

**BEAT THE TEST! pg. 38**

Take out your work (as instructed) for the 5 problems.

$(2y + 1)(y + 14) = 0$	$-\frac{1}{2}$	$-14$
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$(7n - 2)(5n - 4) = 0$	$\frac{2}{7}$	$\frac{4}{5}$
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$(4x + 3)(x - 6) = 0$	$-\frac{3}{4}$	$6$
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$x(x + 2)(x - 3) = 0$ $x = 0$	$0$	$-2$	$3$
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$t(4t + 1)(t - 2) = 0$	$0$	$-\frac{1}{4}$	$2$
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**Section 2 – Topic 5**  
**Solving Inequalities – Part 1**

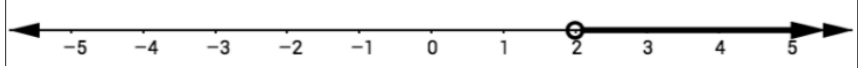
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$$x > 5$$

$$5 < x$$

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Let's start by reviewing how to graph inequalities.



➤ When the endpoint is a(n) **open** dot or circle, the number represented by the endpoint **is not** a part of the solution set.

Describe the numbers that are graphed in the example above.

**The numbers graphed are greater than 2.**

Can you list all the numbers graphed in the example above? Explain your answer.

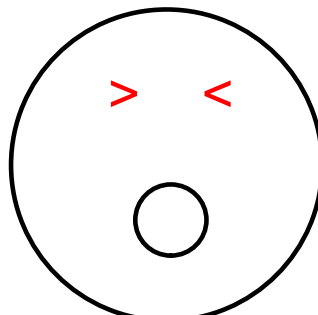
**No, there are infinitely many numbers greater than 2.**

Write an inequality that represents the graph above.

**$x > 2$**


Write the solution set that represents the graph above.

**$\{x | x > 2\}$**  *Set notation*



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Consider the following graph.



➤ When the endpoint is a(n) **closed** dot or circle, the number represented by the endpoint **is** a part of the solution set.

Write an inequality that represents the graph above.

**$x \geq 10$**

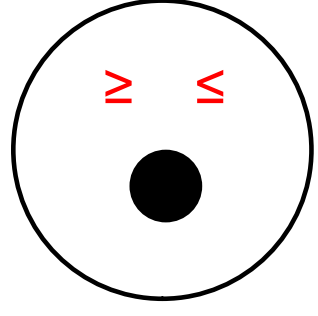
Write the solution set that represents the graph above.

**$\{x | x \geq 10\}$**  *Set notation*

Why is "or equal to" included in the solution set?

**Because 10 is included in the solution.**

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Just like there are Properties of Equality, there are also **Properties of Inequality**. pg. 39

If  $x > 5$ , is  $x + 1 > 5 + 1$ ? Substitute values for  $x$  to justify your answer.

Let  $x = 10$ ,  $10 > 5$  and  $10 + 1 > 5 + 1$ .

### Addition and Subtraction Property of Inequality

- If  $a > b$ , then  $a + c > b + c$  and  $a - c > b - c$  for any real number  $c$ .

Consider  $(2x - 1) + 2 > x + 1$ . Use the addition or subtraction property of inequality to solve for  $x$ .

~~$2x - 1 + 2 > x + 1$~~

$3 > 2$

$$\begin{array}{r|l} (2x - 1) + 2 & > x + 1 \\ 2x(-1) + 2 & > x + 1 \\ \hline 2x + 1 & > x + 1 \\ -x & & -x \\ \hline x + 1 & > 1 \\ -1 & & -1 \\ \hline x & > 0 \end{array}$$

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### Let's Practice!

1. Consider the inequality  $(4 + x) - 5 \geq 10$ . Use the addition or subtraction property of inequality to solve for  $x$ . Express the solution in set notation and graphically on a number line.
- $\{x | x \geq 11\}$

$$\begin{array}{r} (4 + x) - 5 \geq 10 \\ \boxed{4} + x \boxed{-5} \geq 10 \\ \hline x \geq 10 \\ +1 \quad +1 \\ \hline x \geq 11 \end{array}$$



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### Set-builder Notation

How to describe a set by saying what properties its members have.

Here is a simple example of set-builder notation:

$$\{ x \mid x > 0 \}$$

the set of all x such that x is greater than zero

It says "the set of all x's, such that x is greater than 0".

In other words any value greater than 0

The "x" is just a place-holder, it could be anything, such as  $\{ q \mid q > 0 \}$

Some people use ":" instead of "|", so they would write  $\{ x : x > 0 \}$

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### Try It! pg. 39

2. Consider the inequality  $4x + 8 < 1 + (2x - 5)$ . Use the addition or subtraction property of inequality to solve for  $x$ . Express the solution in set notation and graphically on a number line.

$$4x + 8 < 1 + (2x - 5)$$

$$4x + 8 < \boxed{1} + 2x \boxed{-5}$$

$$\begin{array}{r} 4x + 8 < 2x - 4 \\ -2x \quad -2x \\ \hline 2x + 8 < -4 \end{array}$$

$$\begin{array}{r} 2x + 8 < -4 \\ -8 \quad -8 \\ \hline 2x < -12 \end{array}$$

$$\begin{array}{r} 2x < -12 \\ \div 2 \quad \div 2 \\ \hline x < -6 \end{array}$$

$$\xrightarrow{\hspace{10em}}$$

$x < -6$



$$\begin{array}{r} \cancel{2x} \\ -6 \end{array}$$

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3. Peter deposited \$27 into his savings account, bringing the total to over \$234. Write and solve an inequality to represent the amount of money in Peter's account before the \$27 deposit.

Let  $x$  represent amount of money in account before deposit.

$$x + 27 > 234$$

$$\underline{-27 \quad -27}$$

$$x > 207$$

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3-2

Practice

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Form G

Solving Inequalities Using Addition or Subtraction

2.  $3 > \frac{7}{5} + s$

$$\underline{+1\frac{2}{5} \quad +1\frac{2}{5}}$$

$$4\frac{2}{5} > s$$

$$s < 4\frac{2}{5}$$

3.  $6.8 \leq m - 4.2$

$$\underline{+4.2 \quad +4.2}$$

$$11 \leq m$$

$$m \geq 11$$

>
<

≥
≤

5.  $\frac{10}{5} \leq \frac{5}{4} + s$

$$\underline{-1\frac{1}{4} \quad -1\frac{1}{4}}$$

$$1\frac{1}{2} \leq s$$

$$s \geq 1\frac{1}{2}$$

6.  $-3.8 > m + 4.2$

$$\underline{-4.2 \quad -4.2}$$

$$-8 > m$$

$$m < -8$$

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Homework

Pearson wb pg 83

7 - 23 all (17 problems)

You may show work on the page

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