6.2 - Solving Systems by Substitution

*Steps for Substitution*

1. Solve ONE equation for ONE of its variables (x or y).
2. Substitute the expression part of the equation into the OTHER equation. Solve for the variable that remains.
3. Substitute the value from Step 2 into the revised equation from Step 1 and solve. Your answer should be a point.
4. Check your solution in each of your original equations.

*The easiest variable to solve for is one with a coefficient of positive or negative one.

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**Ex 1**: Solve the system by substitution.

\[-x + y = 1\]
\[2x + y = -2\]

**Ex 2**: Solve the system by substitution.

\[x = 9\]
\[2x + y = 24\]
Ex 3: Solve the system by substitution.

3x + y = 5
2x - y = 10

Ex 4: Solve the system by substitution.

2x + 2y = 3
x - 4y = -1

Ex 5: Solve the system by substitution.

x = -2y + 4
3.5x + 7y = 14

Ex 6: Solve the system by substitution.

y = 3x - 11
y - 3x = -13

Ex 7: In one day, the National Civil Rights Museum in TN collected $1590 from 321 people admitted into the museum. The price of adult admission is $6 and the child price is $4. How many adults and children were admitted that day?
6.3 & 6.4 – Solving Systems by Elimination

*Steps for Elimination/Linear Combination*

1. Arrange the equations with like terms lined up in columns. (Standard form is often best.)

2. Multiply one or both of the equations by a number to obtain coefficients that are **OPPOSITES** for one of the variables.

3. **Add** the equations from Step 2. Combining like terms will eliminate one variable. Solve for the remaining variable.

4. Substitute the value obtained in Step 3 into either of the original equations and solve for the other variable. Your final answer should be a **point**.

5. Plug the point back into both original equations to check your answer.

**Ex 1**: Solve the system by elimination.

4x + 3y = 16
2x − 3y = 8

**Ex 2**: Solve the system by elimination.

-x + 2y = -8
x + 6y = -16

**Ex 3**: Solve the system by elimination.

5x − 4y = 3
2x + 8y = -2
Ex 4: Solve the system by elimination.
\[ 3x + 5y = 6 \]
\[ -4x + 2y = 5 \]

Ex 5: Solve the system by elimination.
\[ 3x + 2y = 8 \]
\[ 2y = 12 - 5x \]

Ex 6: Solve the system by elimination.
\[ 2x + 6y = 4 \]
\[ 3x - 7y = 6 \]

Ex 7: Solve the system by elimination.
\[ 2x + 6y = 18 \]
\[ x + 3y = 9 \]

Ex 8: A gold crown, suspected of containing some silver, was found to have a weight of 45 ounces and a volume of 5 cubic inches. Gold weighs 11 ounces per cubic inch and silver weighs 6 ounces per cubic inch. Is there silver mixed within the gold? If so, how much?