

Week 6 Block

Warm Up

**Skill 1:** Solve completely showing all steps.

**Skill 2 :** Write and solve a proportion for:

1.  $-3(4x - 6) + 5x - 2 = -(-5 - 3x) + x$

2. Jack popped 13 balloons in 2 minutes at the rally. How many would we expect him to pop in 7 minutes?

Solve each inequality, if possible, then graph.

3.  $-(7c - 18) - 2c > 0$

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



Choose the set of numbers that are described. Explain why you chose your answer.

5. M is the set of integers that are greater than -1 and less than 4

A)  $\{-1, 0, 2, 3\}$     B)  $\{0, 2, 3, 4\}$     C)  $\{-1, 2, 3, 4\}$     D)  $\{0, 1, 2, 3\}$

6. R is the set of even natural numbers that are less than 2

A)  $\{0\}$     B)  $\{\dots, -4, -2, 0\}$     C)  $\{\}$     D)  $\{\dots, -4, -2, 0, 2\}$

Convert to the given units, use a unit conversion factor.

7. 3.5 cups equals how many ounces? Show the conversion. (8 oz = 1 cup)

8. On Wednesday Fred did 15 homework problems. On Friday he did 10 homework problems. What was the % change? Was it a decrease or an increase?

## 3-6.A

## Required Requirements

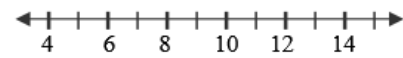


**W**hen people plan a house, they often have many requirements in mind that can be written as inequalities. Such requirements could be the dimensions of rooms or the overall size of the house. In this activity, we will investigate what happens when we combine requirements. First, we will graph each requirement separately, then we will graph combinations of those requirements. Here are the basic requirements we will work with:

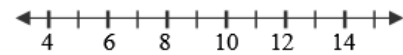
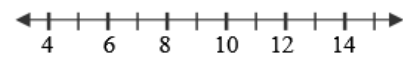
**Dimension Requirements:**Requirement A:  $d > 5$  ftRequirement B:  $d \leq 12$  ftRequirement C:  $d < 10$  ft**Area Requirements:**Requirement D:  $A \leq 1500$  sq ftRequirement E:  $A > 1200$  sq ftRequirement F:  $A \geq 1800$  sq ft

1. First, let's investigate what happens when we combine requirements A & B with "and":

a. Graph the numbers that meet requirement A:



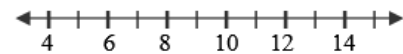
b. Graph the numbers that meet requirement B:

c. Graph only the numbers that meet both A **and** B:

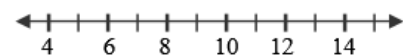
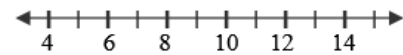
d. Write the solution as an inequality:

2. Now let's investigate what happens when we combine requirements A & B with "or":

a. Graph the numbers that meet requirement A:



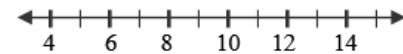
b. Graph the numbers that meet requirement B:

c. Graph all the numbers that meet either A **or** B:

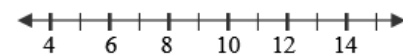
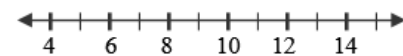
d. Write the solution as an inequality:

3. Now investigate what happens when we combine requirements A & C with "and":

a. Graph the numbers that meet requirement A:



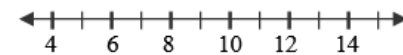
b. Graph the numbers that meet requirement C:

c. Graph only the numbers that meet both A **and** C:

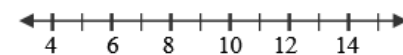
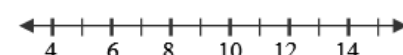
d. Write the solution as an inequality:

4. Investigate what happens when we combine requirements A & C with "or":

a. Graph the numbers that meet requirement A:



b. Graph the numbers that meet requirement C:

c. Graph all the numbers that meet either A **or** C:

d. Write the solution as an inequality:

Each graph that you have drawn on a number line represents the **solution set** or **truth set**.

