LESSON 5. 4c

Solving Radical Inequalities

Today you will:

- Remember the stuff we forgot about inequalities! ☺
- Solve inequalities with radicals in them.
- Practice using English to describe math processes and equations

What are inequalities? Algebraic statements that do not have = but instead have:

$<$

$>$

$\geq$

$\leq$

How to solve an inequality:

- Same as solving an equality (just treat the inequality symbol as an =)
- …but
- …except
- …for one situation
- …
- When you multiply or divide both sides by a negative…
- …then you need to flip the inequality
- …$<$ becomes $>$
- … $\leq$ becomes $\geq$
- …and vice-versa

Think about this example…

Why?

$6 < 8$

$-6 > -8$

Solve the inequality. Graph the solution.

$2v - 4 \geq 8$

SOLUTION

$2v - 4 \geq 8$	Write the inequality.
$+4 \quad +4$	Add 4 to each side.
$2v \geq 12$	Simplify.
$\frac{2v}{2} \geq \frac{12}{2}$	Divide each side by 2.
$v \geq 6$	Simplify.

The solution is $v \geq 6$.

Solve the inequality. Graph the solution.

$\frac{y}{-6} + 7 < 9$

SOLUTION

$\frac{y}{-6} + 7 < 9$ Write the inequality.

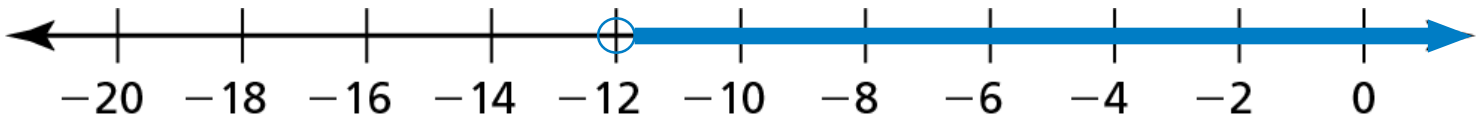
$\underline{-7} \quad \underline{-7}$ Subtract 7 from each side.

$\frac{y}{-6} < 2$ Simplify.

$-6 \cdot \frac{y}{-6} > -6 \cdot 2$ Multiply each side by -6.

$y > -12$ Simplify.

The solution is $y > -12$.



Solve $6x - 5 < 2x + 11$.

SOLUTION

$6x - 5 < 2x + 11$	Write the inequality.
$+5 \quad +5$	Add 5 to each side.
$6x < 2x + 16$	Simplify.
$-2x \quad -2x$	Subtract $2x$ from each side.
$4x < 16$	Simplify.
$\frac{4x}{4} < \frac{16}{4}$	Divide each by 4.
$x < 4$	Simplify.

The solution is $x < 4$.

Solve $3\sqrt{x-1} \leq 12$.

SOLUTION

Step 1 Solve for x.

$3\sqrt{x-1} \leq 12$ Write the original inequality.

$\sqrt{x-1} \leq 4$ Divide each side by 3.

$x - 1 \leq 16$ Square each side.

$x \leq 17$ Add 1 to each side.

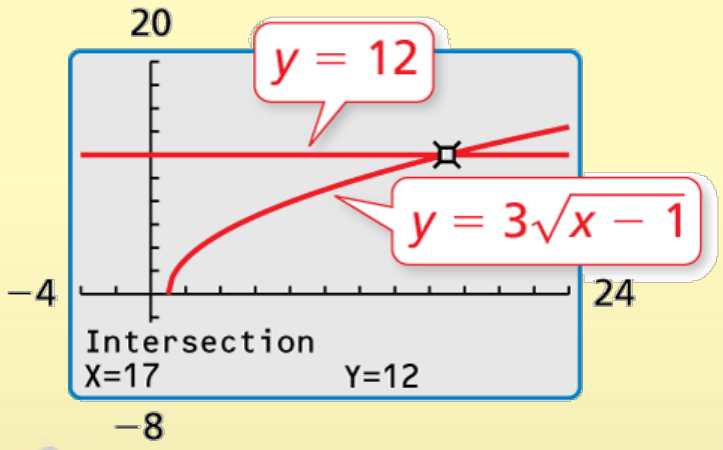
Step 2 Consider the radicand.

$x - 1 \geq 0$ The radicand cannot be negative.

$x \geq 1$ Add 1 to each side.

So, the solution is $1 \leq x \leq 17$.

Check



Solve $2\sqrt{x} - 3 \geq 3$.

SOLUTION

Step 1 Solve for *x*.

$$2\sqrt{x} - 3 \geq 3$$ Write the original inequality.

$$2\sqrt{x} \geq 6$$ Add 3 to each side.

$$\sqrt{x} \geq 3$$ Divide both sides by 2.

$$x \geq 9$$ Square both sides.

