

Inequalities, absolute value, interval notation

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Practice problems

1. Solve the inequality $3x - 7 \geq 14$ and write the answer in interval notation.
2. Solve the equation $|2x + 5| = 11$.
3. Solve the inequality $|x - 3| > 2$ and write the answer in interval notation.

Solutions

1. Solve the inequality $3x - 7 \geq 14$ and write the answer in interval notation.

- Add 7 to both sides to get $3x \geq 21$.
- Divide both sides by 3 to get $x \geq 7$.
- Since x is greater than or equal to 7, the interval starts at 7 and goes to infinity.
- Use a square bracket for 7 because it is included.

Answer: $[7, \infty)$

2. Solve the equation $|2x + 5| = 11$.

- Set up two cases: $2x + 5 = 11$ and $2x + 5 = -11$.
- For the first case, subtract 5 to get $2x = 6$, then divide by 2 to get $x = 3$.
- For the second case, subtract 5 to get $2x = -16$, then divide by 2 to get $x = -8$.
- Both values satisfy the original equation.

Answer: $x = 3, x = -8$

3. Solve the inequality $|x - 3| > 2$ and write the answer in interval notation.

- The distance from x to 3 must be greater than 2.
- This means $x - 3 > 2$ or $x - 3 < -2$.
- Solving the first part: $x > 5$, which is $(5, \infty)$.
- Solving the second part: $x < 1$, which is $(-\infty, 1)$.
- Combine these two disjoint sets using the union symbol.

Answer: $(-\infty, 1) \cup (5, \infty)$