# Writing and Graphing Inequalities

U4-1 NOTES

Key Vocabulary:

Inequality: _____

Algebraic Inequality: _____

Solution Set: _____

## Part I: Inequality Key Words and Phrases

| Symbol | Phrases | Symbol | Phrases |
|---|---|---|---|
| $<$ | | $>$ | |
| $\leq$ | | $\geq$ | |

## Using the key words and phrases, write an inequality.

| | |
|---|---|
| 1. There are fewer than 25 students (s) in the class. | 2. Above 18 people (p) in the room had brown hair. |
| 3. There are at least 15 dogs (d) in the park. | 4. No more than 50 people (p) were on the bus. |
| 5. There are at most 31 days (d) in a month. | 6. There is more than $282 (d) in the bank. |

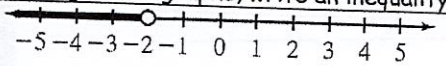
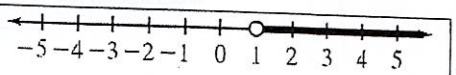
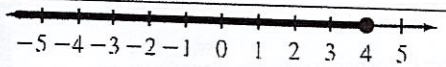
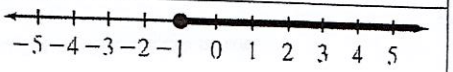
## Part II: Graphing Inequalities:

| | |
|---|---|
| An Open Circle: _____ on the number line means the inequality sign is _____ or _____. | A Closed Circle: _____ on the number line means the inequality sign is _____ or _____. |

## Graph the following inequalities.

| | |
|---|---|
| $x < -2$ | $g > 7$ |
| $-3 \geq y$ | $m \leq 0$ |

## Looking at the graphs, write an inequality.

| | |
|---|---|
|   Inequality: |   Inequality: |
|   Inequality: |   Inequality: |

## Using the inequalities you wrote in Part I, graph each inequality.

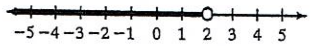
| | |
|---|---|
| 1. There are fewer than 25 students (s) in the class. | 2. Above 18 people (p) in the room had brown hair. |
| 3. There are at least 15 dogs (d) in the park. | 4. No more than 50 people (p) were on the bus. |
| 5. There are at most 31 days (d) in a month. | 6. There is more than $282 (d) in the bank. |

Unit I
Week 1

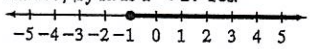
Name _____ Class _____ Date _____

# Reteaching 2-8 Inequalities and Their Graphs

Write an inequality for each graph.

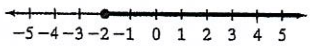
a. 


The open dot indicates 2 is not a solution. However, every number less than 2 is a solution. Thus, $x < 2$. Check by testing a point. Since 1 is shaded, try it. Is $1 < 2$? Yes.

b. 


The closed dot indicates −1 is a solution. Every number greater than −1 is also a solution. Thus, $x \geq -1$. Check by testing a point. Since 2 is shaded, try it. Is $2 \geq -1$? Yes.

**Write an inequality for each graph.**

1. 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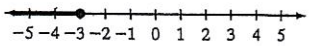
2. 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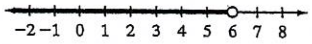
3. 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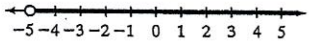
4. 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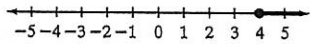
5. 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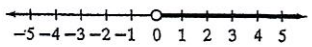
6. 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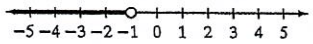
7. 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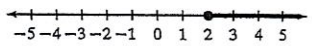
8. 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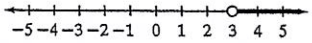
9. 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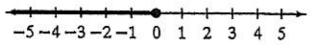
10. 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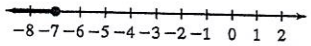
Name _____ Class _____ U4-1 HW

# Practice 2-8 Inequalities and Their Graphs

**Write an inequality for each sentence.**

1. The total $t$ is less than sixteen. _____
2. A number $h$ is not less than 7. _____
3. The price $p$ is less than or equal to \$25. _____
4. A number $n$ is negative. _____

