

8.8 PART 2 Solving Radical Inequalities

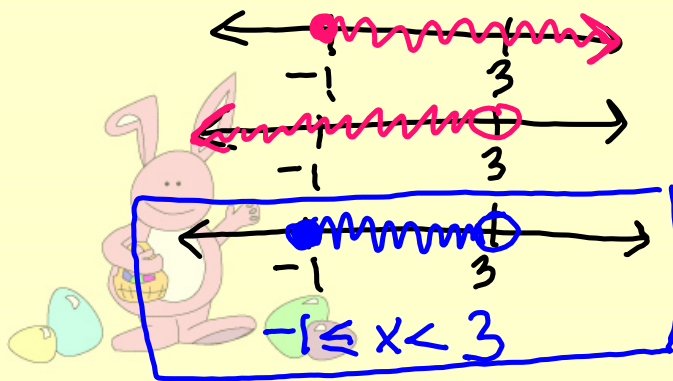
Example 1

Solve $\sqrt{x+1} < 2$.

$$D: \frac{x+1 \geq 0}{-1 \quad -1} \\ x \geq -1$$

and

$$\frac{(\sqrt{x+1})^2 < (2)^2}{x+1 < 4}{-1 \quad -1} \\ x < 3$$



① Find domain.

② Isolate radical & solve.

Example 2

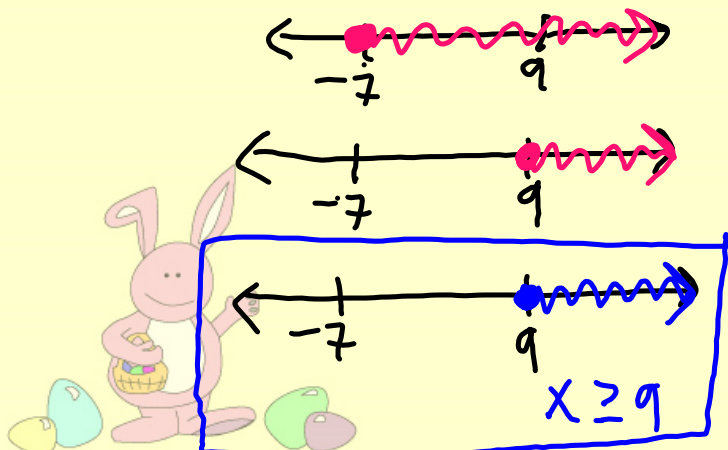
Solve $\sqrt{x+7} \geq 4$.

$$\frac{x+7 \geq 0}{-7 \quad -7}$$

$$D: x \geq -7$$

and

$$\frac{(\sqrt{x+7})^2 \geq (4)^2}{x+7 \geq 16}{-7 \quad -7} \\ x \geq 9$$



Example 3

Solve $\sqrt{2x-3} < 5$.

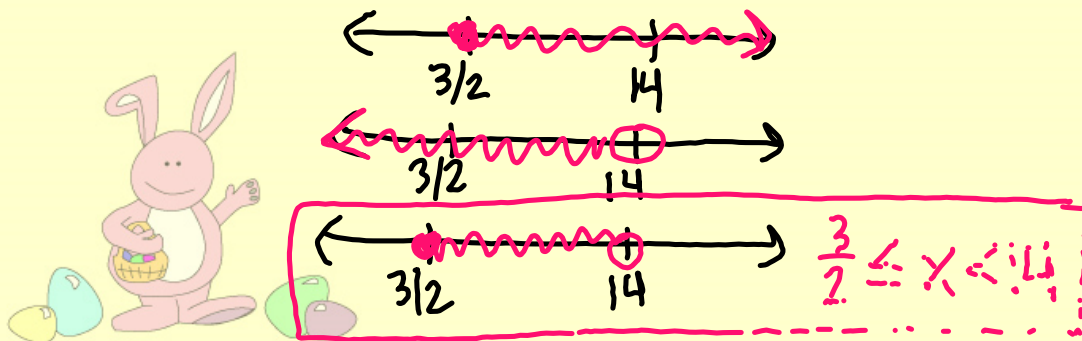
$$\begin{array}{r} 2x-3 \geq 0 \\ +3 \quad +3 \\ \hline 2x \geq 3 \\ \frac{2x}{2} \geq \frac{3}{2} \end{array}$$

