**Why does it work?**

Alex and Morgan were asked to solve the linear system

\[
\begin{align*}
  x + 2y &= 11 \\
-3x + y &= 2
\end{align*}
\]

**Alex's "substitute value of \( x \) into first equation" way**

1. First I solved the second equation for \( y \).
2. I substituted this expression for \( y \) into the first equation.
3. I then simplified to solve for \( x \).
4. I then substituted this value of \( x \) into the first equation. I solved this equation to find \( y \).
5. This gives me the solution to this linear system.

The solution is \( (1,5) \)

**Morgan's "substitute value of \( x \) into second equation" way**

1. First I solved the second equation for \( y \).
2. I substituted this expression for \( y \) into the first equation.
3. I then simplified to solve for \( x \).
4. I then substituted this value of \( x \) into the second equation. I solved this equation to find \( y \).
5. This gives me the solution to this linear system.

The solution is \( (1,5) \)

---

* How did Alex solve the problem?
* How did Morgan solve the problem?
* What are some similarities and differences between Alex's and Morgan's ways?
* Alex and Morgan used different ways, yet they got the same answer. Why?
Alex and Morgan were asked to solve the linear system:
\[
\begin{align*}
  x + 2y &= 11 \\
-3x + y &= 2 
\end{align*}
\]

**Alex's "substitute value of x into first equation" way**

First I solved the second equation for y.

I substituted this expression for y into the first equation.

I then simplified to solve for x.

I then substituted this value of x into the second equation. I solved this equation to find y.

This gives me the solution to this linear system.

**Morgan's "substitute value of x into second equation" way**

First I solved the second equation for y.

I substituted this expression for y into the first equation.

I then simplified to solve for x.

I then substituted this value of x into the second equation. I solved this equation to find y.

The solution is (1,5)

After you find the value of one of the variables, that value can be substituted into either of the original equations.

There is more than one way to solve a system of equations using substitution. Before you start, you can look at the problem first and try to see which way will be easier.

* How did Alex solve the problem?
* How did Morgan solve the problem?
* What are some similarities and differences between Alex's and Morgan's ways?
* Alex and Morgan used different ways, yet they got the same answer. Why?
1a. How did Alex solve the problem?

1b. How did Morgan solve the problem?

2. What are some similarities and differences between Alex’s and Morgan’s ways?

3. Alex and Morgan used different ways, yet they got the same answer. Why?
Why does it work?

Alex and Morgan were asked to solve the linear system 

\[
\begin{align*}
   x + 3y &= 2 \\
   5x + y &= -4
\end{align*}
\]

**Alex’s “solve for x” way**

I solved the first equation for \( x \).

\[
   x = 2 - 3y
\]

I substituted this expression for \( x \) into the second equation.

\[
   5(2 - 3y) + y = -4
\]

I then simplified to solve for \( y \).

\[
   10 - 15y + y = -4 \\
   10 - 14y = -4 \\
   -14y = -14 \\
   y = 1
\]

I then substituted this value of \( y \) into the equation I previously solved for \( x \). I solved this equation to find \( x \).

\[
   x = 2 - 3y \\
   x = 2 - 3(1) \\
   x = 2 - 3 \\
   x = -1
\]

This gives me the solution to this linear system.

The solution is (-1,1)

**Morgan’s “solve for y” way**

I solved the second equation for \( y \).

\[
   y = -4 - 5x
\]

I substituted this expression for \( y \) into the first equation.

\[
   x + 3(-4 - 5x) = 2
\]

I then simplified to solve for \( x \).

\[
   x - 12 - 15x = 2 \\
   -14x - 12 = 2 \\
   -14x = 14 \\
   x = -1
\]

I then substituted this value of \( x \) into the equation I previously solved for \( y \). I solved this equation to find \( y \).

\[
   y = -4 - 5x \\
   y = -4 - 5(-1) \\
   y = -4 + 5 \\
   y = 1
\]

This gives me the solution to this linear system.

