**Example 1**: A system of 2 linear equations for 2 unknowns:

$$\begin{cases} x - y = -1 \\ 3x + y = 9 \end{cases}$$

**Solution**:

$$\begin{cases} x = 2 \\ y = 3 \end{cases}$$

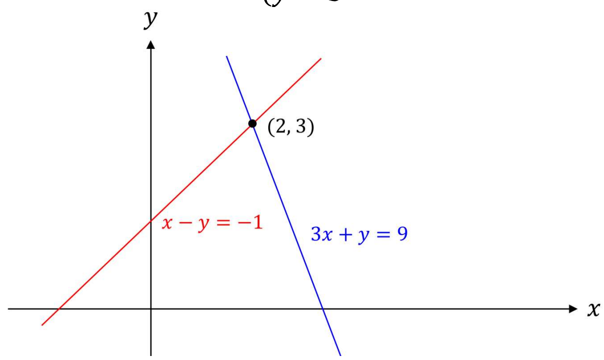


**Figure 7. Illustration of the solution of a system of two linear equations.**

**Example 2**: A system of 3 linear equations for 2 unknowns:

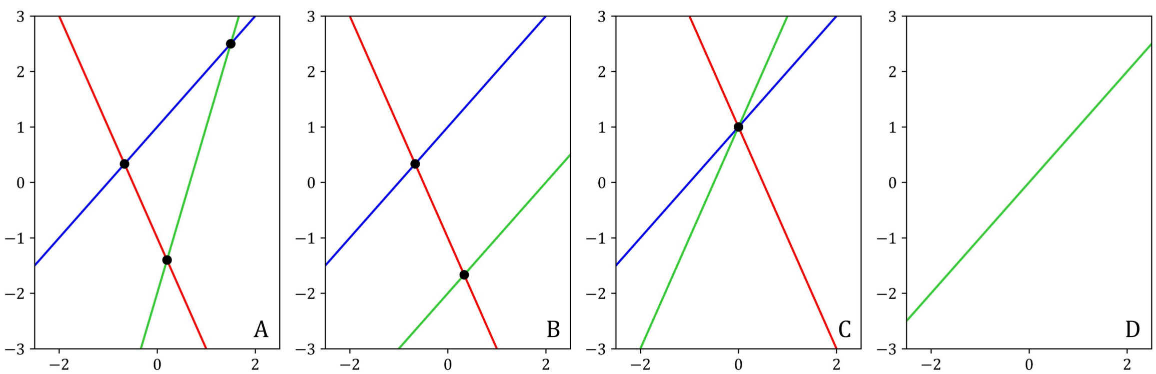


**Figure 8. Geometrical interpretations of the solutions of a system of 3 equations**

In these figures, we noticed a system of 2 unknowns and 3 equations may have 4 possibilities:

(1) Three intersections, pairwise linearly independent
(2) Two parallel, two intersections
(3) One intersection, one linearly dependent
(4) Infinite many intersections, all linearly dependent

As demonstrated by the above, we have:
**Three possibilities of the solutions** for a given linear systems Ax=B:

(1) Infinitely many solutions
(2) A single solution
(3) No solution

**The most basic LA: Elementary row operations:** These operations retain the solutions of the system

1. Swap the positions of two rows.
2. Multiply a row by a nonzero scalar.