**Write an inequality for each graph.**

5. 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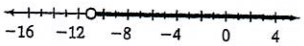
6. 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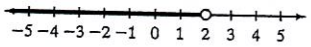
7. 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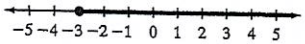
8. 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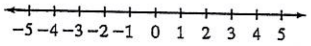
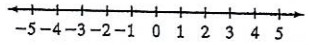
**Graph the solutions of each inequality on a number line.**

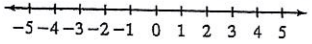
9. $x < -2$



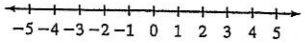

10. $y \geq -1$




11. $k > 1$




12. $p \leq 4$




**Write an inequality for each situation.**

13. Everyone in the class is under 13 years old. Let $x$ be the age of a person in the class.

_____

14. The speed limit is 60 miles per hour. Let $s$ be the speed of a car driving within the limit.

_____

15. You have \$4.50 to spend on lunch. Let $c$ be the cost of your lunch.

_____

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1A

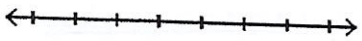
# Solving One-Step Inequalities Notes

U4-2 NOTES

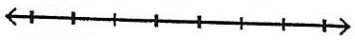
| | |
|---|---|
| Ex. 1) $c - (-3) \geq 4$ | Ex. 2) $n + 14 < -5$ |
| Ex. 3) $-8m \leq -32$ | Ex. 4) $\frac{r}{3} > -7$ |

*Use addition or subtraction to solve each inequality. Graph the solutions.*

Ex 1. $n + (-8) \geq -19$



Ex 2. $t - (-6) > 44$



Ex 3. $-26 > y + 14$

Ex 4. $486 \leq -80 + k$

Use multiplication or division to solve each inequality. Graph the solutions.

***KEY RULE:***

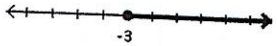
| | | |
|---|---|---|
| Ex 1. $8x > -112$ | Ex 2. $-21 > 3m$ | Ex 3. $-9t \leq 36$ |

| | | |
|---|---|---|
| Ex 4. $\frac{m}{-4} \geq 12$ | Ex 5. $\frac{-r}{14} \leq 13$ | Ex 6. $-\frac{t}{4} > 7$ |

*Identify the accurate simplified inequality.*

| | | | |
|---|---|---|---|
| $-45 \geq n - 12$ | A. $n \geq -33$<br>B. $n \leq -33$<br>C. $n \geq -57$<br>D. $n \leq -57$ | $-3n > 18$ | A. $n > 6$<br>B. $n < 6$<br>C. $n > -6$<br>D. $n < -6$ |

Match the inequality to the graph:

| | | |
|---|---|---|
| ____ 1. $x - (-3) \geq 0$<br>____ 2. $-x \geq -3$<br>____ 3. $\frac{x}{-3} \geq 1$<br>____ 4. $-2x \leq -6$ | A. | B.   |
| | C. | D. |