The solution is (-1,1)

* How did Alex solve the problem?
* How did Morgan solve the problem?
* What are some similarities and differences between Alex’s and Morgan’s ways?
* Alex and Morgan used different ways, yet they got the same answer. Why?
Alex and Morgan were asked to solve the linear system \[
\begin{align*}
    x + 3y &= 2 \\
    5x + y &= -4
\end{align*}
\]

* How did Alex solve the problem?
* How did Morgan solve the problem?
* What are some similarities and differences between Alex’s and Morgan’s ways?
* Alex and Morgan used different ways, yet they got the same answer. Why?

The process of substitution allows you to eliminate one variable so that you can solve for the other. You can solve and substitute for either variable first; you’ll get the same answer in the end.

There is more than one way to solve a system of equations using substitution. Before you start, you can look at the problem first and try to see which way will be easier.
1a How did Alex solve the problem?

1b How did Morgan solve the problem?

2 What are some similarities and differences between Alex’s and Morgan’s ways?

3 Alex and Morgan used different ways, yet they got the same answer. Why?
Alex and Morgan were asked to solve the linear system \[
\begin{align*}
4x + 6y &= 4 \\
x - 2y &= -6
\end{align*}
\]

**Alex's "solve for x" way**

I solved the second equation for \(x\).

\[
x - 2y = -6 \\
x = 2y - 6
\]

I substituted this expression for \(x\) into the first equation.

\[
4(2y - 6) + 6y = 4
\]

I then simplified to solve for \(y\).

\[
8y - 24 + 6y = 4 \\
14y = 28 \\
y = 2
\]

I then substituted this value of \(y\) into the equation I previously solved for \(x\). I solved this equation to find \(x\).

\[
x = 2y - 6 \\
x = 2(2) - 6 \\
x = 4 - 6 \\
x = -2
\]

This gives me the solution to this linear system.

\[
\text{The solution is (-2,2)}
\]

**Morgan's "solve for y" way**

I solved the second equation for \(y\).

\[
x - 2y = -6 \\
-2y = -x - 6 \\
2y = x + 6
\]

I substituted this expression for \(y\) into the first equation.

\[
4x + 6\left(\frac{x}{2} + 3\right) = 4
\]

I then simplified to solve for \(x\).

\[
4x + 3x + 18 = 4 \\
7x + 18 = 4 \\
7x = -14 \\
x = -2
\]

I then substituted this value of \(x\) into the equation I previously solved for \(y\). I solved this equation to find \(y\).

\[
\begin{align*}
y &= \frac{x}{2} + 3 \\
y &= \frac{-2}{2} + 3 \\
y &= -1 + 3 \\
y &= 2
\end{align*}
\]

This gives me the solution to this linear system.

\[
\text{The solution is (-2,2)}
\]

* How did Alex solve the problem?
* How did Morgan solve the problem?
* What are some similarities and differences between Alex's and Morgan's ways?
* Alex and Morgan used different ways, yet they got the same answer. Why?
* Which way do you think is better, Alex's way or Morgan's way? Why?
Alex and Morgan were asked to solve the linear system
\[
\begin{align*}
4x + 6y &= 4 \\
x - 2y &= -6
\end{align*}
\]

Alex’s “solve for x” way

1. I solved the second equation for \( x \).
\[
4x + 6y = 4 \\
x = 2y - 6
\]
2. I substituted this expression for \( x \) into the first equation.
\[
4(2y - 6) + 6y = 4
\]
3. I then simplified to solve for \( y \).
\[
8y - 24 + 6y = 4 \\
14y = 28 \\
y = 2
\]
4. I then substituted this value of \( y \) into the equation I previously solved for \( x \). I solved this equation to find \( x \).
\[
x = 2(2) - 6 \\
x = -2
\]

The solution is \((-2, 2)\).