3-6.B



**Solution Set (or Truth Set)**  
*A solution set is all the numbers that make a statement true.*

5. Next, combine requirements D & E:

- a. Graph the numbers that meet requirement D:
- b. Graph the numbers that meet requirement E:
- c. Graph the numbers that meet requirements D **and** E:
- d. Graph all the numbers that meet requirement D **or** E:

6. Now combine requirements E & F:

- a. Graph the numbers that meet requirement E:
- b. Graph the numbers that meet requirement F:
- c. Graph the numbers that meet requirements E **and** F:
- d. Graph all the numbers that meet requirement E **or** F:

7. Now combine requirements D & F:

- a. Graph the numbers that meet requirement D:
- b. Graph the numbers that meet requirement F:
- c. Graph the numbers that meet requirements D **and** F:
- d. Graph all the numbers that meet requirement D **or** F:

8. Now combine requirements B & C:

- a. Graph the numbers that meet requirement B:
- b. Graph the numbers that meet requirement C:
- c. Graph the numbers that meet requirements B **and** C:
- d. Graph all the numbers that meet requirement B **or** C:

9. Now write some notes to help you remember what you have learned about combining *solution sets* using the words **and** & **or**.



3-6.C

Lines Dancing



**Graphing Compound Inequalities**

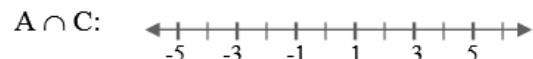
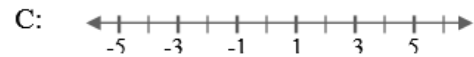
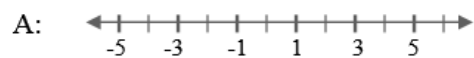
Combining two inequalities with the word “or” creates the **union** of the two solution sets. The symbol for the *union* of two sets is “ $\cup$ ”. Any value that is in the solution set to either of the original inequalities is in the solution set of compound inequality.

Combining two inequalities with the word “and” creates the **intersection** of the two solution sets. The symbol for the *intersection* of two sets is “ $\cap$ ”. Only values that are in the solution set to both original inequalities may be in the solution set of the compound inequality.

Use the table of inequality requirements below to find each union or intersection. Sketch each individual requirement first, and then sketch the compound inequality on the third number line.

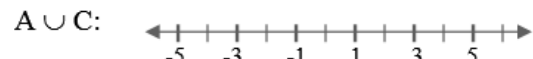
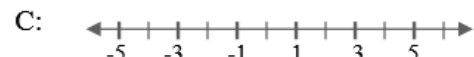
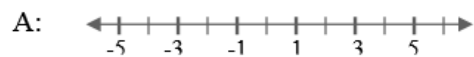
Requirement A: $x > -3$
Requirement B: $x < 2$
Requirement C: $x \geq 0$
Requirement D: $x \leq -1$
Requirement E: $x \leq 4$
Requirement F: $x > 2$
Requirement G: $x < 0$

1. Requirements **A and C**.



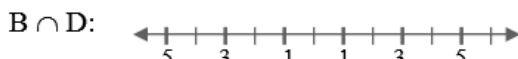
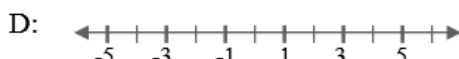
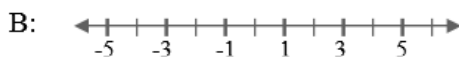
Solution:

2. Requirements **A or C**.



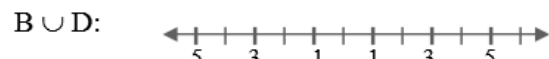
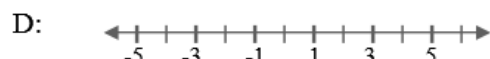
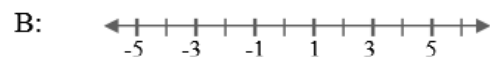
Solution:

3. Requirements **B and D**.



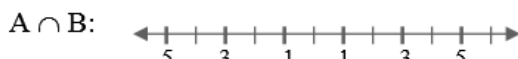
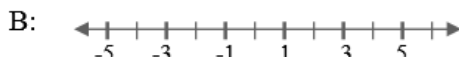
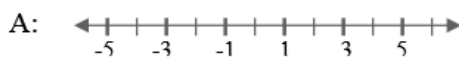
Solution:

4. Requirements **B or D**.



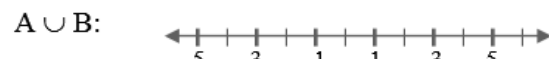
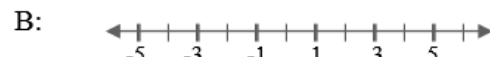
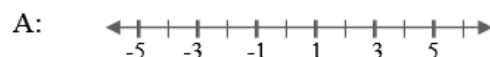
Solution:

5. Requirements **A and B**.



Solution:

6. Requirements **A or B**.



Solution:

## HW: p 190: 35, 37, 38, 39 (+ 3-6.D)

Solve each inequality, if possible. If the inequality has no solution, write *no solution*. If the solutions are all real numbers, write *all real numbers*.

35.  $-3(x - 3) \geq 5 - 4x$

36.  $3s + 6 \leq -5(s + 2)$

37.  $3(2 + t) \geq 15 - 2t$



38.  $\frac{4}{3}s - 3 < s + \frac{2}{3} - \frac{1}{3}s$

39.  $4 - 2n \leq 5 - n + 1$

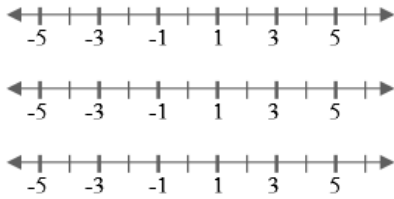
40.  $-2(0.5 - 4t) \geq -3(4 - 3.5t)$



Graph each set of requirements as indicated and write the solution as an inequality. Remember to label each number line!

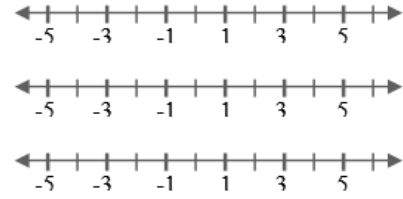
3-6.D

7. Requirements **E and G**.



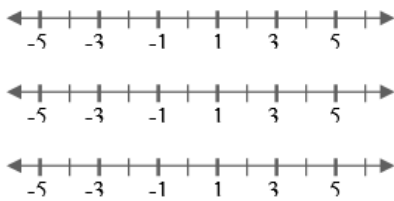
Solution:

8. Requirements **E or G**.



Solution:

9. Requirements **C and D**.



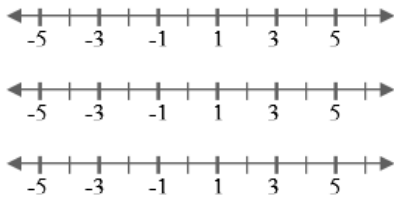
Solution:

10. Requirements **C or D**.



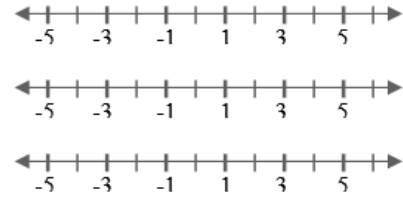
Solution:

11. Requirements **B and C**.



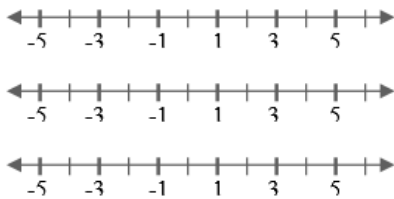
Solution:

12. Requirements **D or F**.



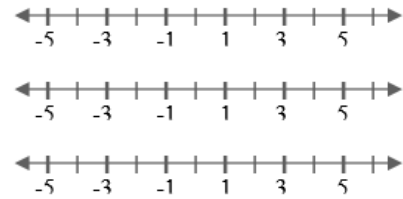
Solution:

13. Requirements **A and F**.



Solution:

14. Requirements **B or F**.



Solution:

15. Based on these graphs, what generalizations can you make about the differences between these two types of compound inequalities (*unions* and *intersections*)?