Infinite Algebra 1

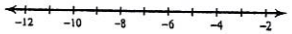
# One-Step Inequalities

Name_____

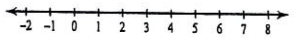
Date_____ Period____

**Solve each inequality and graph its solution.**

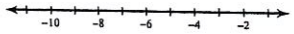
1) $-12 > x - 7$



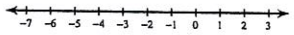

2) $-1 + r \geq 4$



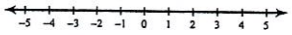

3) $n - 6 \leq -14$



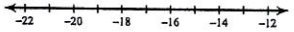

4) $b - 7 < -12$



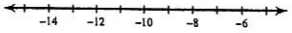

5) $a - 17 > -16$



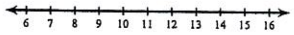

6) $15 + x \leq 0$



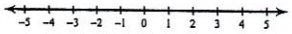

7) $3 + v \leq -9$




8) $8 \geq n - 6$

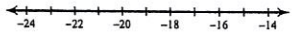



9) $-3x > 3$

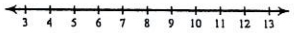



10) $\frac{n}{3} > 3$

11) $\frac{k}{4} < -4$

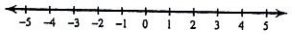



12) $-9x \geq -90$

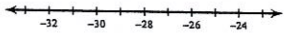




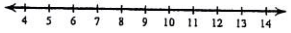

13) $0 \geq 7n$



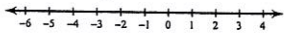

14) $\frac{m}{5} \geq -5$



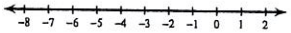

15) $-13x < -156$



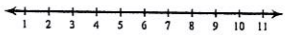

16) $32 \geq -16p$



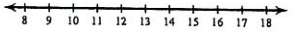

17) $-8 > v - 3$



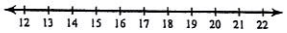

18) $11 \leq 5 + x$



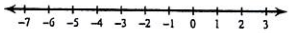

19) $25 \geq n + 13$



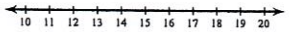

20) $-168 > -12a$



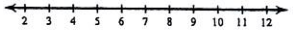

21) $-3 \leq x - 4$



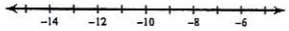

22) $\frac{r}{3} > 6$




23) $12n \geq 84$




24) $-22 > -10 + b$



# Notes: Solving Multi-Step Inequalities

U4-3 NOTES

*Solve each two-step inequality.*

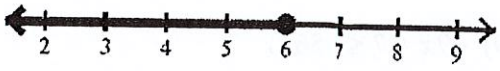
| | | |
|---|---|---|
| 1.) $-9x - 8 > 28$ | 2.) $12 - 3x < 9$ | 3.) $\frac{r}{3} + 5 \geq 9$ |
| 4.) $-4 \geq 4(-x + 2)$ | 5.) $\frac{w}{-5} + 4 \geq 9$ | 6.) $-15 + \frac{c}{6} \leq -12$ |

*Identify the accurate simplified inequality.*

| | | | |
|---|---|---|---|
| 7. $-67 \geq 3n - 16$ | A. $n \geq -17$<br>B. $n \leq -17$<br>C. $n \geq 17$<br>D. $n \leq 17$ | 8. $-4n - 7 > -19$ | A. $n > 3$<br>B. $n < 3$<br>C. $n > -3$<br>D. $n < -3$ |

Solve each inequality. Match it to the appropriate graph in the final column.

| | |
|---|---|
| 9. $-4 + \frac{r}{3} > -2$ | 10. $-1 + 4x \leq 23$ |
| 11. $49 < -5 + 6x$ | 12. $-3n - 3 > 9$ |

A. 


B.


C.


D.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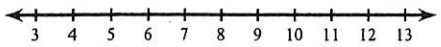
Name_____

# Two-Step Inequalities

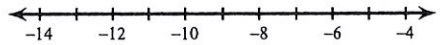
Date_____ Period____

**Solve each inequality and graph its solution.**

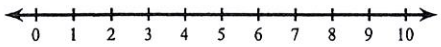
1) $2x + 4 \geq 24$



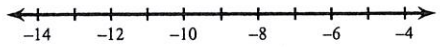

2) $\frac{m}{3} - 3 \leq -6$



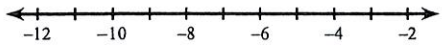

3) $-3(p + 1) \leq -18$



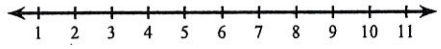

4) $-4(-4 + x) > 56$



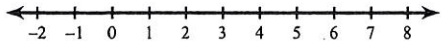

5) $-b - 2 > 8$



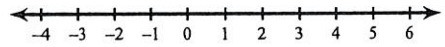

6) $-4(3 + n) > -32$



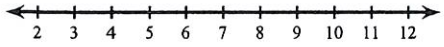

7) $4 + \frac{n}{3} < 6$



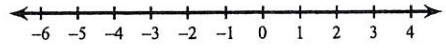

8) $-3(r - 4) \geq 0$



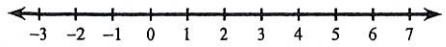

9) $-7x + 7 \leq -56$



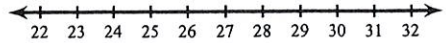

10) $-3(p - 7) \geq 21$




11) $-11x - 4 > -15$




12) $\frac{-9 + a}{15} > 1$

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3A

## Multi-Step Inequalities

Two Step, Distribute, Combine Like Terms, Variables on both sides.

