Algebra I

Lesson 6.4 – Solving special Systems Using Substitution and Elimination

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In the fall semester we looked at special systems of equations with respect to graphing. We found that systems of equations that were **2 parallel lines have no solution** and are called an **inconsistent system**. Systems of equations that graphed as **same lines have infinitely many solutions** and are called **consistent and dependent systems.**

We now know that there is more than one way to solve a system of equations. If we try to solve a system using the algebraic technique of substitution or elimination what will we find for inconsistent or consistent systems?

Solve the systems using both substitution and elimination techniques.

$\begin{cases} y = -2x + 5 \\ 2x + y = 1 \end{cases}$	$\begin{cases} y = 2x - 4 \\ 2x - y - 4 = 0 \end{cases}$
When we get an answer where the variables cancel out and the equation yields a **false statement** like $\mathbf{0 = 4}$, we have parallel lines or an inconsistent system of equations. $\boldsymbol{false \leftrightarrow no\ solution}$	When the variables cancel out and the equation yields a **true statement** like $0 = 0$, we have the same lines or a consistent and dependent system of equations. $\boldsymbol{true \leftrightarrow infinitely\ many\ solutions}$

Classify the systems and give the number of solutions

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

$\begin{cases} y = -2(x - 1) \\ y = -x + 3 \end{cases}$

$\begin{cases} 2x - 3y = 0 \\ y = \frac{2}{3}x \end{cases}$

6.4 Special Systems – Assignment due next class:

Solve each system of linear equations use either substitution or elimination methods. Check your work using your graphing calculator. Remember!! No Work, No Credit!!!

1. $\begin{cases} y = 2x - 3 \\ y - 2x = -3 \end{cases}$

2. $\begin{cases} 3x + y = 4 \\ -3x = y - 7 \end{cases}$

3. $\begin{cases} y = -4x + 1 \\ 4x = -y - 6 \end{cases}$

4. $\begin{cases} y + 2x + 4 = 0 \\ 2x = -y - 4 \end{cases}$

5. $\begin{cases} y = -x - 6 \\ y - 2x = -3x + 6 \end{cases}$

6. $\begin{cases} y - x = 3 = 0 \\ x = y + 3 \end{cases}$

Classify each system and give the number of solutions

7. $\begin{cases} y + 2(x - 3) = 0 \\ 2x = -y - 3 \end{cases}$

8. $\begin{cases} y + 3x = -1 \\ x = y + 3x - 1 \end{cases}$

9. In a factory Brandon assembles 12 pats each minute. He has assembled 156 parts. Frank starts on the line, assembling at a pace of 15 parts per minute. If their assembly rates continue, will Frank ever catch up to Brandon? EXPLAIN

10. Roger started jogging at 4 miles per hour. After he jogged 1 mile, his friend Anthony started jogging along the same path at the same pace of 4 miles per hour. If they continue to jog at the same rate, will Anthony ever catch up with Roger? EXPLAIN

11. At a restaurant the cost of a breakfast taco and a small glass of milk costs $3.95. 4 tacos and 2 glasses of milk cost $13.40. Write a system of equations that can be used to determine the cost of a breakfast taco, **t,** and the cost of a glass of milk, **m.**
How much does a breakfast taco cost? A glass of milk?