2.5 Solving Inequalities

Example 1 (Linear Inequalities)

Solve: \((-4 \leq \frac{3-2x}{3} < 5)\)^3

\[-12 \leq 3 - 2x < 15\]
\[-15 \leq -2x < 12\]
\[-\frac{15}{2} \leq x < \frac{12}{2}\]
\[-\frac{15}{2} \leq x < 6\]
\[-6 < x \leq \frac{15}{2}\]
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Example 2 (Absolute Value Inequalities)

Solve: \[ |2x - 15| \leq 3 \]

\[ -a \leq x \leq a \]

\[ x \geq -a \quad \Rightarrow \quad x \geq a \]
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Example 3 (Absolute Value Inequalities)

Solve: $|x + 7| > 6$
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Example 4 (Absolute Value Inequalities)

Solve: \( |x^2 + 5x - 4| \leq 6 \)
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Example 5 (Absolute Value Inequalities)

Solve: $|3x + 1| < 5 - 2x$
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Example 6 (Polynomial and Fractional Inequalities – SIGN GRAPH)

Solve: $2x^3 + 5x^2 > 12x$
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Example 7 (Polynomial and Fractional Inequalities – SIGN GRAPH)

Solve: \( x^2 - 4x - 1 \leq 0 \)
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Example 8 (Polynomial and Fractional Inequalities – SIGN GRAPH)

TRY IT! Solve: $x^3 - x^2 - 2x \geq 0$

ANS: $[-1, 0] \cup [2, +\infty)$
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Example 9 (Polynomial and Fractional Inequalities – SIGN GRAPH)

Solve: \( \frac{x + 12}{x + 2} \geq 3 \)
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Example 10 (Domain Questions – AGAIN)

Find the domain of the function: \( f(x) = \sqrt{\frac{x-2}{x^2-9}} \)
2.5 Solving Inequalities

Example 11 (Domain Questions – AGAIN)

Find the domain of the function: \( f(x) = \sqrt{2x^3 - 4x^4} \)