U4-4 NOTES

*Solve each inequality.*

| | | |
|---|---|---|
| 1.) $-2x - 10 - 4x > 50$ | 2.) $3(4 - x) < 9$ | 3.) $3 + \frac{r}{3} + 5 \geq 9$ |
| 4.) $-4 \geq 4(-2x + 3)$ | 5.) $\frac{w}{-5} + 10 \geq 2 - 8$ | 6.) $-4c - 15 + 6c \leq -29$ |

*Identify the accurate simplified inequality.*

| | | | |
|---|---|---|---|
| 7. $3(2n - 4) \geq 6$ | A. $n \geq 3$<br>B. $n \leq -1$<br>C. $n \geq 1$<br>D. $n \leq 3$ | 8. $-6 - 12 > 18 + 3n$ | A. $n > -12$<br>B. $n < -12$<br>C. $n > 0$<br>D. $n < 0$ |

Solve each inequality. Match it to the appropriate graph in the final column.

| | |
|---|---|
| 9. $-24 + \frac{r}{3} > 12$ | 10. $-12 + -4x \leq 10 + 14$ |
| 11. $49 < -15 + 6x + 10$ | 12. $14n - 3 - 17n > 9$ |

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Infinite Algebra 1

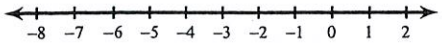
Name_____

# Multi-Step Inequalities

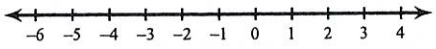
Date_____ Period____

**Solve each inequality and graph its solution.**

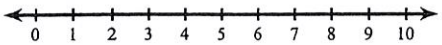
1) $3 < -5n + 2n$



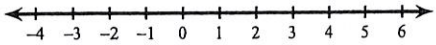

2) $6x + 2 + 6x < 14$



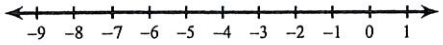

3) $-p - 4p > -10$



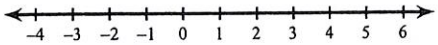

4) $18 \geq 5k + 4k$



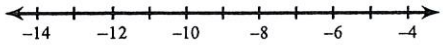

5) $9 \geq -2m + 2 - 3$



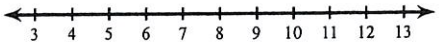

6) $-3 - 6(4x + 6) > -111$



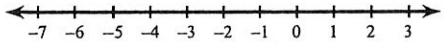

7) $6 - 4(6n + 7) \geq 122$



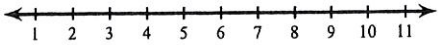

8) $-138 \geq -6(6b - 7)$



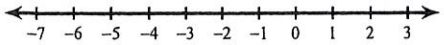

9) $167 < 6 + 7(2 - 7r)$



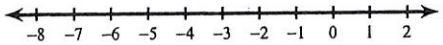

10) $5(6 + 3r) + 7 \geq 127$




11) $-8x + 2x - 16 < -5x + 7x$




12) $-1 - 6x - 6 > -11 - 7x$

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Infinite Algebra 1

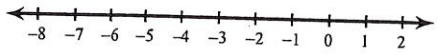
Name_____

# Multi-Step Inequalities

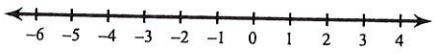
Date_____ Period____

**Solve each inequality and graph its solution.**

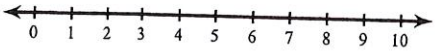
1) $3 < -5n + 2n$



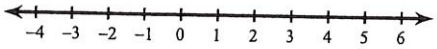

2) $6x + 2 + 6x < 14$



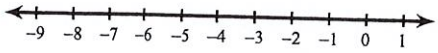

3) $-p - 4p > -10$



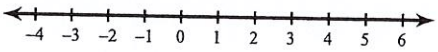

4) $18 \geq 5k + 4k$



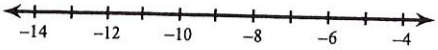

5) $9 \geq -2m + 2 - 3$



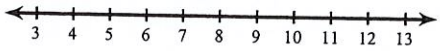

6) $-3 - 6(4x + 6) > -111$



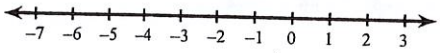

7) $6 - 4(6n + 7) \geq 122$



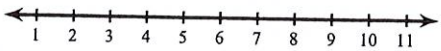

8) $-138 \geq -6(6b - 7)$



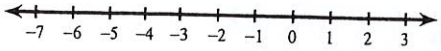

9) $167 < 6 + 7(2 - 7r)$



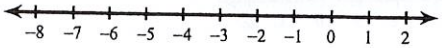

10) $5(6 + 3r) + 7 \geq 127$




11) $-8x + 2x - 16 < -5x + 7x$




12) $-1 - 6x - 6 > -11 - 7x$

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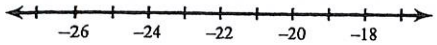
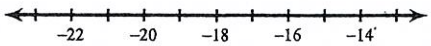
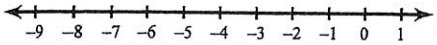
13) $-1 \le \frac{v-2}{21}$



