COLLEGE ALGEBRA

NAME: Amanda Lord

GPS # 8 **1.7 SYSTEM OF LINEAR EQUATIONS IN TWO VARIABLES II** Class Time: 11:30-12:45 Date: 1-22-08

Useful Guidelines and Definitions:

* Solving a System by Substitution
1: Solve one of the equations for one of the variables.
2: Substitute for that variable in the other equation.
3: Solve the equation for that variable and substitute the result into the equation from step 1.

When two lines intersect in a single point, the coordinates of this point give the only solution of the system. Then the system is consistent, and the equations are independent.

When the lines are parallel to each other, the system is inconsistent and the solution set is an empty set.

When the lines are overlapped on each other. The equations are dependent. The solution set is an infinite Set of ordered pairs representing the points on the line.

1. Solve each system by substitution. Is the system consistent, inconsistent or has dependent equations?

a) $2x+3y=1$
$y-2x=0$ $y=2x$

$2x+3(2x)=1$
$2x+6x=1$
$\frac{8x}{8}=\frac{1}{8}$
$x=1/8$

$y=2(1/8)$
$y=1/4$

Consistent
Independent
$\{x=1/8\ y=1/4\}$

b) $x+2y=1$
$2x+4y=8$

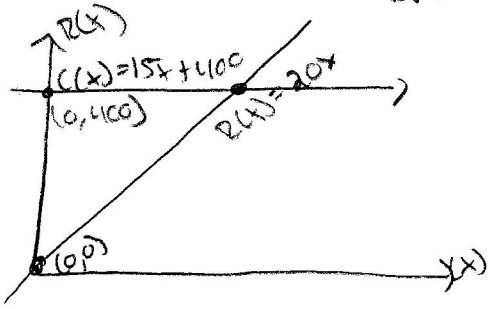
$2(1-2y)+4y=8$
$2-4y+4y=8$
$2\neq 8$ (false)
NO solution
Inconsistent

2. A manufacturer of plastic bags has total revenue given by the function $R(x)=20x$ and has total cost given by $C(x)=15x+400$, where x is the number of plastic bags produced and sold. Find the number of units that gives break even for the product.

Break even

revenue function $R(x)=20x$
Cost function $C(x)=15x+4100$

$R(x)=C(x)$
$20x=15x+400$
$\frac{5x}{5}=\frac{400}{5}$
$x=80$ units



3. Suppose you have \$500,000 to invest, part at 15% and the remainder in a less risky investment at 6%. If your investment goal is to have an annual income of \$42,000, how much should you put in each investment? [Let x be the amount invested at 15% and y be the amount invested at 6%.]

\$500,000 → 15% → x → .15x → \$42,000
\$500,000 → 6% → y → .06y → \$42,000

① $x+y=500,000$ $(y=500,000-x)$
② $.15x+.06y=42,000$

$0.15x+0.06(500,000-x)=42,000$
$0.15x+30000-0.06x=42,000$
$.09x=12,000$
$x=\$133,333.33$