$$D: x \geq \frac{3}{2}$$

$$(\sqrt{2x-3})^2 < (5)^2$$

$$\begin{array}{r} 2x-3 < 25 \\ +3 \quad +3 \\ \hline 2x < 28 \\ \frac{2x}{2} < \frac{28}{2} \\ x < 14 \end{array}$$

and



Example 4

Solve $\sqrt{x+5} < \sqrt{x-3}$.

$$\begin{array}{r} x+5 \geq 0 \\ x \geq -5 \end{array}$$

$$\begin{array}{r} x-3 \geq 0 \\ x \geq 3 \end{array}$$

$$\begin{array}{r} (\sqrt{x+5})^2 < (\sqrt{x-3})^2 \\ x+5 < x-3 \\ \hline 5 < -3 \end{array}$$

no solution



Example 5

Solve $\sqrt{3-2x} > 4$.

$$\begin{array}{r} 3-2x \geq 0 \\ -3 \qquad -3 \\ \hline -2x \geq -3 \\ -2 \qquad -2 \\ \hline x \leq \frac{3}{2} \end{array}$$

D: $x \leq \frac{3}{2}$

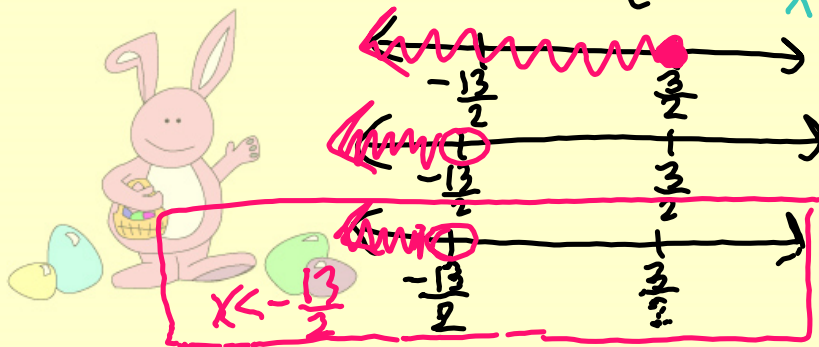
$$(\sqrt{3-2x})^2 > (4)^2$$

$$\begin{array}{r} 3-2x > 16 \\ -3 \qquad -3 \\ \hline -2x > 13 \end{array}$$

$$\frac{-2x}{-2} > \frac{13}{-2}$$

$$x < -\frac{13}{2}$$

and



Example 6

Solve $\sqrt{x^2-2x+1} > \frac{3}{2}$.

$$x^2-2x+1 \geq 0$$

$$(x-1)(x-1) \geq 0$$



D: \mathbb{R}

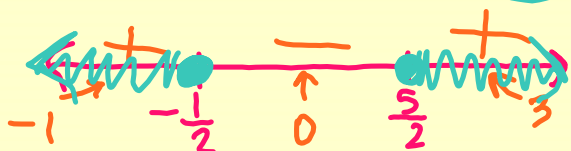
$$\begin{array}{r} -\frac{10}{4} \quad \frac{2}{4} \\ -\frac{5}{2} \quad \frac{1}{2} \end{array}$$

$$(\sqrt{x^2-2x+1})^2 > \left(\frac{3}{2}\right)^2$$

$$4 \cdot (x^2-2x+1) > \frac{9}{4} \cdot 4$$

$$\begin{array}{r} 4x^2-8x+4 > 9 \\ -9 \qquad -9 \\ \hline 4x^2-8x-5 > 0 \end{array}$$

$$(2x-5)(2x+1) > 0$$



$$\begin{array}{r} (-7)(-1) \quad (-5)(1) \quad (1)(7) \end{array}$$

$$x \leq -\frac{1}{2} \text{ or } x \geq \frac{5}{2}$$