

Algebra,

Been there – Done that

Systems of Equations

Decision making

Mathematical Systems

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Algebra, Been there –Done that is a newsletter that links algebra to previously learned concepts and skills or outside experiences

Methods for Solving Systems of Equations

1. Trial & Error
2. Graphing
3. Substitution
4. Linear Combination

How many times have you watched a commercial on television touting a product or services as not only the best, but the cheapest? Let's say you were watching TV tonight and you saw the following commercials back to back. The first commercial representing Phone Company A declares they are the least expensive telephone service. Immediately following that commercial, a different Phone Company B makes the same claim, they have the cheapest rates, what can you conclude from these two commercials?

Most people might conclude on first blush one of the phone companies is being less than truthful. But, if we were to look at this problem from a mathematical standpoint (logic), we might see that both of these phone companies are, in fact, telling the truth.

Let's look at two telephone companies and see how this might occur. Telephone Company A charges a monthly fee of \$10.00 plus ten cents per minute. Mathematically, we'd write:

$$c_A = \$10.00 + .10m$$

Substitution –

1. Solve for a variable in one equation
2. Plug that into the other equation
3. Solve the resulting equation.

Telephone Company B charges \$11.50 per month plus five cents per minute. Writing that mathematically, we have

$$c_B = \$11.50 + .05m$$

Two different phone companies, two different monthly charges, two different charges per minute. To determine which is the better deal, we plug in each formula the number of minutes the phone is being used.

What we would find is Phone Company A is cheaper if you use the phone less than 30 minutes. However, if you use the phone more than 30 minutes, the Phone Company B is cheaper.

Linear Combination –

1. Make one of the coefficients on one of the variables the same in both equations
2. Subtract the equations
3. Solve the resulting equation

In other words, both companies were telling the truth in their respective commercials depending upon the number of minutes the phone was being used. The break even point is 30 minutes, both companies would charge \$13.00.

So, which phone company offers the better deal? That answer depends upon your usage. Those type decisions have to be made all the time in real life. Do you buy a car or lease one?. Do you rent a car or use a taxi? Do you buy a house or rent?

Systems of equations can be solved by trial and error, graphically, substitution, or by linear combination. Trial and error may take a little time, graphing both equations would give us an idea where the costs are the same, the other two methods will tell us exactly where the break even point is.