




Objective: Solving Inequalities and Remembering the Special Condition

Homework SE-4 – NYA p.208 #4 – 6, 8, 26, 80
 NYA p.215 #6, 18, 33, 61
 NYA p.222 #2, 3, 13, 15, 28

Do Now: Solve. 1. $\frac{x}{4} = 12$ 2. $-2x + 8 = 8$

Exam Prep: Which is a solution to the inequality $-5x > 35$?
 A) $x = 7$ B) $x = 0$ C) $x = -7$ D) $x = -10$



Your friend The Cat wants you to know that this stuff should be very easy. Remember your rules of solving equations and you will be fine... just one or two more things to remember.

Solving Inequalities

- Follow steps to solve an equation.
- Equations have 1 or a few solutions, inequalities have a range of solutions.
- The solutions are always in simplest form.

Example: We will look at the equation $3x - 2 = 10$ and inequality $3x - 2 > 10$.

$3x - 2 = 10$ +2 +2	Step 1: Add 2 to <u>all</u> sides	$3x - 2 > 10$ +2 +2
$\frac{3x}{3} = \frac{12}{3}$	Step 2: Divide <u>all</u> sides by 3	$\frac{3x}{3} > \frac{12}{3}$
$x = 4$	Result: 1 Solution vs. Infinite Solutions	$x > 4$

Sign Change Ex.	
$-2x + 5 \leq 21$	$-5 \quad -5$
$\frac{-2x}{-2} \leq \frac{16}{-2}$	$-2 \quad -2$
Sign →	$x \geq -8$
Change →	$x \geq -8$

★ **Special Condition:** When solving an inequality, if you MULTIPLY or DIVIDE by a NEGATIVE value then you must REVERSE the inequality symbol.

Solve. 1. $2(4 - 3x) > 38$ 2. $2x + 8 \leq 5x - 10$

Practice

1. $3s > 12$

2. $56 - p \geq 0$

3. $-60 < -15y$

4. $2(-x + 1) \leq 19$

5. $-3x - 7 > 4x$

6. $\frac{m}{8} + 3 \geq 9$

7. $10 < 4 - 2x$

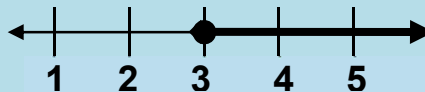
8. $6(x + 10) \leq 10x$



Solution sets can be shown in two ways.

Set Notation: $\{3, 4, 5, 6, \dots\}$ or $\{x \mid x \geq 3\}$

Graphical Notation:

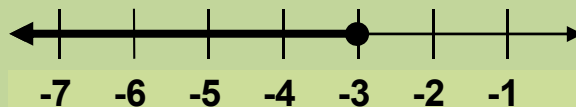


- Use curly brackets $\{ \}$ to denote a set.
- Roster form is a list in curly brackets. $x = \{2, 3, 4, \dots\}$
- Set-builder form describes a set. $\{x \mid x \text{ is a factor of } 12\}$

Graphing Solution Sets

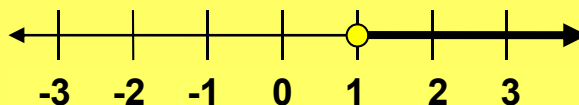
$$n \leq -3 \text{ or } -3 \geq n$$

- Filled circle means that -3 is included in the solution.



$$x > 1 \text{ or } 1 < x$$

- Open circle means that 1 is not included.







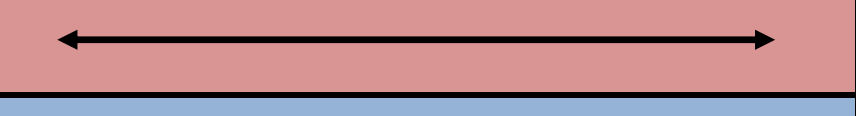



Dark line shows numbers included and dark arrow shows that the solution set extends to infinity, ∞ (or sometimes $-\infty$).



Values in the solutions always have bubbles, like 3 and 1 above!

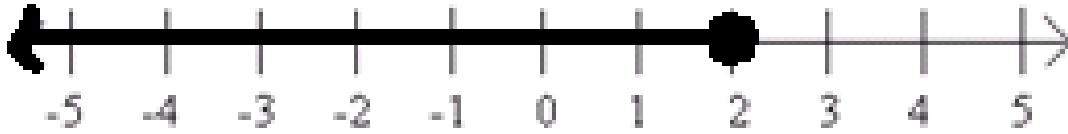


Graphing Solution Sets – Using Solutions from Above

1. $3s > 12$	$s > 4$	
2. $56 - p \geq 0$	$56 \geq p$	
3. $-60 < -15y$	$4 > y$	
4. $2(-x + 1) \leq 19$	$x \geq 8.5$	
5. $-3x - 7 > 4x$	$-1 > x$	
6. $\frac{m}{8} + 3 \geq 9$	$m \geq 48$	
7. $10 < 4 - 2x$	$x < -3$	
8. $6(x + 10) \leq 10x$	$15 \leq x$	

Wrap Up

1. Here is the graphical representation of a set of real numbers:



- Describe this set of real numbers in words.
- Describe this set of real numbers in set notation.

Write an equation or an inequality which has the set above as its solution