Inequalities Quick Reference

Everything you need to know about solving and graphing inequalities.

Inequality Symbols

Symbol	Meaning	Graph
<	Less than	Open circle, shade left
>	Greater than	Open circle, shade right
<=	Less than or equal to	Closed circle, shade left
>=	Greater than or equal to	Closed circle, shade right

Solving Linear Inequalities

Basic Rules

Add/Subtract: Same as equations. Direction stays the same.

Multiply/Divide (+): Direction stays the same.

Multiply/Divide (-): FLIP the inequality sign!

Example:
-3x + 6 > 12
-3x > 6
x < -2 (flipped because we divided by -3)

Compound Inequalities

AND (intersection):
x > 2 AND x < 7 means 2 < x < 7. Both conditions must be true. Graph: shaded region between 2 and 7.

OR (union):
x < -1 OR x > 4. At least one condition must be true. Graph: shaded regions outside -1 and 4.

Absolute Value Inequalities

Less than (AND):
|x| < a means -a < x < a
|x - 3| < 5 means -2 < x < 8

Greater than (OR):
|x| > a means x < -a OR x > a
|x + 2| > 6 means x < -8 OR x > 4

Graphing on Number Lines

Type	Notation	Circle	Shading
x > 3	(3, inf)	Open at 3	Right
x >= 3	[3, inf)	Closed at 3	Right
x < -1	(-inf, -1)	Open at -1	Left
2 < x <= 5	(2, 5]	Open at 2, closed at 5	Between

Systems of Inequalities

To solve: Graph each inequality on the same coordinate plane. The solution is the overlapping shaded region.

Dashed line: < or > (boundary not included)

Solid line: <= or >= (boundary included)

Test point: Pick (0,0) if not on the line. If it satisfies the inequality, shade that side.

The #1 mistake with inequalities: forgetting to flip the sign when multiplying or dividing by a negative number. Always double-check this step.