound inequality $-5<2x+1<4$.

* 1. Rewrite the inequality as a compound statement of inequality.
	2. Solve each inequality for $x$. Then, write the solution to the compound inequality.
	3. Write a sentence describing the possible values of $x$.
	4. Graph the solution set on the number line below.



Exercise 4

Given $x<-3$ or$ x>-1$

* 1. What must be true in order for the compound inequality to be a true statement?
	2. Write a sentence describing the possible values of $x$.
	3. Graph the solution set on the number line below.



Exercise 5

Given $x+4<6 $or $x-1>3$

* 1. Solve each inequality for $x$. Then, write the solution to the compound inequality.
	2. Write a sentence describing the possible values of $x$.
	3. Graph the solution set on the number line below.



Exercise 6

Solve each compound inequality for $x$ and graph the solution on a number line.

* 1. $x+6<8$ and$ x-1>-1$
	2. $-1\leq 3-2x\leq 10$
	3. $5x+1<0$ or $ 8\leq x-5$
	4. $10>3x-2 $or $x=4$
	5. $x-2<4$ or $ x-2>4$

* 1. $x-2\leq 4 $and$ x-2\geq 4$

Exercise 7

Solve each compound inequality for $x$ and graph the solution on a number line. Pay careful attention to the inequality symbols and the “and” or “or” statements as you work.

* 1. $1+x>-4 $or$ 3x-6>-12$

* 1. $1+x>-4 $or$ 3x-6<-12$
	2. $1+x>4 $and$ 3x-6<-12$

Problem Set

Solve each inequality for $x$ and graph the solution on a number line.

|  |  |
| --- | --- |
| 1. $x-2<6$ or$ $ $\frac{x}{3}$ $>4$
 | 1. $-6 <$ $\frac{x+1}{4} $ $< 3$
 |
| 1. $5x\leq 21+2x $or$ 3\left(x+1\right)\geq 24$
 | 1. $5x+2\geq 27 $and$ 3x-1<29$
 |
| 1. $0\leq 4x-3\leq 11$
 | 1. $2x>8 $or$ -2x<4 $
 |
| 1. $8\geq -2(x-9)\geq -8$
 | 1. $4x+8>2x-10 $or $\frac{1}{3}x-3<2$
 |
| 1. $7-3x<16 $and$ x+12<-8$
 |  |

1. If inequalities question 8 were joined by “and” instead of “or,” what would the solution set become?
2. If the inequalities in question 9 were joined by “or” instead of “and,” what would the solution set become?