

System of Equations

of Solutions:

1 soln (x, y)	Infinitely Many Solns All pts on line	No Soln { } or \emptyset (null set)
Lines intersect in exactly 1 pt * Independent & Consistent	Lines – coincide (same line) * Dependent & Consistent	Lines are parallel (same slopes) / do not intersect * Inconsistent

Methods of Solving a System of Equation

1. Graphing

* Best to use when lines intersect at integer coordinates (must be neat & accurate)

- graph both lines on coordinate plane (use $y = mx + b$)

- Solution will be:

One point \rightarrow (x, y) If intersect at a point

Infinitely many \rightarrow if lines coincide

No Soln \rightarrow If lines are parallel

2. Substitution Method

* Best to use when one of eqns has a variable with a coefficient of 1

- Solve one eqn (this will be 1st eqn) for one of variables (isolate variable)

- Substitute this expression into the other eqn (2nd eqn) for given variable

- Solve 2nd eqn for remaining variable

- Substitute answer from 2nd eqn into one of original eqns & solve for remaining variable

Note:

If you are solving 2nd eqn and variable drops out:

- if resulting statement is true \rightarrow Infinitely Many solns

- if resulting statement is false – NO soln

3. Elimination Method

- * Use only when one of variables has the same or opposite coefficients
 - Re-write eqns. so that variable terms line up vertically.
 - If coefficients are opposites – add eqns.
 - If coefficients are same – subtract eqns. (note: subtract every term)
 - Solve for remaining var.
 - Substitute value from step 3 into 1 of orig. eqns. & solve for remaining var.

Note:

If both variables drop out:

- if resulting statement is true -> Infinitely Many solns
- if resulting statement is false – NO soln

4. Elimination with Multiplication Method

- * Use when none of coefficients are 1 or -1 & neither var. can be elim. by simply adding or subtracting the eqns.
 - Multiply 1 or both of the eqns. by some number(s) so that 1 of the variable terms are the same or opposites. Be sure that you multiply EVERY term of eqn by the #.
 - Use elim. with add. or subt. to eliminate 1 of the var.

Note:

If both variables drop out:

- if resulting statement is true -> Infinitely Many solns
- if resulting statement is false – NO soln

You can also solve word problems with systems of eqns

1. Define 2 variables
2. Write 2 eqns that relate variables from given info.
3. Solve the resulting sys. of eqns.