

MATH 120 Section 4.1 Systems of Linear Equations in Two Variables

A system of linear equations consists of two or more linear equations, which are solved simultaneously.

A solution to a system consists of the values of the variables which make the system true.

Three Methods for Solving Systems

I. Graphing

II. Substitution

Solve one equation for a variable and substitute into the other equation.

III. Elimination (Sometimes called Addition)

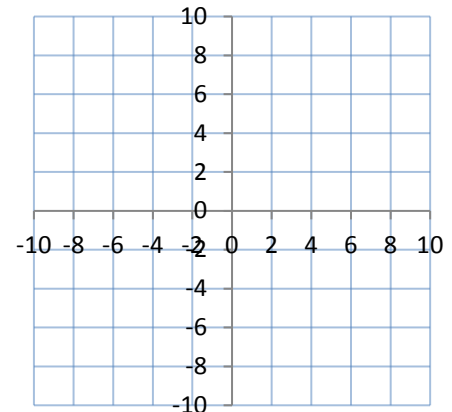
- Multiply one or both equations by a value or values, so that the coefficients of one variable in both equations are the same number but opposite signs.
- Add the equations so that one variable is eliminated.

Problems

1. Solve the system of linear equations by the following methods:

a) Graphing, b) Elimination, c) Substitution.

$$\begin{cases} 2x + y = 8 \\ x + 3y = 9 \end{cases}$$

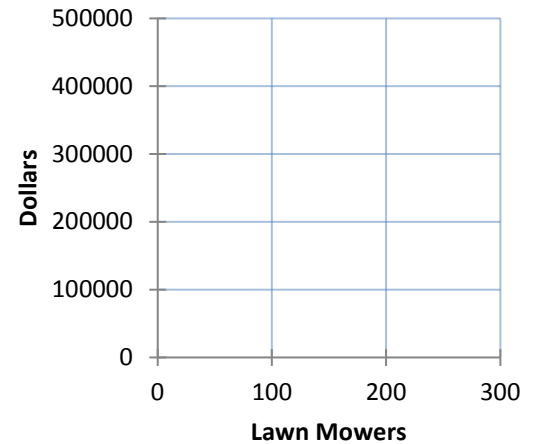


2. Animals in an experiment are to be kept under a strict diet. Each animal should receive 60 grams of protein and 10 grams of fat. The laboratory technician is able to purchase two food mixes: Mix A has 20% protein and 6% fat. Mix B has 50% protein and 5% fat. Complete the chart. Write and solve a system of equations to determine how many grams of each mix should be used to obtain the right diet for one animal?

	Grams of Mix A	Grams of Mix B	Total
Protein			
Fat			

4. A company produces lawn mowers. The company's daily fixed costs are \$42,000 and variable costs are \$1500 per lawn mower. The mowers are sold for \$1800 each.

- Find the cost function $C(x)$.
- Find the revenue function $R(x)$.
- Find the break-even point. Write your answer as an ordered pair.
- Graph the cost and revenue functions on the given coordinate system and show the break-even point.
- Write the meaning of the break-even point you found in part c using complete sentences with correct units. Include an interpretation of the regions between the lines that are to the left and to the right of the break-even point.



5. A company markets exercise DVDs that sell for \$34.95, including shipping and handling. The monthly fixed costs (advertising, rent, etc.) are \$47,700 and the variable costs (materials, shipping, etc.) are \$12.45 per DVD.

- Find the cost function $C(x)$.
- Find the revenue function $R(x)$.
- Find the break-even point. Write your answer as an ordered pair.
- Graph the cost and revenue functions on the given coordinate system and show the break-even point.
- Write the meaning of the break-even point you found in part c using complete sentences with correct units. Include an interpretation of the regions between the lines that are to the left and to the right of the break-even point.

