

Questions From Homework

$$\textcircled{31} \text{ b) } (\sqrt{x+11})^2 = (x-9)^2$$

$$x+11 = x^2 - 18x + 81$$

$$0 = x^2 - 19x + 70$$

$$0 = (x-5)(x-14)$$

$$\begin{array}{l} x-5=0 \\ x=5 \end{array}$$

$$\begin{array}{l} x-14=0 \\ x=14 \end{array}$$

Test $x=5$

$$\sqrt{(5)+11} = (5)-9$$

$$\sqrt{16} = -4$$

$$4 \neq -4$$

Not a Solution.
"Extraneous Root"

Test $x=14$

$$\sqrt{(14)+11} = (14)-9$$

$$\sqrt{25} = 5$$

$$5 = 5 \checkmark$$

$x=14$ is a solution

Absolute Inequalities

$$|x - 1| \leq 5$$

$$\textcircled{1} \quad x - 1 \leq 5$$
$$x \leq 6$$

$$\textcircled{2} \quad x - 1 \geq -5$$
$$x \geq -4$$

$$\boxed{-4 \leq x \leq 6}$$

Absolute Inequalities

$$|2x+3| \geq 9$$

$$\begin{aligned} \textcircled{1} \quad 2x+3 &\geq 9 \\ 2x &\geq 6 \\ x &\geq 3 \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad 2x+3 &\leq -9 \\ 2x &\leq -12 \\ x &\leq -6 \end{aligned}$$

Absolute Rational Inequalities

$$\left| \frac{x+2}{x+1} \right| \leq 2$$

$$\textcircled{1} \frac{x+2}{x+1} \leq 2$$

$$\textcircled{2} \frac{x+2}{x+1} \geq -2$$

positive

negative

Case 1 $x+1 > 0$

Case 2 $x+1 < 0$

$$\frac{x+2}{x+1} \leq 2$$

$$\frac{x+2}{x+1} \geq -2$$

$$\frac{x+2}{x+1} \leq 2$$

$$\frac{x+2}{x+1} \geq -2$$

$$x+2 \leq 2x+2$$

$$x+2 \geq -2x-2$$

$$x+2 \geq 2x+2$$

$$x+2 \leq -2x-2$$

$$-x \leq 0$$

$$3x \geq -4$$

$$-x \geq 0$$

$$3x \leq -4$$

$$x \geq 0$$

$$x \geq -\frac{4}{3}$$

$$x \leq 0$$

$$x \leq -\frac{4}{3}$$

Absolute Inequalities

$$5 < |x + 2| < 10$$

$$\textcircled{1} \quad 5 < x + 2 < 10$$

$$\boxed{3 < x < 8}$$

$$\textcircled{2} \quad -5 > x + 2 > -10$$

$$-7 > x > -12$$

$$\boxed{-12 < x < -7}$$

Homework