Morgan’s “solve for y” way

1. I solved the second equation for \( y \).
\[
x - 2y = -6 \\
y = \frac{x + 6}{2}
\]
2. I substituted this expression for \( y \) into the first equation.
\[
4x + 6\left(\frac{x + 6}{2}\right) = 4
\]
3. I then simplified to solve for \( x \).
\[
4x + 3x + 18 = 4 \\
7x = -14 \\
x = -2
\]
4. I then substituted this value of \( x \) into the equation I previously solved for \( y \). I solved this equation to find \( y \).
\[
y = \frac{-2 + 6}{2} \\
y = 2
\]

The solution is \((-2, 2)\).

* How did Alex solve the problem?
* How did Morgan solve the problem?
* What are some similarities and differences between Alex’s and Morgan’s ways?
* Alex and Morgan used different ways, yet they got the same answer. Why?
* Which way do you think is better, Alex’s way or Morgan’s way? Why?

The process of substitution allows you to eliminate one variable so that you can solve for the other. You can solve and substitute for either variable first.

Before you start solving a system, you can look at the problem first and try to see which variable will be easier to solve for in that problem.
1a How did Alex solve the problem?

1b How did Morgan solve the problem?

2 What are some similarities and differences between Alex’s and Morgan’s ways?

3 Alex and Morgan used different ways, yet they got the same answer. Why?

4 Which way do you think is better, Alex’s way or Morgan’s way? Why?
Alex and Morgan were asked to solve the linear system \[
\begin{align*}
-9x + 4y &= -17 \\
9x - 6y &= 3
\end{align*}
\]

**Alex's “substitute value of \( y \) into first equation” way**

First I added the two equations together to solve for \( y \).

\[
\begin{align*}
-9x + 4y &= -17 \\
9x - 6y &= 3 \\
2y &= -14 \\
y &= 7
\end{align*}
\]

I substituted the value I got for \( y \) into the first equation.

\[
\begin{align*}
-9x + 4y &= -17 \\
-9x + 4(7) &= -17 \\
-9x + 28 &= -17 \\
-9x &= -35 \\
x &= 5
\end{align*}
\]

I then simplified to solve for \( x \).

This gives me the solution to this linear system.

The solution is \((5, 7)\).

**Morgan’s “substitute value of \( y \) into second equation” way**

First I added the two equations together to solve for \( y \).

\[
\begin{align*}
-9x + 4y &= -17 \\
9x - 6y &= 3 \\
-2y &= -14 \\
y &= 7
\end{align*}
\]

I substituted the value I got for \( y \) into the second equation.

\[
\begin{align*}
9x - 6y &= 3 \\
9x - 6(7) &= 3 \\
9x - 42 &= 3 \\
9x &= 45 \\
x &= 5
\end{align*}
\]

I then simplified to solve for \( x \).

This gives me the solution to this linear system.

The solution is \((5, 7)\).

**Why does it work?**

* How did Alex solve the problem?
* How did Morgan solve the problem?
* What are some similarities and differences between Alex’s and Morgan’s ways?
* Alex and Morgan used different ways, yet they got the same answer. Why?
Alex and Morgan were asked to solve the linear system \[
\begin{align*}
-9x + 4y &= -17 \\
9x - 6y &= 3
\end{align*}
\]

**Alex's "substitute value of y into first equation" way**

First I added the two equations together to solve for \(y\).

I substituted the value I got for \(y\) into the first equation.

I then simplified to solve for \(x\).

This gives me the solution to this linear system.

**Morgan's "substitute value of y into second equation" way**

After you find the value of one of the variables, that value can be substituted into either of the original equations.

There is more than one way to solve a system of equations using substitution. Before you start, you can look at the problem first and try to see which way will be easier.

* How did Alex solve the problem?
* How did Morgan solve the problem?
* What are some similarities and differences between Alex's and Morgan's ways?
* Alex and Morgan used different ways, yet they got the same answer. Why?
1a. How did Alex solve the problem?

1b. How did Morgan solve the problem?

2. What are some similarities and differences between Alex’s and Morgan’s ways?

3. Alex and Morgan used different ways, yet they got the same answer. Why?
Alex and Morgan were asked to solve the linear system \[
\begin{align*}
4x + 5y &= -1 \\
3x + 2y &= 1
\end{align*}
\]

**Alex's “multiply to eliminate the x terms” way**

First, I multiplied the top equation by 3, and the bottom equation by -4, so that I could cancel out the x terms.

