Assignment 6.1_2	Period (circle one): 5 7	Date:	Name: Key

Write a system of linear equations to represent each problem situation. Define each variable. Then, graph the system of equations and estimate the break-even point. Explain what the break-even point represents with respect to the given problem situation.

#1 Olivia is building birdhouses to raise money for a trip to Hawaii. She spends a total of $30 on the tools needed to build the houses. The material to build each birdhouse costs $3.25. Olivia sells each birdhouse for $10.

x = number of birdhouses

$C(x)$ = cost of ~~selling~~ making x birdhouses

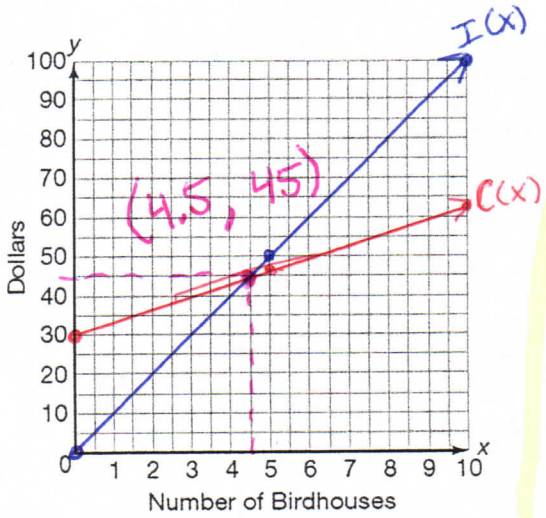
$I(x)$ = Income from selling x birdhouses

$C(x) = 3.25x + 30$

x	$C(x)$
0	30
5	46.25
10	62.50

$I(x) = 10x$

x	$I(x)$
0	0
5	50
10	100



The break-even point is about (4.5, 45), which means if she were to sell 4.5 bird houses, her costs and income would be equal, $45. She would not make any money, nor would she loose any. However, Olivia can not make/sell 0.5 of a bird house, so the break-even point does not make sense in this problem.

Solve each system of equations by substitution. Determine whether the system is consistent or inconsistent.

Step 1: get y by itself.

#2
- $\begin{cases} 0.5x + 1.2y = 2 \\ 3.3x - 0.7y = 3 \end{cases}$

- $0.5x + 1.2y = 2$
  $-0.5x \quad -0.5x$
  $\frac{1.2y}{1.2} = \frac{-0.5x}{1.2} + \frac{2}{1.2}$
  $y = -0.42x + 1.67$

- $3.3x - 0.7y = 3$
  $-3.3x \quad -3.3x$
  $\frac{-0.7y}{-0.7} = \frac{-3.3x}{-0.7} + \frac{3}{-0.7}$
  $y = 4.71x - 4.29$

problem cont. next page

#3
- $\begin{cases} 2x + y = 9 \\ y = 5x + 2 \end{cases}$ ← y is already by itself

- $2x + y = 9$
  $-2x \quad -2x$
  $y = -2x + 9$

- $y = 5x + 2$

problem cont. next page

Step 2: set equations equal to each other and solve for x

#2

$$\begin{cases} y = -0.42x + 1.67 \\ y = 4.71x - 4.29 \end{cases}$$

$-0.42x + 1.67 = 4.71x - 4.29$

$-4.71x \quad\quad -4.71x$

$-5.13x + 1.67 = -4.29$

$-1.67 \quad\quad -1.67$

$\frac{-5.13x}{-5.13} = \frac{5.96}{-5.13}$

$x = 1.16$

#3

$$\begin{cases} y = -2x + 9 \\ y = 5x + 2 \end{cases}$$

$-2x + 9 = 5x + 2$

$-5x \quad\quad -5x$

$-7x + 9 = 2$

$-9 \quad\quad -9$

$\frac{-7x}{-7} = \frac{-7}{-7}$

$x = 1$

Step 3: Plug in the value of x into one of the equations to solve for y

$x = 1.16$

$y = 4.71x - 4.29$

$y = 4.71(1.16) - 4.29$

$y = 1.17$

$x = 1$

$y = -2x + 9$

$y = -2(1) + 9$

$y = 7$

Step 4: write your solution as an ordered pair and interpret your results

Solution: $(1.16, 1.17)$

Solution: $(1, 7)$