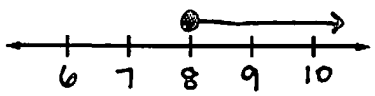
Name: Key	Date:
Topic:	Class:

Main Ideas/Questions	Notes
Graphing Inequalities	• Use a Closed dot for ≤ or ≥ symbols. • Use an Open dot for < or > symbols.
Interval Notation	**Interval notation** is a way to write the solution to an inequality using infinity symbols, parentheses, and brackets. • **Parentheses** indicate **"not included"** or **"open"** ( ) • **Brackets** indicate **"included"** or **"closed"** [ ]

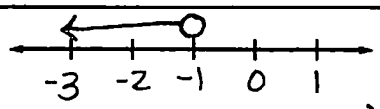
Directions: Graph each inequality and write the solution in interval notation.

1. $x \geq 8$



Interval Notation: [8, ∞)

2. $a < -1$



Interval Notation: (-∞, -1)

Solving Inequalities	• Follow the same rules to solve an inequality as you do an equation. • Switch the inequality symbol if you **multiply or divide** by a negative number.

Examples: Solve, graph, and write the solution to each inequality in interval notation.

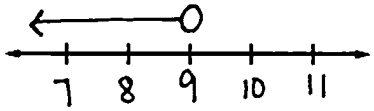
3. $5v + 1 > 7v - 17$

$1 > 2v - 17$

$18 > 2v$

$9 > v$

$\boxed{v < 9}$



Interval Notation: (-∞, 9)

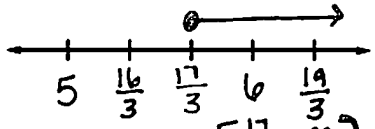
4. $21x - 3(5x + 9) \geq 7$

$21x - 15x - 27 \geq 7$

$6x - 27 \geq 7$

$6x \geq 34$

$x \geq \frac{17}{3}$



Interval Notation: $[\frac{17}{3}, \infty)$

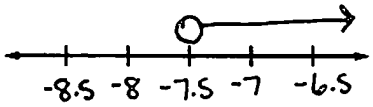
5. $12p + 52 > -2(4 - 2p)$

$12p + 52 > -8 + 4p$

$8p + 52 > -8$

$8p > -60$

$p > -7.5$



Interval Notation: (-7.5, ∞)

6. $3 - (4m + 1) \geq 5m - 25$

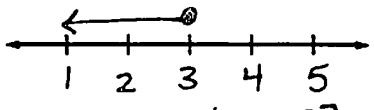
$3 - 4m - 1 \geq 5m - 25$

$-4m + 2 \geq 5m - 25$

$-9m + 2 \geq -25$

$-9m \geq -27$

$m \leq 3$



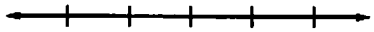
Interval Notation: (-∞, 3]

7. $3(8x-9) > 4(6x+1)$

$24x-27 > 24x+4$

$-27 > 4$

No Solution



Interval Notation: $\emptyset$

8. $10(a-3)-13a \leq 9(a-8)$

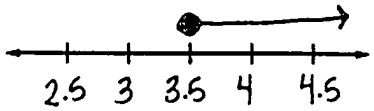
$10a-30-13a \leq 9a-72$

$-3a-30 \leq 9a-72$

$-12a-30 \leq -72$

$-12a \leq -42$

$a \geq 3.5$



Interval Notation: $[3.5, \infty)$

9. $8-7(2r+3) \leq 3(r-10)$

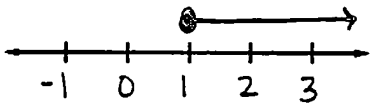
$8-14r-21 \leq 3r-30$

$-14r-13 \leq 3r-30$

$-17r-13 \leq -30$

$-17r \leq -17$

$r \geq 1$



Interval Notation: $[1, \infty)$

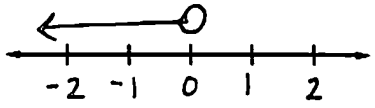
10. $-3(2p+8) < -4(2p+6)$

$-6p-24 < -8p-24$

$2p-24 < -24$

$2p < 0$

$p < 0$



Interval Notation: $(-\infty, 0)$

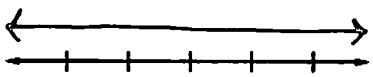
11. $11x-4 \leq 6x-(3-5x)$

$11x-4 \leq 6x-3+5x$

$11x-4 \leq 11x-3$

$-4 \leq -3$

R; all real numbers



Interval Notation: $(-\infty, \infty)$

12. $\frac{4+5(2w-10)}{-2} < +7$

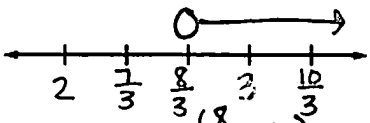
$\frac{4+10w-50}{-2} < w+7$

$10w-46 > -2w-14$

$12w-46 > -14$

$12w > 32$

$w > \frac{8}{3}$



Interval Notation: $(\frac{8}{3}, \infty)$

Set Notation

Set Notation is another way of expressing the solution to an inequality.

Example: $x > 5$ **Set Notation:** $\{x \mid x > 5\}$

Read as the set of x-values where x is greater than 5

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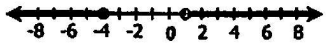
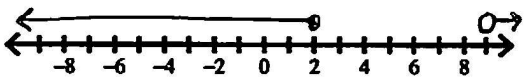
Main Ideas/Questions	Notes
Compound Inequalities	Two or more inequalities graphed together on the same number line.
TYPE 1: "OR"	 **Written:** $x \leq -4$ or $x > 1$ **Int. Notation:** $(-\infty, -4] \cup (1, \infty)$
Solving "Or" Inequalities	To solve "or" inequalities, solve each part, then graph on a number line to show the solutions.