Step 2 Consider the radicand.

$$x \geq 0$$ The radicand cannot be negative.

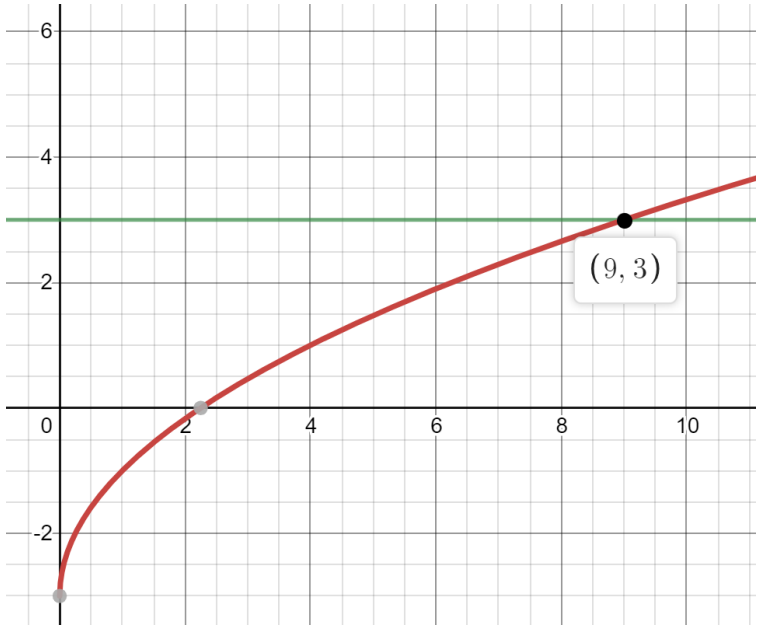
But we already have decided *x* must be greater than 9 so this is not needed….

$x \geq 9$ takes care of $x \geq 0$

AND $x \geq 0$ includes values that do not work!

So, the solution is $x \geq 9$.

Check



Solve $-4\sqrt[3]{x+1} < 8$.

SOLUTION

Step 1 Solve for x.

$-4\sqrt[3]{x+1} < 8$ Write the original inequality.

$\sqrt[3]{x+1} > -2$ Divide each side by -4, flip inequality.

$x + 1 > -8$ Cube both sides.

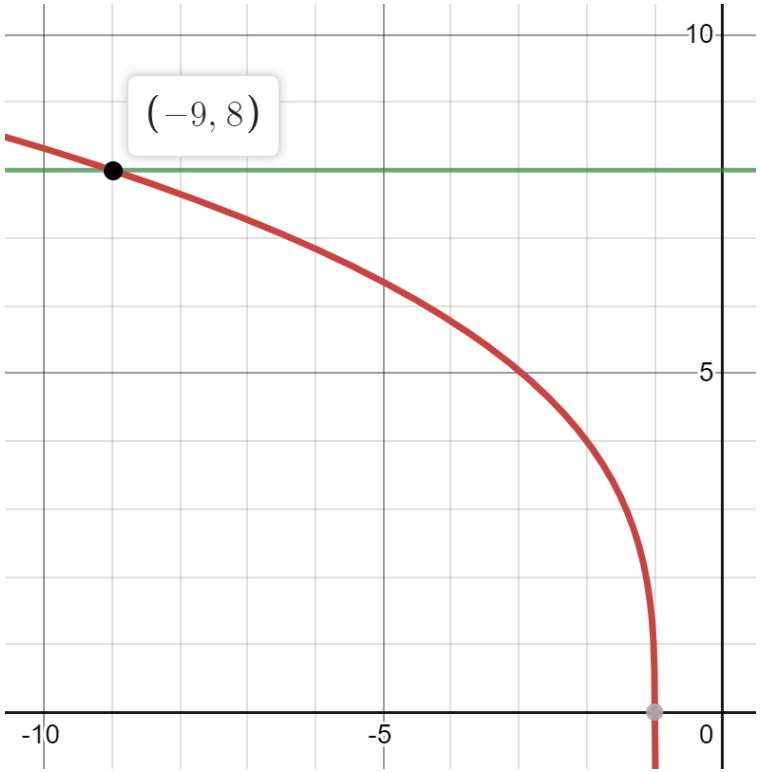
$x > -9$ Subtract 1 from each side.

Step 2 Consider the radicand.

$\sqrt[3]{x+1}$ The root is odd so there are no limits on the radicand.

So, the solution is $x > -9$.

Check



Homework

Pg 266, #37-44, 47-53