I simplified to get these equations, which I then added together.

This gave me an equation with only y in it, which I solved to find the y-coordinate of the solution, which is -1.

I plugged the y-value into the second equation, which I solved for x.

This gives me the solution to this linear system.

**Morgan's “multiply to eliminate the y terms” way**

First, I multiplied the top equation by 2, and the bottom equation by -5, so that I could cancel out the y terms.

I simplified to get these equations, which I then added together.

This gave me an equation with only x in it, which I solved to find the x-coordinate of the solution, which is 1.

I plugged the x-value into the second equation, which I solved for y.

This gives me the solution to this linear system.

* How did Alex solve the problem?
* How did Morgan solve the problem?
* What are some similarities and differences between Alex's and Morgan's ways?
* Alex and Morgan used different ways, yet they got the same answer. Why?
Alex and Morgan were asked to solve the linear system \[
\begin{align*}
4x + 5y &= -1 \\
3x + 2y &= 1
\end{align*}
\]

**Alex's “multiply to eliminate the x terms” way**

First, I multiplied the top equation by 3, and the bottom equation by -4, so that I could cancel out the x terms.

I simplified to get these equations, which I then added together.

This gave me an equation with only \( y \) in it, which I solved to find the \( y \)-coordinate of the solution, which is -1.

I plugged the \( y \)-value into the second equation, which I solved for \( x \).

**Morgan's “multiply to eliminate the y terms” way**

First, I multiplied the top equation by 2, and the bottom equation by -5, so that I could cancel out the \( y \) terms.

I simplified to get these equations, which I then added together.

This gave me an equation with only \( x \) in it, which I solved to find the \( x \)-coordinate of the solution, which is 1.

I plugged the \( x \)-value into the second equation, which I solved for \( y \).

When using the elimination method, you can eliminate either the \( x \)-variable or the \( y \)-variable. In either case, you are merely changing the form of the equation to make it easier to find a point that solves both equations.

There is more than one way to solve a system of equations using elimination. Before you start, you can look at the problem first and try to see which way will be easier.

* How did Alex solve the problem?  
* How did Morgan solve the problem?  
* What are some similarities and differences between Alex's and Morgan's ways?  
* Alex and Morgan used different ways, yet they got the same answer. Why?
1. How did Alex solve the problem?

2. How did Morgan solve the problem?

3. What are some similarities and differences between Alex’s and Morgan’s ways?

4. Even though Morgan and Alex used different ways, they arrived at the same answer. Why?
Which is correct?

Alex and Morgan were asked to solve the linear system \[
\begin{align*}
4x + y &= 12 \\
3x + y &= 10
\end{align*}
\]

**Alex's "elimination" way**

First, I eliminated the y's.

Then I solved for x.

Then I substituted what I found for x into the second equation, to solve for y.

Here is my solution.

**Morgan's "elimination" way**

First, I multiplied the second equation by -1 on both sides.

Then I added the two equations together to eliminate the y's. I got x = 2.

Then I plugged my answer for x back into the first equation and solved for y. I got y = 4.

Here is my solution.

*How did Alex solve the problem?*

*How did Morgan solve the problem?*

*Whose answer is correct, Alex's or Morgan's? How do you know?*

*What are some similarities and differences between Alex's and Morgan's ways?*

*Can you explain Alex's error to a new student in your class? How and when is elimination used to solve systems of linear equations?
Alex and Morgan were asked to solve the linear system:

\[
\begin{align*}
4x + y &= 12 \\
3x + y &= 10
\end{align*}
\]

**Alex’s “elimination” way**

First, I eliminated the y's.
Then I solved for x.

**Morgan’s “elimination” way**

First, I multiplied the second equation by -1 on both sides.
Then I added the two equations together to eliminate the y's. I got x = 2.

Hey Alex, what did we learn from comparing these right and wrong ways?

