




Objective: Inequalities Joined by “And” and “Or” with Solution Sets

Homework SE-5 – NYA p.229 #1, 2, 6, 7, 24, 29 – 32, 56, 57

Do Now: Find three values of x. 1. $x > 4$ or $x < 0$ 2. $15 \leq x \leq 16$

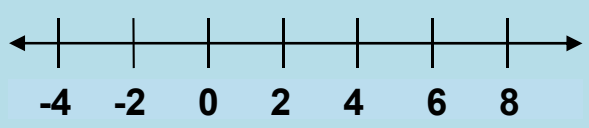
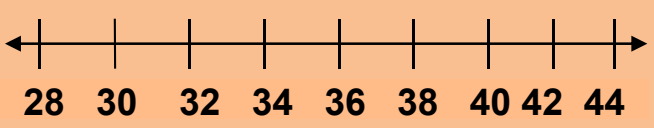
Exam Prep: Which value is a solution for: $10 < x$ and $x \leq 5$.

- A) $x = 5$ B) $x = 8$ C) $x = 11$ D) *no solution*



If you are ever confused during this lesson about your answers, simply test out some solutions by plugging in values around your answers.

Writing Compound Inequalities

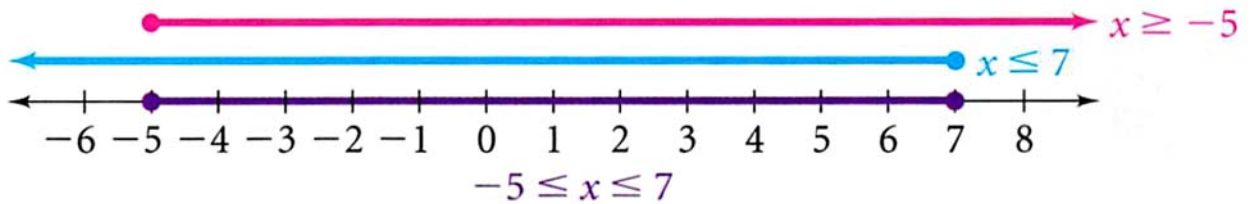
All numbers that are at least -2 and at most 4.	Temperatures above 32° but not as high as 40°.	
<i>and</i>	2 Statements	<i>and</i>
	3-Sided Statement	
		

Solving Inequalities

Two inequalities joined by *and* / *or* are compound inequalities.

You can write $x \geq -5$ and $x \leq 7$ as $-5 \leq x \leq 7$.

*If they are joined by *and*, then both statements must be true!



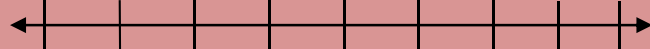
Practice: Solve and Graph

1. $-6 \leq 3x < 15$

2. $-3 \leq 2x - 1 < 7$

3. $7 < 3n + 1 \leq 13$

1.



2.



3.



A compound inequality joined by **or** is true if either statement is true.

1. All real numbers less than -3 and greater than 7.

Compound Statement

or

Graphed Solution



2. Discounted fares are available to kids 12 and under and adults over 60.

Compound Statement

or

Graphed Solution



Mixed Practice

1. $-1 < 4x + 7 \leq 11$



2. $3c + 4 > 13$ or $6c - 1 < 11$



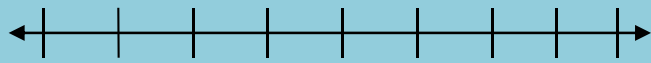
3. $-2 < -3x + 4 < 4$



4. $7 \leq 3 - 2p < 11$



5. $-3 \leq j + 2 < 7$



6. $\frac{2x + 4}{2} > 5$ or $c + 1 < 12$



5. $-3 < j + 2 < 7$

6. $3 \leq w + 2 \leq 7$

7. $2 < 3n - 4 \leq 14$

8. $7 \leq 3 - 2p < 11$

9. $-2 < -3x + 7 < 4$

10. $1.5 < w + 3 \leq 6.5$

11. $-16 < -3x + 8 < -7$

12. $-1 < 4m + 7 \leq 11$

13. $-9 < -2s - 1 \leq -7$

14. $12 \leq \frac{14 + 17 + a}{3} \leq 16$

15. $\frac{1}{2} < \frac{3x - 1}{4} < 5$

16. $-2 \leq \frac{5 - x}{3} \leq 2$

For each situation write and graph an inequality.

17. all real numbers n that are at most -3 or at least 5

18. all real numbers x that are less than 3 or greater than 7

19. all real numbers h less than 1 or greater than 3

20. all real numbers b less than 100 or greater than 300

Solve each compound inequality. Graph your solution.

21. $3b - 1 < -7$ or $4b + 1 > 9$

22. $4 + k > 3$ or $6k < -30$

23. $3c + 4 \geq 13$ or $6c - 1 < 11$

24. $6 - a < 1$ or $3a \leq 12$

25. $7 - 3c \geq 1$ or $5c + 2 \geq 17$

26. $5y + 7 \leq -3$ or $3y - 2 \geq 13$

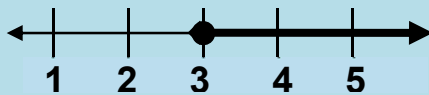
27. $2d + 5 \leq -1$ or $-2d + 5 \leq 5$

28. $5z - 3 > 7$ or $4z - 6 < -10$



Solution sets can be shown in two ways.

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

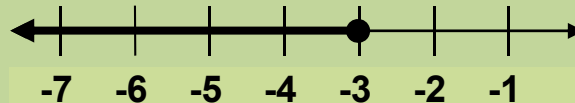
Graphical Notation: 

- 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

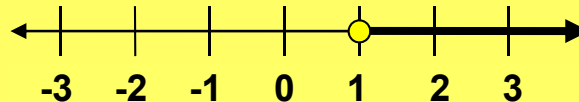
$$n \leq -3 \quad \text{or} \quad -3 \geq n$$

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



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

- Open circle means that 1 is not included.







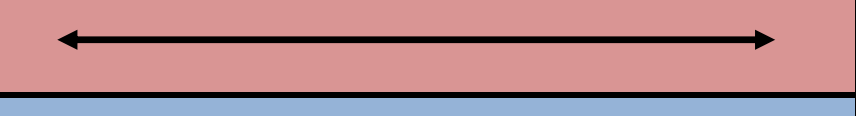



Dark line shows numbers included and dark arrow shows that the solution set extends to infinity, ∞ (or sometimes $-\infty$).



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

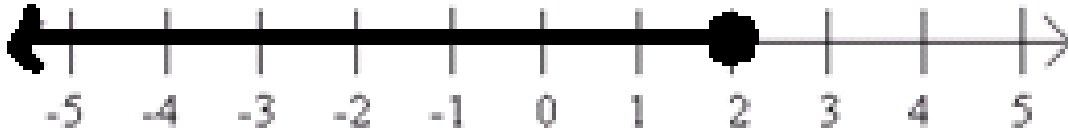


Graphing Solution Sets – Using Solutions from Above

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