Bell Work

1. John and Sarah are saving money for a car. The total amount of money John will save is given by the function *$f(x)=60+5x$*. The total amount of money that Sarah will save is given by the function *$g(x) = x^2+46$*. After how many weeks,x, will they have the same amount of money saved. Explain how you arrived at your answer.

Feb 14-4:16 PM

$60+5x=x^2+46$

$0=x^2-5x-14$

$0=(x-7)(x+2)$

$x-7= 0$ or $x+2=0$

$x=7$ or $x=-2$ Cannot have negative time!

So, after 7 weeks they will have the same amount of money ($95).

Feb 14-4:21 PM

Solving System of 3 linear Equations in 3 Variables

A linear equation in three variables has three distinct variables, each of which is either first degree or has a coefficient of 0.

The three variables that satisfy the linear equation are called an ordered triple and are written (x,y,z).

The set of all ordered pairs that satisfy a an equation like this forms a plane.

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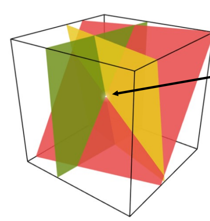
system of equations in three variables: a set of one or more equations, each of which contain one or more of the variables x,y and z.



One unique solution

An independent system

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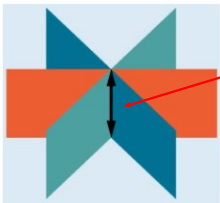

Planes intersect along a line--infinitely many solutions

Dependent System

**Results in 0=0 (or other true statement) when solving

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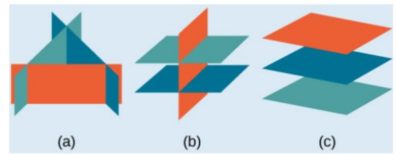


No solution

Inconsistent System

**Solution will result in a false statement, like 3=0

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Method 1: Solving by Substitution You want to use this method when you have a variable that is easy to solve for (coefficient of 1).

$$\begin{cases} 3x+2y-z=6 \\ -2x+2y+z=3 \\ x+y+z=4 \end{cases}$$

Using the first equation, solve for z:

z=3x+2y-6 Plug that value into the other 2 equations

Now we need to solve this system for x and y. Then plug the results into the first equation. Solve like you have in the past.

$-2x+2y+3x+2y-6=3 \longrightarrow x+4y=9$

$x+y+3x+2y-6=4 \longrightarrow 4x+3y=10$

$x=-4y+9$

$4(-4y+9)+3y=10$

$-16y+36+3y=10$

$-13y+36=10$

$-13y=-26$

$y=2$

$x=-4(2)+9$

$x=1$

$z=3x+2y-6$

$z=3(1)+2(2)-6$

$z=1$

Now that we know the values for x and y, we just plug them into the first equation and solve for z.

https://youtu.be/5JSCbEKsguQ

The solution (1,2,1)

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Your turn 2 and 3 page 206

Reflect

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## Bell Work

1. Complete survey for Mrs. Boyd.

2. Get out your homework. Check it with a neighbor and see if you have questions.

   On paper tell me the following: Did you complete the assignment? How did you do? What questions do you still have?

3. Summarize how you solve a system of 3 linear equations in 3 variables using substitution.

Feb 18-9:40 AM

Method 2 Solving by Elimination

Using the first two equations, eliminate one of the variables so that you can solve for the other 2.

$$\begin{cases} x+y+z=2 \\ x-y+3z=4 \\ 2x+2y+z=3 \end{cases}$$

$$\begin{array}{r} x+y+z=2 \\ +x-y+3z=4 \\ \hline 2x+4z=6 \end{array}$$

Must eliminate the same variable from both pairs of equations!

$$\begin{cases} 2(x-y+3z=4) \\ (2x+2y+z=3) \end{cases}$$

$$\begin{array}{r} 2x-2y+6z=8 \\ +2x+2y+z=3 \\ \hline 4x+7z=11 \end{array}$$

Using equations 2 and 3, eliminate the same variable.

$$\begin{cases} 2x+4z=6 \\ 4x+7z=11 \end{cases}$$

Solve this system for x and z.

$$-2(2x+4z=6) \rightarrow -4x-8z=-12$$
$$4x+7z=11 \rightarrow 4x+7z=11$$

$$-z=-1$$
$$z=1$$

$$2x+4(1)=6$$
$$2x=2$$
$$x=1$$

Plug value in and solve for x.

$$x+y+z=2$$
$$1+y+1=2$$
$$y+2=2$$
$$y=0$$

Plug values of x and z into one of the original equations to solve for y.

https://youtu.be/5JSCbEKsguQ

$(1,0,1)$

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Your turn 4 and 5 page 309

Reflect: Write the steps that you took to solve by elimination.

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