Algebra 1 Workbook

Inequalities

krista king MATH

TRICHOTOMY

1. Solve the inequality.

$$2(x+1) \nleq -(8-x)$$

2. Give two ways to write the sentence in mathematical notation.

"x^2 is not greater than $4y$ and is also not equal to $4y$."

3. Give the three possible relationships in the Law of Trichotomy.

4. Find a way to express the relationships as one equality or inequality.

$x^2 + x \not< 2$ and $x^2 + x \not> 2$

5. Give two ways to write the statement in mathematical notation.

"$3(x+1)$ is not less than $-x-5$ and is also not equal to $-x-5$."

6. Solve the statement.

$-3(1-x) \not> 3(7-x) - 2x$ and $-3(1-x) \not< 3(7-x) - 2x$

INEQUALITIES AND NEGATIVE NUMBERS

1. Solve the inequality.

$$-3x + 4 < 22$$

2. What went wrong in this set of steps?

$$-5x + 6 < 9 - 2x$$

$$-3x < 3$$

$$x < -1$$

3. Solve the inequality.

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

4. Solve the inequality.

$$-6x + 7 > -3x + 2$$

5. What went wrong in this set of steps?

$$-2(x + 1) \geq 3(2 + x)$$

$$-2x - 2 \geq 6 + 3x$$

$$-2x - 3x - 2 \leq 6$$

6. Solve the inequality.

$$7(1 - x) \leq 2x$$

GRAPHING INEQUALITIES ON A NUMBER LINE

1. Give two inequalities that, when graphed on a number line, have open circles at $x = 3$.

2. Graph the inequality on a number line.

$$-2x < 4$$

3. Graph the inequality on a number line.

$$x - 1 \geq 3$$

4. Graph the inequality on a number line.

$$5(-x + 3) < -3x + 7$$

5. What's wrong with this graph of $x > 1$?

6. Graph the inequality on a number line.

$$5(x+7)-x \geq 3(x+10)+6$$

GRAPHING DISJUNCTIONS ON A NUMBER LINE

1. What's wrong with the graph of the disjunction?

$2x \leq 4$ or $x - 5 > 3$

2. Graph the disjunction.

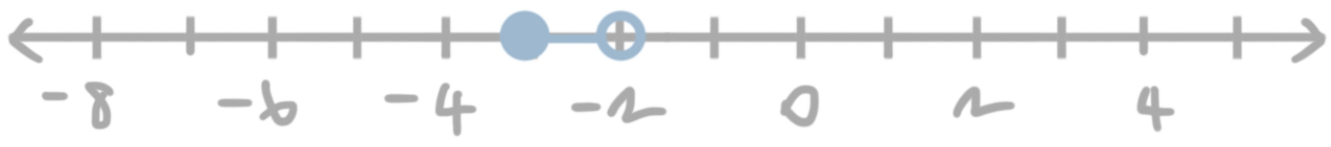
$x + 2 \geq 2x + 3$ or $x - 5 \geq 0$

3. Graph the disjunction of the inequalities.

$2(x - 3) + x < 2x + 1$ or $2(x - 1) - 6 > 6$

4. What's wrong with the graph of the disjunction?

$-x + 3 < 5$ or $-2(x + 2) \geq 2$



5. Graph the disjunction.

$2x + 3 \geq 3$ or $2x + 5 < x$

6. Graph the disjunction.

$-2x + 5 \geq -1$ or $x - 6 > -2$

GRAPHING CONJUNCTIONS ON A NUMBER LINE

1. Graph the conjunction of the inequalities $3(x-4) < x-2$ and $-2(x-6)+3 \geq 5$.

2. Graph the conjunction.

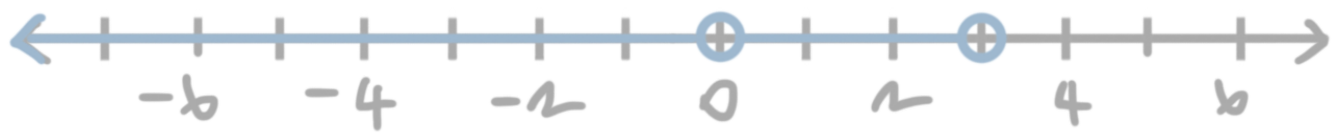
$$-8 \leq -2x < 10$$

3. What's wrong with the graph of the conjunction?

$x \leq 3$ and $x > -4$

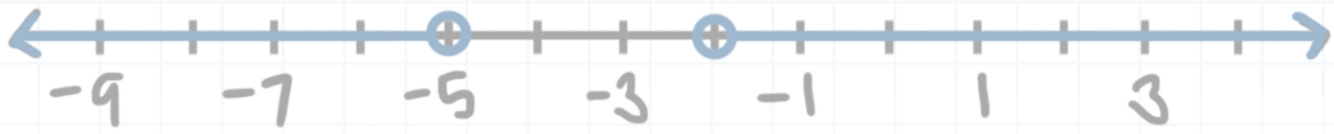
4. What's wrong with the graph of the conjunction?

$x \leq 3$ and $x \neq 0$



5. What's wrong with the graph of the conjunction?

$x < -2$ and $x > -5$



6. Graph the conjunction.

$2x - 1 \geq 3$ and $-x \geq -9$

GRAPHING INEQUALITIES IN THE PLANE

1. Graph the inequality in the Cartesian coordinate plane.

$$x \leq 5$$

2. Graph the inequality in the Cartesian coordinate plane.

$$y < -2x + 4$$

3. Graph the inequality in the Cartesian coordinate plane.

$$y \geq -\frac{1}{3}x + 5$$

4. Graph the inequality in the Cartesian coordinate plane.

$$y \leq x - 1$$

5. Graph the inequality in the Cartesian coordinate plane.

$$y > \frac{1}{2}x - 3$$

6. Graph the inequality in the Cartesian coordinate plane.

$$y \geq 3x - 2$$

ABSOLUTE VALUE EQUATIONS

1. Solve $|3 - x| = 1$.

2. Solve $|4x - 8| = 3x - 6$.

3. Solve $|2x - 2| = x - 6$.

4. Solve $|3x + 1| + x = 1$.

5. Solve $|2x + 5| = 3x + 6$.

6. Solve $|3x + 2| = |3x + 4|$.

ABSOLUTE VALUE INEQUALITIES

1. Rewrite the inequality by taking away the absolute value.

$$|3x - 7| \geq 2$$

2. Graph the inequality.

$$5|1 - x| - 7 < 3$$

3. Graph the inequality.

$$2(|x - 4| - 1) + 6 \leq 4$$

4. Graph the inequality.

$$-2|x + 2| - 3 \geq 1$$

5. Graph the inequality.

$$2(3 + |x - 5|) - 4 \geq 10$$

6. Graph the inequality.

$|6 - 2x| \leq 4$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