

Linear equations

None of this is on the CLT formula sheet, and there is no calculator: memorize it.

- ✓ **Slope:** $m = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$; keep the points in the same order
- ✓ **Slope-intercept:** $y = mx + b$, slope m , y -intercept b
- ✓ **Standard form:** $Ax + By = C$, slope $-\frac{A}{B}$
- ✓ **Point-slope:** $y - y_1 = m(x - x_1)$
- ✓ **Parallel lines:** identical slopes; **perpendicular:** negative reciprocals
- ✓ **Intercepts:** $y = 0$ at the x -intercept, $x = 0$ at the y -intercept
- ✓ **Reflect** across the y -axis: negate x ; across the x -axis: negate y

≥ Inequalities and absolute value

- ✓ Solve like an equation, but **flip the sign when you multiply or divide by a negative**
- ✓ $|A| = B$ gives $A = B$ or $A = -B$
- ✓ $|2x + 7| < 12$: $-12 < 2x + 7 < 12$, so $-\frac{19}{2} < x < \frac{5}{2}$: **less than means and**
- ✓ $|A| > B$: $A > B$ or $A < -B$: **greater than means or**
- ✓ **Plug in 0** to test which range is right
- ✓ Systems of inequalities: add them (pointing the same way) to eliminate; never subtract

Solving systems of equations

Approach	How	Best when
Substitution	Isolate a variable in one equation, plug it into the other, solve, then plug back	A variable is already, or easily, isolated
Elimination	Multiply so one variable has opposite coefficients, add, solve, plug back. Same signs: subtract	Often the fastest way on the CLT
Graphing	Sketch both and estimate where they cross	Both are in, or near, slope-intercept form
Backsolving	Plug each answer into both equations	Nothing else looks quick

- ✓ **Line and parabola:** set them equal, move everything to one side, use the discriminant $b^2 - 4ac$ to count intersections
- ✓ If $a > 0$ and $c < 0$, there are always **two real roots**
- ✓ Three equations: reduce to two with elimination, or guess and check when the variables are positive integers

X¹ Multivariable equations

- ✓ **In terms of:** solve for the variable before the phrase
- ✓ You need as many equations as variables
- ✓ **distance = speed × time**
- ✓ Word problems: the smaller quantity gets the help: twice as many apples as bananas is $a = 2b$