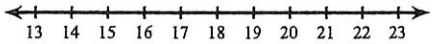

14) $-132 > 12(n+9)$



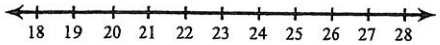

15) $\frac{-11+n}{15} < -1$



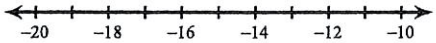

16) $-90 \ge -5(k-3)$



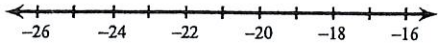

17) $4 < 1 + \frac{n}{7}$



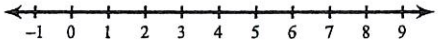

18) $-1 > \frac{12+x}{4}$



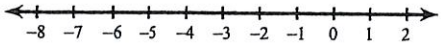

19) $7n - 1 > -169$



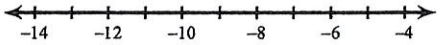

20) $-4b - 5 > -25$



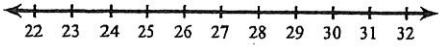

21) $84 \ge -7(v-9)$



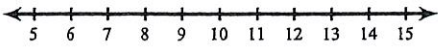

22) $\frac{-8+r}{2} > -8$




23) $\frac{x}{-6} - 8 \le -12$




24) $\frac{m-3}{2} \le 5$




2

5A

Name:_____ Date:_____

U4-6 NOTES

## Inequalities Word Problems

*Define a variable (V), write an inequality (I), solve (S) the inequality, and graph the solution set.*

1. The perimeter of the Jacob's square backyard is no more than 72 meters. What is the solution set for the length that his backyard can be?

V: _____

I: _____

S: _____

2. To get an A, you need more than 200 points on a two-part test. You score 109 points on the first part. What solution set represents how many more points you need?

V: _____

I: _____

S: _____

3. Marcus wants to buy 4 baseballs. He has $68. What solution set represents what each baseball can cost?

V: _____

I: _____

S: _____

4. 3 times a number, plus 5, is at most -28. What solution set represents what the number can be?

V: _____

I: _____

S: _____

5. -4 times a number, minus 6, is at least 22. What solution set represents what the number can be?

V: _____

I: _____

S: _____

6. You buy want to buy several candy bars for $2 each and one newspaper for $3. What solution set would represent the number of candy bars can you buy if you only have $19?

V: _____

I: _____

S: _____

7. A telephone company charges a $27 monthly service, plus $2 for each long-distance call that you make. If you budget $65 for your telephone bill each month, what solution set represents how many long distance phone calls you can make during the month without going over your budget?

V: _____

I: _____

S: _____

Ad

NAME _____ DATE _____ PERIOD _____

# TWO STEP INEQUALITY WORD PROBLEMS

1. Daniel had $25 to spend at the fair. If the admission to the fair is $4 and the rides cost $1.50 each, what is the greatest number of rides Daniel can go on?

A. Write an inequality that represents Daniel's situation.

B. How many rides can Daniel go on?. Justify your answer.

C. Graph the solutions on a number line.

2. The seventh grade class is putting on a variety show to raise money. It cost $700 to rent the banquet hall that they are going to use. If they charge $15 for each ticket, how many tickets do they need to sell in order to raise at least $1000?

A. Write an inequality that represents the situation.

B. How many tickets do they need to sell? Justify your answer.

C. Graph the solution on a number line.

3. Kevin has $25. MP3 downloads cost $0.75 each. How many songs can he download and still have $13 left to spend?

A. Write an inequality that represents Kevin's situation.

B. How many downloads can Kevin purchase? Justify your answer.

C. Graph the solution on a number line.

4. Triniti had $500 in a saving account at the beginning of the summer. She wants to have at least $200 in the account by the end of the summer. She withdraws $25 each week for food, clothes, and movie tickets.

A. Write an inequality that represents Triniti's situation.

B. How many weeks can Triniti withdraw money from her account. Justify your answer.

C. Graph the solution on a number line.

6A