*AAT

Chapter 9: Review for Quiz 9.1-9.5 (IC/HW)

Name: Key

Date: ________ Period: ________

1. Use the method of substitution to solve the system.

$$\begin{cases} 3y = x^2 \\ y = 2x^3 \end{cases}$$

$3(2x^3) = x^2$

$6x^3 = x^2$

$6x^3 - x^2 = 0$

$x^2(6x-1) = 0$

$x = 0$, $x = \frac{1}{6}$

$y = 0$

$y = 2\left(\frac{1}{6}\right)^3$

$y = \frac{2}{216} = \frac{1}{108}$

$(0,0)$

$\left(\frac{1}{6}, \frac{1}{108}\right)$

2. The data in the table are generated by the function f(x) = $\sqrt{ax+b}$. Approximate the unknown constants a and b to four decimal places.

x	2	4	6
f(x)	3.8627	5.4698	6.7020

$2a + b = (3.8627)^2$

$4a + b = (5.4698)^2$

Use Matrices: $a = 7.4991$ $b = -.0778$

3. A rancher is preparing an oat-cornmeal mixture for livestock. Each ounce of oats provides 6 grams of protein and 16 grams of carbohydrates, and an ounce of cornmeal provides 4 grams of protein and 23 grams of carbohydrates. How many grams of each can be used to meet the nutritional goals of 270 grams of protein and 1,275 grams of carbohydrates per feeding?

$6x + 4y = 270$

$16x + 23y = 1{,}275$

Use Matrices: $x = 15$ g. oats

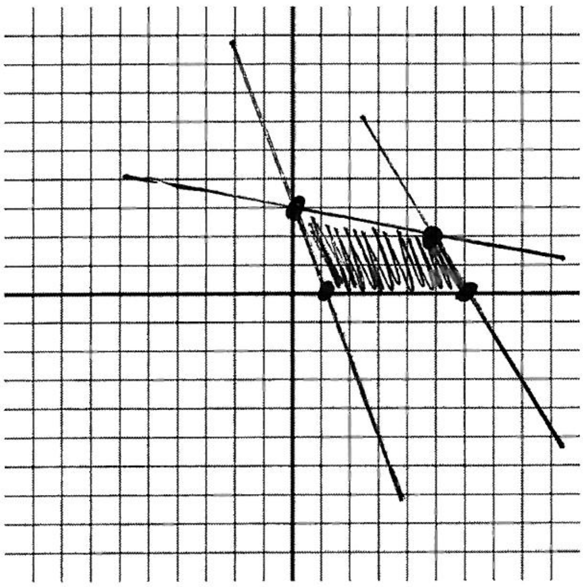
$y = 45$ g. cornmeal

4. Region R is determined by the constraints:

$$\begin{cases} y \geq 0 \\ 3x + y \geq 3 \\ x + 5y \leq 15 \\ 2x + y \leq 12 \end{cases}$$

$y \geq 0$
$y \geq -3x+3$
$y \leq -\frac{1}{5}x+3$
$y \leq -2x+12$

Find the minimum value of C = 8x + y on R.



$C = 8(0)+3 = 3$

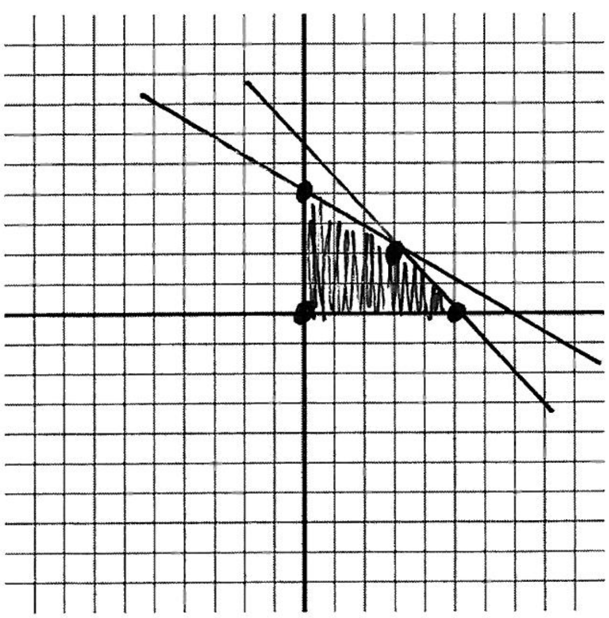
$C = 8(5)+2 = 42$

$C = 8(1)+0 = 8$

$C = 8(6)+0 = 48$

5. A fish farmer will purchase no more than 5,000 young trout and bass from the hatchery and will feed them a special diet for the next year. The cost of food per fish will be $0.50 for trout and $0.75 for bass, and the total cost is not to exceed $3,000. At the end of the year, a typical trout will weigh 3 pounds, and a bass will weigh 4 pounds. How many fish of each type should be stocked in the pond in order to maximize the total number of pounds of fish at the end of the year?

x = # trout
y = # bass



$\boxed{\text{Pound} = 3x+4y}$

$x+y \leq 5000$
$.50x + .75y \leq 3000$
$x \geq 0$
$y \geq 0$

$P = 3(0)+4(0) = \underline{\underline{0}}$

$P = 3(0)+4(4000) =$ $\underline{\underline{16,000}}$

$P = 3(3000)+4(2000) =$ * $\underline{\underline{17,000}}$

$P = 3(5000)+4(0) =$ $\underline{\underline{15,000}}$

6. Three solutions contain a certain acid. The first contains 10% acid, the second 30%, and the third 50%. A chemist wishes to use all three solutions to obtain 40-liter mixture containing 35% acid. If the chemist wants to use twice as much of the 50% solution as of the 30% solution, how many liters of each solution should be used?

$$x + y + z = 40$$

$$.10x + .30y + .50z = .35(40)$$

$$z = 2y$$

10L → 10%

10L → 30%

20L → 50%

7. A shop specializes in preparing blends of gourmet coffees. From Colombian, Brazilian, and Kenyan coffees, the owner wishes to prepare 5-pound bags that will sell for $8.50 per pound. The cost per pound of these coffees is $10, $6, and $8, respectively. The amount of Colombian is to be three times the amount of Brazilian. Find the amount of each type of coffee in the blend.

$$x + y + z = 5$$

$$10x + 6y + 8z = 5(8.50)$$

$$x = 3y$$

C = 1.875 lb.

B = .625 lb.

K = 2.5 lb.

8. If $f(x) = ax^3 + bx^2 + cx + d$, find a, b, c, and d if the graph of f is to pass through (-2,6), (-1,4), (1,0), and (2,-14).

$$6 = -8a + 4b - 2c + d$$

$$4 = -a + b - c + d$$

$$0 = a + b + c + d$$

$$-14 = 8a + 4b + 2c + d$$

<u>Use Matrices</u>: $a = -1,\ b = -2,\ c = -1,\ d = 4$