

SYSTEMS OF LINEAR EQUATIONS

system of linear equations: two or more linear equations with two or more variables

solution to a system of linear equations: set of numbers that satisfies all of the linear equations; can find the solution using models, tables, graphs, and algebraic methods

Example 1: Use a system of linear equations to describe the following situation. The total cost of a salad and a drink is \$4.80. The salad costs \$2.00 more than the drink. Let s represent the cost of the salad and d represent the cost of the drink.

Equation 1: $s + d = \$4.80$ describes the total cost

Equation 2: $s = d + \$2.00$ salad cost equals drink cost plus \$2.00

Is $s = \$3.00$ and $d = \$1.00$ a reasonable solution to this system?

Substitute $s = \$3.00$ and $d = \$1.00$ into each equation.

Equation 1: $s + d = \$4.80$

$$\$3.00 + \$1.00 = \$4.80$$

$$\$4.00 = \$4.80$$

False

Equation 2: $s = d + \$2.00$

$$\$3.00 = \$1.00 + \$2.00$$

$$\$3.00 = \$3.00$$

True

Answer: Since Equation 1 is false, this is not a reasonable solution.

Example 2: Find the solution to the following system of linear equations using the tables, graph, and algebraic method.

$$y = x + 2$$

$$y = -2x - 1$$

Tables

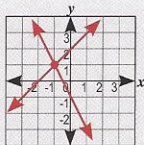
$$y = x + 2$$

x	y
-2	0
-1	1
0	2
1	3
2	4

$$y = -2x - 1$$

x	y
-2	3
-1	1
0	-1
1	-3
2	-5

Graph



Lines intersect at point $(-1, 1)$.

Algebraic Method

Replace y in first equation with $-2x - 1$

$$-2x - 1 = x + 2$$

$$-2x - 1 + 1 = x + 2 + 1$$

$$-2x - x = x - x + 3$$

$$-3x = 3$$

$$\frac{-3x}{-3} = \frac{3}{-3}$$

$$x = -1$$

Now find y when $x = -1$

$$y = x + 2 = -1 + 2$$

$$y = 1$$