Directions: Solve, graph, and write each solution in interval notation.

1. $3x + 4 \leq 10$ or $5x > 45$

$3x \leq 6$

$x \leq 2$ or $x > 9$

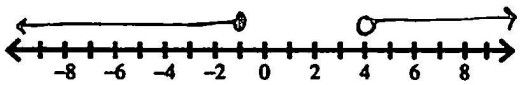


Interval Notation: $(-\infty, 2] \cup (9, \infty)$

2. $n + 6 \leq 5$ or $9n + 7 > 43$

$n \leq -1$ or $9n > 36$

$n > 4$

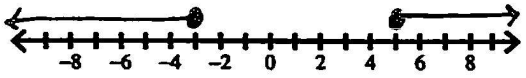


Interval Notation: $(-\infty, -1] \cup (4, \infty)$

3. $-3y + 8 \leq -7$ or $10y - 3 \leq -33$

$-3y \leq -15$ $10y \leq -30$

$y \geq 5$ or $y \leq -3$

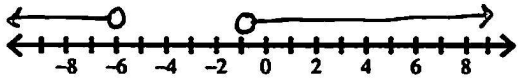


Interval Notation: $(-\infty, -3] \cup [5, \infty)$

4. $6 - 2a < 8$ or $\frac{a}{2} + 1 < -2$

$-2a < 2$ $\frac{a}{2} < -3$

$a > -1$ or $a < -6$



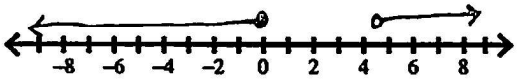
Interval Notation: $(-\infty, -6) \cup (-1, \infty)$

5. $3(5 - 2k) < -12$ or $\frac{1}{3}(15k - 9) \leq -3$

$15 - 6k < -12$ $5k - 3 \leq -3$

$-6k < -27$ $5k \leq 0$

$k > 4.5$ or $k \leq 0$



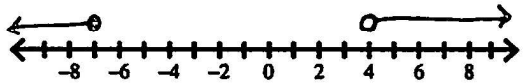
Interval Notation: $(-\infty, 0] \cup (4.5, \infty)$

6. $\frac{8 - x}{-3} \leq -5$ or $5 - \frac{3}{2}x < -1$

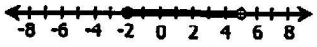
$8 - x \geq 15$ $10 - 3x < -2$

$-x \geq 7$ $-3x < -12$

$x \leq -7$ or $x > 4$



Interval Notation: $(-\infty, -7] \cup (4, \infty)$

TYPE 2: "AND"	 **Written:** $x \geq -2$ and $x < 5$ **Int. Notation:** $[-2, 5)$
Rewriting "And" Inequalities	Because the solutions to an "and" inequality fall between two endpoints, they are frequently written in a more condensed form. **Example:** $x \geq -2$ and $x < 5$ ➡ $-2 \leq x < 5$
Solving "And" Inequalities	If the "and" inequalitiy is written out, solve each part separately. If condensed, you can solve it all together, working inside out. Then, graph to show all possible solutions.

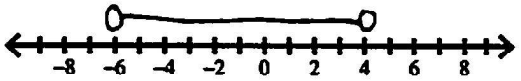
Directions: Solve, graph, and write each solution in interval notation.

7. $2x + 3 > -9$ and $8x - 2 < 30$

$2x > -12$ $\quad 8x < 32$

$x > -6$ and $x < 4$

$-6 < x < 4$



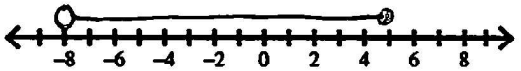
Interval Notation: $(-6, 4)$

8. $2w + 1 \leq 11$ and $1 - 5w < 41$

$2w \leq 10$ $\quad -5w < 40$

$w \leq 5$ and $w > -8$

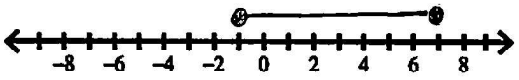
$-8 < w \leq 5$



Interval Notation: $(-8, 5]$

9. $-2 \leq a - 1 \leq 6$

$-1 \leq a \leq 7$

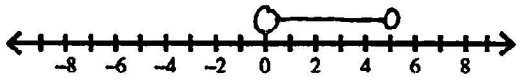


Interval Notation: $[-1, 7]$

10. $4 < 3p + 4 < 19$

$0 < 3p < 15$

$0 < p < 5$

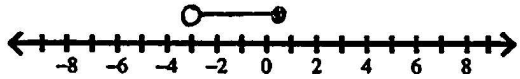


Interval Notation: $(0, 5)$

11. $28 > -2 - 10m \geq -7$

$30 > -10m \geq -5$

$-3 < m \leq \frac{1}{2}$



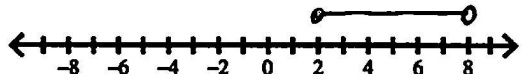
Interval Notation: $(-3, \frac{1}{2}]$

12. $-5 \leq \frac{12 - x}{-2} < -2$

$10 \geq 12 - x > 4$

$-2 \geq -x > -8$

$2 \leq x < 8$



Interval Notation: $[2, 8)$