Unit 2 Applications of Equations and Inequalities

4.5 Compound Inequalities DAY 1

Day _____

I can . . .

. . . graph and write inequalities containing "*and*" and "*or*".

Pick a number that is greater than 5 or less than or equal to -1.

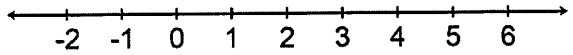
Pick a number that is less than or equal to 5 and less than -1.

Pick a number that is greater than 5 and less than -1.

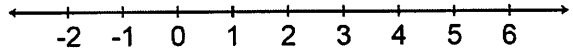
A ***Compound Inequality*** is two inequalities that are joined by the word ***and*** or the word ***or***.

OR

$x > 5$ or $x \leq -1$



$x \geq 5$ or $x < -1$



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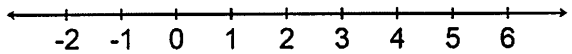

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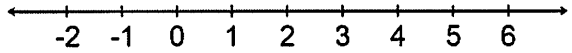


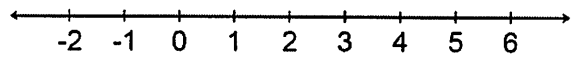
AND

Set-Builder Notation	**or**	**Interval Notation**
$-1 \leq x < 5$		$[-1, 5)$

$x < 5$ and $x \geq -1$

$-1 \leq x < 5$

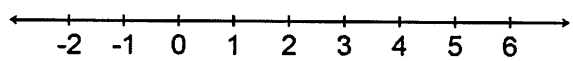
$[-1, 5)$



$x \leq 5$ and $x > -1$

$-1 < x \leq 5$

$(-1, 5]$



$x \leq 5$ and $x \geq -1$

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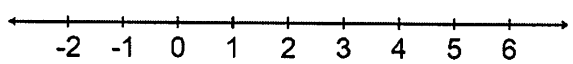
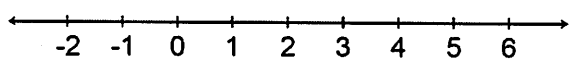
$[-1, 5]$



$x < 5$ and $x > -1$

$-1 < x < 5$

$(-1, 5)$



I THINK I GOT IT?

Write a compound inequality, in set-builder and interval notation (and statements only), that represents each situation. Graph the solutions.

1. All real numbers that are at least -1 and at most 3.

2. All real numbers that are less than 0 or greater than or equal to 6.

3. All real numbers that are less than -1, but greater than -5

I GOT IT!

4. Discounted tickets are available to children under 7 years old or to adults 65 and older.

5. Fun Night is for all students who are at most 14 years old and at least 10 years old.

1) $-1 \leq x \leq 3$ $[-1, 3]$ 2) $x < 0$ or $x \geq 6$ 3) $-5 < x < -1$ $(-5, -1)$
4) $x < 7$ or $x \geq 65$ 5) $10 \leq x \leq 14$ $[10, 14]$

Practice: p229 1-4 and p230 17-20, 29-32

Unit 2 Applications of Equations and Inequalities
4.5 Compound Inequalities DAY 2

Day _____

I can . . .

. . . solve compound inequalities.

Is 3 the solution to the inequality: $-2(x+5) \geq 5x+23$?

Is 3 the solution to the compound inequality: $-(x-8) < 9$ and $\frac{x}{5}+1 \leq 2$?

Solve the compound inequality and graph the solution.

$-3 \leq \frac{3}{2}x + 6 \leq 3$

$7 + 2a > 9$ or $-4a > 8$

I GOT IT!

$t + 5 < 2$ or $3t + 1 > 10$

$-29 \leq 5s - 4 \leq 41$

Practice: p230 7, 9, 15, 25, 27 and p231 43, 46-48

Unit 2 Applications of Equations and Inequalities **Day _____**
4.5 Compound Inequalities DAY 1

I can . . .

. . . graph and write inequalities containing "*and*" and "*or*".

Pick a number that is greater than 5 or less than or equal to -1.

A value that satifies one **or** the other inequality

Pick a number that is less than or equal to 5 and less than -1.

0

A value that satifies both inequalities

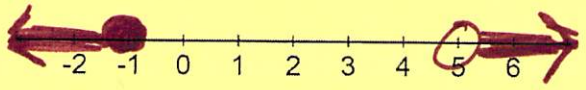
Pick a number that is greater than 5 and less than -1.

There is no value that satisfies both inequalities at the same time.

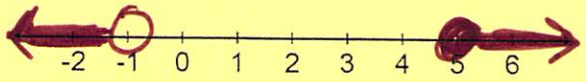
A ***Compound Inequality*** is two inequalities that are joined by the word ***and*** or the word ***or***.

