



# Algebra 1 Workbook

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Inequalities

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MATH

## TRICHOTOMY

- 1. Solve the inequality.

$$2(x + 1) \not\leq -(8 - x)$$

- 2. If  $x \not\leq y$  and  $x \not> y$ , by the law of trichotomy, what do we know about the relationship between  $x$  and  $y$ ?

- 3. Give two ways to write the following sentence in mathematical notation.

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

- 4. Solve the inequality.

$$x(3x - 2) \not\geq 3(x + x^2) + 10$$

- 5. Give the three possible relationships in the law of trichotomy.

- 6. Find a way to express the following relationships as one equality or inequality.



$$x^2 + x \not< 2 \text{ and } x^2 + x \not> 2$$

■ 7. Give two ways to write the following statement in mathematical notation.

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

■ 8. Solve the following statement.

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



## INEQUALITIES AND NEGATIVE NUMBERS

- 1. Solve the inequality.

$$-3x + 4 < 22$$

- 2. What is the only difference between solving inequalities and solving equations? Give an example.

- 3. What went wrong in the following set of steps?

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

$$-3x < 3$$

$$x < -1$$

- 4. Solve the inequality.

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

- 5. Of  $<$ ,  $>$ , or  $=$ , which sign is unaffected when solving inequalities? Give an example.



- 6. Solve the inequality.

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

- 7. What went wrong in the following set of steps?

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

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

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

- 8. Solve the inequality.

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



## GRAPHING INEQUALITIES ON A NUMBER LINE

- 1. Give two expressions that, when graphed, have open circles at 3.

- 2. Graph the inequality on a number line.

$$-2x < 4$$

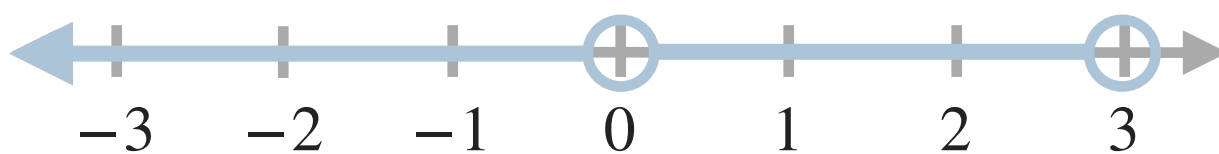
- 3. Graph the values of  $x$  that satisfy the following expressions.

$$x \leq 3 \text{ and } x \neq -2$$

- 4. Give two expressions that, when graphed, have closed circles at  $-1$ .

- 5. What is wrong with the graph of the following inequality?

$$x \leq 3 \text{ and } x \neq 0$$

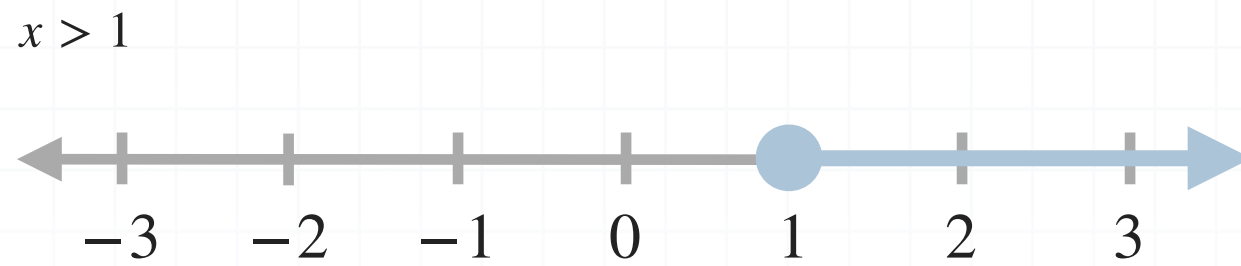


- 6. Graph the inequality on a number line.



$$x - 1 \geq 3$$

■ 7. What is wrong with the graph of the following inequality?



## GRAPHING CONJUNCTIONS ON A NUMBER LINE

- 1. Write the inequality that takes away the absolute value sign.

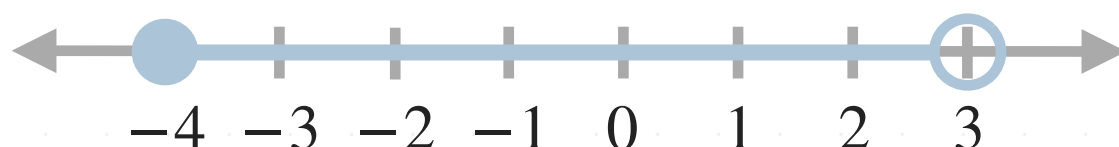
$$|3x - 7| \geq 2$$

- 2. Graph the inequality.

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

- 3. What is wrong with the graph of the following inequality?

$$x \leq 3 \text{ and } x > -4$$



- 4. Graph the inequality.

$$x < 5 \text{ and } x \geq -3$$

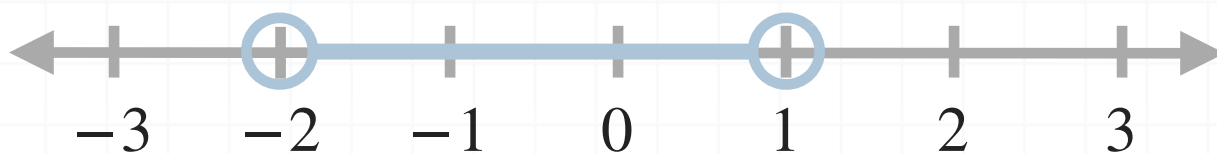
- 5. Give an example of a conjunction for which the graph is a line segment connecting two points.





- 6. What is wrong with the graph of the following inequality?

$$x < -2 \text{ and } x > 1$$



- 7. Graph the inequality.

$$|6 - 2x| \leq 4$$

- 8. Graph the inequality.

$$2x - 1 \geq 3 \text{ and } -x \geq -9$$