When using the elimination method for solving systems of equations, remember that coefficients of terms to be eliminated should be additive inverses and not equal, so that when the equations are added together, the terms are eliminated. Try to avoid this common mistake!

**Questions:**

* How did Alex solve the problem?
* How did Morgan solve the problem?
* Whose answer is correct, Alex’s or Morgan’s? How do you know?
* What are some similarities and differences between Alex’s and Morgan’s ways?
* Can you explain Alex’s error to a new student in your class? How and when is elimination used to solve systems of linear equations?
1a. How did Alex solve the problem?

1b. How did Morgan solve the problem?

2. Whose answer is correct, Alex’s or Morgan’s? How do you know?

3. What are some similarities and differences between Alex’s and Morgan’s ways?

4. Can you explain Alex's error to a new student in your class? How and when is elimination used to solve systems of linear equations?
Alex and Morgan were asked to solve

\[
\begin{align*}
2x + 3y &= 12 \\
5x - 3y &= 9
\end{align*}
\]

**Alex's "elimination" way**

First I added the two equations together.

\[
\begin{align*}
2x + 3y &= 12 \\
5x - 3y &= 9
\end{align*}
\]

\[
7x = 21
\]

Then I solved for \(x\).

\[
7x = 21 \\
x = 3
\]

I substituted the value of \(x\) into the first equation to find the value of \(y\).

\[
\begin{align*}
2x + 3y &= 12 \\
2(3) + 3y &= 12 \\
6 + 3y &= 12 \\
-6 &= -6
\end{align*}
\]

\[
\frac{3y}{3} = 6 \\
y = 2
\]

Here is my answer.

\((3, 2)\)

* How did Alex solve the system of equations?

**Morgan's "use the equal sign" way**

The equal sign means that the quantities on either side have the same value. So \(5x - 3y\) has the same value as 9.

I can add the same value on both sides of an equation while maintaining the equality, so I added \(5x - 3y\) to one side of the first equation and 9 to the other side of the first equation.

Next I combined like terms to get \(7x = 21\). Then I solved for \(x\).

\[
\begin{align*}
2x + 3y &= 12 \\
2(3) + 3y &= 12 \\
6 + 3y &= 12 \\
-6 &= -6
\end{align*}
\]

\[
\frac{3y}{3} = 6 \\
y = 2
\]

Here is my answer.

\((3, 2)\)

* How did Morgan solve the system of equations?

* What are some similarities and differences between Alex's and Morgan's ways?

* Why does Alex's way work? Why can you “add” two equations together?
Alex and Morgan were asked to solve the system of equations:

\[
\begin{align*}
2x + 3y &= 12 \\
5x - 3y &= 9
\end{align*}
\]

**Alex's “elimination” way**

First I added the two equations together.

\[
\begin{align*}
2x + 3y &= 12 \\
5x - 3y &= 9
\end{align*}
\]

The equal sign means that the quantities on either side have the same value. So 3y has the same value as 9.

Then I solved for x.

I substituted the value of x into the first equation to find the value of y.

Here is my answer.

(3, 2)

**Morgan's “use the equal sign” way**

The equal sign indicates that the quantities on either side have the same value.

Since you can add the same value to both sides of an equation while maintaining the equality, you can add the values on either side of an equal sign to either side of another equation and you will maintain the equality of that equation.

Here is my answer.

(1, 2)

**Why does it work?**

* How did Alex solve the system of equations?
* How did Morgan solve the system of equations?
* What are some similarities and differences between Alex's and Morgan's ways?
* Why does Alex's way work? Why can you “add” two equations together?
1a. How did Alex solve the system of equations?

1b. How did Morgan solve the system of equations?