OR

$x > 5$ or $x \leq -1$



$x \geq 5$ or $x < -1$



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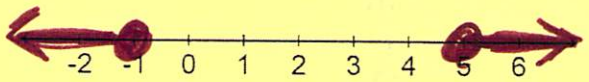
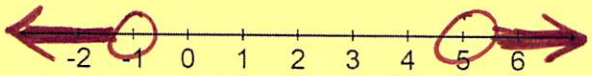


$x > 5$ or $x < -1$



AND

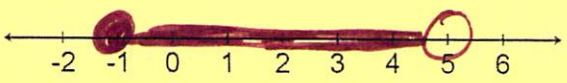
Set-Builder Notation **or** **Interval Notation**

$-1 \leq x < 5$ $[-1, 5)$

$x < 5$ and $x \geq -1$

$-1 \leq x < 5$

$[-1, 5)$



$x \leq 5$ and $x > -1$

$-1 < x \leq 5$

$(-1, 5]$

$x \leq 5$ and $x \geq -1$

$-1 \leq x \leq 5$

$[-1, 5]$

$x < 5$ and $x > -1$

$-1 < x < 5$

$(-1, 5)$

I THINK I GOT IT?

Write a compound inequality, in set-builder and interval notation (and statements only), that represents each situation. Graph the solutions.

1. All real numbers that are at least -1 and at most 3.

$x \geq 1$ and $x \leq 3$

$\{x \mid 1 \leq x \leq 3\}$

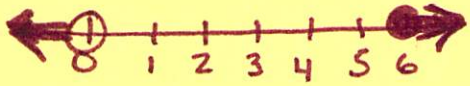
$[-1, 3]$

2. All real numbers that are less than 0 or greater than or equal to 6.

$x < 0$ or $x \geq 6$

$\{x \mid x < 0 \text{ or } x \geq 6\}$

$(-\infty, 0) \cup [6, \infty)$



3. All real numbers that are less than -1, but greater than -5

$x < -1$ and $x > -5$

$-5 < x < -1$

$(-5, -1)$

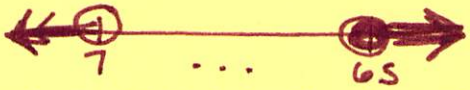
I GOT IT!

4. Discounted tickets are available to children under 7 years old or to adults 65 and older.

$\{x \mid x < 7 \text{ or } x \geq 65\}$

$a < 7$ or $a \geq 65$

$(0, 7) \cup [65, \infty)$



5. Fun Night is for all students who are at most 14 years old and at least 10 years old.

$a \leq 14$ $\quad a \geq 10$

$\{x \mid 10 \leq x \leq 14\}$

$[10, 14]$

1) $-1 \leq x \leq 3$ $[-1, 3]$ 2) $x < 0$ or $x \geq 6$ 3) $-5 < x < -1$ $(-5, -1)$
4) $x < 7$ or $x \geq 65$ 5) $10 \leq x \leq 14$ $[10, 14]$

Practice: p229 1-4 and p230 17-20, 29-32

Unit 2 Applications of Equations and Inequalities **Day _____**
4.5 Compound Inequalities DAY 2

I can . . .

. . . solve compound inequalities.

Is 3 the solution to the inequality: $-2(x+5) \geq 5x+23$?

Solve

$-2x-10 \geq 5x+23$

$+2x \quad +2x$

$-10 \geq 7x+23$

$-23 \quad -23$

$\frac{-33}{7} \geq \frac{7x}{7}$

$-4\frac{5}{7} \geq x$

NO

$-4\frac{5}{7} \not\geq 3$

Plug-In

$-2(3+5) \geq 5(3)+23$

$-2(8) \geq 15+23$

$-16 \not\geq 38$

No

Is 3 the solution to the compound inequality: $-(x-8) < 9$ and $\frac{x}{5}+1 \leq 2$?

BOTH

$-x+8 < 9$

$-8 \quad -8$

$\frac{-x}{-1} < \frac{1}{-1}$

$x > -1$

Yes

$3 > -1$

AND

$\frac{x}{5}+1 \leq 2$

$-1 \quad -1$

$5 \cdot \frac{x}{5} \leq 1 \cdot 5$

$x \leq 5$

Yes

$3 \leq 5$

YES

Solve the compound inequality and graph the solution.

$-3 \le \frac{3}{2}x + 6 \le 3$

$-6 \quad -6 \quad -6$

$\frac{2}{3} \cdot -9 \le \frac{3}{2}x \le -3 \cdot \frac{2}{3}$

$\cdot \frac{2}{3}$

$-6 \le x \le -2$

$[-6, -2]$

$7 + 2a > 9$ or $-4a > 8$

$-7 \quad -7 \quad \frac{}{-4} \quad \frac{}{-4}$

$\frac{2a}{2} > \frac{2}{2} \quad a < -2$

$a > 1$

$a > 1$ or $a < -2$

$(-\infty, -2) \cup (1, \infty)$

I GOT IT!

$t + 5 < 2$ or $3t + 1 > 10$

$-5 \quad -5 \qquad -1 \quad -1$

$t < -3 \qquad \frac{3t}{3} > \frac{9}{3}$

$t > 3$

$t < -3$ or $t > 3$

$(-\infty, -3) \cup (3, \infty)$

$-29 \leq 5s - 4 \leq 41$

$+4 \quad +4 \quad +4$

$\frac{-25}{5} \leq \frac{5s}{5} \leq \frac{45}{5}$

$-5 \leq s \leq 9$

$[-5, 9]$

Practice: p230 7, 9, 15, 25, 27 and p231 43, 46-48