What a System Is, and Solving by Graphing

A system is two equations at once. A solution must work in every equation: on a graph, the intersection. Graph both from m and b, read the crossing, check in both.

1 THE VOCABULARY
Words we use

System of equations — two or more equations that must all be true at once.

Solution of a system — a point that makes every equation true. Check it in both.

Intersection — where the graphs cross: the one point on both lines.

Solve by graphing — graph both from m and b, read the crossing, check.

Exact answer — algebra (Lessons 2 and 3) gives it even when the crossing is off the grid corners.

- Watch out for these.
- Calling a point on one line a solution. It must be on both.
- Reading the crossing without checking. Put it into both equations.
- Trusting a crossing that is not on a grid corner. Estimate, then solve by algebra.
- Forgetting to rewrite into y = mx + b before graphing.

2 THE METHOD
Solve by graphing

1. GRAPH BOTH each line from m and b (rewrite first if needed).
2. READ THE CROSSING the intersection: its x and its y.
3. CHECK IN BOTH put the point into each equation. Both true, or it is not the solution.
4. KNOW THE LIMIT off a grid corner, you can only estimate. Use algebra for the exact point.

WHY THE CROSSING IS THE SOLUTION

A point on line 1 makes equation 1 true. A point on line 2 makes equation 2 true. The crossing is on both lines, so it makes both true at once, and no other point does.

3 BY GRAPHING
y = x + 1 and y = −2x + 7

line 1: b = 1, m = 1	plot (0, 1), up 1 right 1
line 2: b = 7, m = −2	plot (0, 7), down 2 right 1
they cross at (2, 3)	read the intersection
check: 2 + 1 = 3	true in equation 1
check: −4 + 7 = 3	true in equation 2. (2, 3) is the solution

A POINT ON ONE LINE ONLY

(0, 1) is on line 1 (0 + 1 = 1) but not line 2 (0 + 7 = 7, not 1). Not a solution of the system.

SAY IT OUT LOUD

Two lines, one shared point. It has to work in every equation. Graph to see, algebra to be exact.