2. What are some similarities and differences between Alex’s and Morgan’s ways?

3. Why does Alex’s way work? Why can you “add” two equations together?
Alex and Morgan were asked to solve the linear system
\[
\begin{align*}
3x + 2y &= 8 \\
x - 3y &= 10
\end{align*}
\]

**Alex’s “substitution” way**

First, I solved the second equation for \(x\).

\[
x - 3y = 10 \\
x = 3y + 10
\]

Then I substituted the resulting expression into the first equation.

\[
3(3y + 10) + 2y = 8 \\
9y + 30 + 2y = 8 \\
11y + 30 = 8 \\
11y = -22 \\
y = -2
\]

I simplified and solved this equation for \(x\). This means that the \(x\)-coordinate of the solution is 4.

\[
x - 3y = 10 \\
x - 3(-2) = 10 \\
x = 4
\]

To find the \(x\)-coordinate, I plugged the \(y\)-value into the original second equation.

This gives me the coordinates of the solution to this system.

\[
\text{The solution is (4, -2)}
\]

**Morgan’s “elimination” way**

First I multiplied both sides of the second equation by -3, because this will help me to cancel out the 3x term.

\[
3x + 2y = 8 \\
-3(x - 3y = 10)
\]

Next I added the two equations.

\[
3x + 2y = 8 \\
-3x + 9y = -30 \\
11y = -22 \\
y = -2
\]

I found the \(y\)-value by dividing both sides of the equation by 11. This means that the \(y\)-coordinate of the solution is -2.

\[
x - 3y = 10 \\
x - 3(-2) = 10 \\
x = 4
\]

To find the \(x\)-coordinate, I plugged the \(y\)-value into the original second equation.

This gives me the coordinates of the solution to this system.

\[
\text{The solution is (4,-2)}
\]

* How did Alex solve the problem?
* How did Morgan solve the problem?
* What are some similarities and differences between Alex’s and Morgan’s ways?
* What are some advantages of Alex’s way? Of Morgan’s way?
Alex and Morgan were asked to solve the linear system \[
\begin{align*}
3x + 2y &= 8 \\
x - 3y &= 10
\end{align*}
\]

**Alex’s “substitution” way**
- First, I solved the second equation for x.
  \[
  x = 3y + 10
  \]
- Then I substituted the resulting expression into the first equation.
- I simplified the equation by distributing and combining like terms.
  \[
  3x + 2y = 8
  \]
  \[
  -3(x - 3y = 10)
  \]
- This gives me the coordinates of the solution to this system.

**Morgan’s “elimination” way**
- First I multiplied both sides of the second equation by -3, because this will help me to cancel out the 3x term.
  \[
  x - 3y = 10
  \]
  \[
  x = 3y + 10
  \]
- Next I added the two equations.
  \[
  3x + 2y = 8
  \]
  \[
  -3(x - 3y = 10)
  \]
- I subtracted 30 from both sides of the equation and solved for \(y\). This means that the y-coordinate of the solution is -2.
- To find the \(x\)-coordinate, I plugged the \(y\)-value into the original second equation.
  \[
  x + 6 = 10
  \]
  \[
  x = 4
  \]
- This gives me the coordinates of the solution to this system.

Which is better?

**Before you start solving the system, you can look at the problem first and try to see which way will be easier.**

* How did Alex solve the problem?  
* How did Morgan solve the problem?  
* What are some similarities and differences between Alex’s and Morgan’s ways?  
* What are some advantages of Alex’s way? Of Morgan’s way?
1a How did Alex solve the problem?  

1b How did Morgan solve the problem?  

2 What are some similarities and differences between Alex’s and Morgan’s ways?  

3 What are some advantages of Alex’s way? Of Morgan’s way?
Which is better?

Alex and Morgan were asked to solve the linear system

\[
\begin{align*}
3x + 4y &= 2 \\
y &= -3x - 4
\end{align*}
\]

**Alex's “elimination” way**

First, I rewrote the second equation in standard form.

Then I multiplied the second equation by (-1) so that I could eliminate the x terms.

I then used the elimination method by adding the two equations together. This gave me an equation with only y. I solved to get the y-coordinate of the solution.

I substituted this value for y into the first equation so I could solve for x.

I got the solution.

**Morgan's “substitution” way**

I substituted the expression for y in the second equation for y in the first equation.

I solved the resulting equation, which gave me the x-coordinate of the solution.

I substituted this value of x into the second equation to solve for y.

I got the solution.

The solution is (-2,2)

* How did Alex solve the problem?
* How did Morgan solve the problem?
* What are some similarities and differences between Alex's and Morgan's ways?
* Whose way is easier, Alex's or Morgan's? Why?
* Complete the statements: “I think it's better to use substitution when ________.” “I think it's better to use elimination when ________.”
Alex and Morgan were asked to solve the linear system

\[
\begin{align*}
3x + 4y &= 2 \\
y &= -3x - 4
\end{align*}
\]

**Alex's "elimination" way**

First, I rewrote the second equation in standard form.

Then I multiplied the second equation by (-1) so that I could eliminate the \(x\) terms.

I got the solution.

**Morgan's "substitution" way**

I substituted the expression for \(y\) in the second equation for \(y\) in the first equation.

I solved the resulting equation, which gave the \(x\)-coordinate of the solution.

I substituted this value of \(x\) into the second equation to solve for \(y\).

I got the solution.

When solving a system of linear equations, it is often easiest to use substitution when one equation is already solved for one of the variables.

Before you start solving a system, you can look at the problem first and try to see which way will be easier.

* How did Alex solve the system?
* How did Morgan solve the problem?
* What are some similarities and differences between Alex’s and Morgan’s ways?
* Whose way is easier, Alex’s or Morgan’s? Why?
* Complete the statements: “I think it’s better to use substitution when ________.” “I think it’s better to use elimination when ________.”
How did Alex solve the problem?  

How did Morgan solve the problem?  

What are some similarities and differences between Alex’s and Morgan’s ways?  

Whose way is easier, Alex’s or Morgan’s? Why?  

Complete the statements: “I think it’s better to use substitution when _________________.

“I think it’s better to use elimination when ______________________.”
Alex and Morgan were asked to solve the linear system \[
\begin{align*}
2x + 4y &= 3 \\
-6x + 4y &= 7
\end{align*}
\]

**Alex’s “substitution” way**

First, I solved the first equation for \(x\).

Then I substituted this expression for \(x\) into the second equation and then solved for \(y\). I got \(y = 1\).

I substituted this value of \(y\) into the first equation to solve for \(x\).

Here is my answer.

* How did Alex solve the problem?
* How did Morgan solve the problem?
* What are some similarities and differences between Alex's and Morgan’s ways?
* Whose way is easier, Alex's or Morgan's? Why?
* Complete the statements: “I think it’s better to use substitution when ________.” “I think it’s better to use elimination when ________.”
Alex and Morgan were asked to solve the linear system \[
\begin{align*}
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\]

**Alex’s “substitution” way**

First, I solved the first equation for \(x\).

Then I substituted this expression for \(x\) into the second equation and then solved for \(y\). I got \(y = 1\).

Here is my answer.

Before you start solving a system, you can look at the problem first and try to see which way will be easier.

**Morgan’s “elimination” way**

First I multiplied the second equation by -1.

Then I added the new equation to the second equation to eliminate \(x\). When I added the equations together, I got a new equation that only had \(y\)'s in it. I solved this new equation for \(y\).

I substituted this value of \(y\) into the first equation to solve for \(x\).

Here is my answer.

It is often easier to use substitution when one equation is already solved for one of the variables. On the other hand, it is often easier to use elimination when the equations in the system contain opposite terms.

* How did Alex solve the problem?
* How did Morgan solve the problem?
* What are some similarities and differences between Alex’s and Morgan’s ways?
* Whose way is easier, Alex’s or Morgan’s? Why?
* Complete the statements: “I think it’s better to use substitution when ________.” “I think it’s better to use elimination when ________.”
1a. How did Alex solve the problem?

1b. How did Morgan solve the problem?

2. What are some similarities and differences between Alex’s and Morgan’s ways?

3. Whose way is easier, Alex’s or Morgan’s? Why?

4. Complete the statements: “I think it’s better to use substitution when ________________________.”
   “I think it’s better to use elimination when ______________________________.”