SOLVING SYSTEMS MATRIX APPLICATIONS **NAME**_____

Provide the following for each application problem below:

- **(a) Define your variables.**
- **(b) Write a system of linear equations.**
- **(c) From your system of linear equations, write a matrix equation.**
- **(d) Use your calculator to solve your matrix equation.**
- **(e) Answer the question asked in each problem <u>using a complete sentence</u>.**

1. Greg is a star player on the basketball team. In one game, his field-goal total was 20 points, made up of 2-point and 3-point baskets. If Greg made a total of 9 baskets, how many of each type did he make?

a = # of 2-pointers
b = # of 3-pointers

a + b = 9
2a + 3b = 20

2. A mail-order company charges for postage and handling according to the weight of the package. A package that weighs less than 3 pounds costs $2.00 for shipping and handling, and a package that weighs 3 pounds or more costs $3.00. An order of 12 packages had a total shipping and handling cost of $29.00. Find the number of packages that weighed less than 3 pounds and the number of packages that weighed 3 pounds or more.

a = # packages < 3 pounds
b = # packages ≥ 3 pounds

a + b = 12
2a + 3b = 29

3. When Dale baby-sat for 8 hours and worked at a restaurant for 3 hours, he made a total of $58. When he baby-sat for 2 hours and worked at a restaurant for 5 hours, he made a total of $40. How much does Dale get paid for each type of work?

b = # hours baby-sitting
r = # hours at restaurant

8b + 3r = 58
2b + 5r = 40

4. Armando is comparing parking prices at a local concert. One option is a $7 entry fee plus $2 per hour. A second option is a $5 entry fee plus $3 per hour. What is the break-even point (intersection) for the two options? Which option do you think is better? Explain your answer.

C = cost
h = # of hours

C = 7 + 2h
C = 5 + 3h

5. To conduct a scientific experiment, students need to mix 90 milliliters of a 3% acid solution. They have a 1% and a 10% solution available. How many milliliters of the 1% solution and of the 10% solution should be combined to produce 90 milliliters of the 3% solution?

x = amount of 1%
y = amount of 10%

x + y = 90
0.01x + 0.1y = 0.03(90)

6. Mr. George bought 7 drums of two different cleaning fluids for his dry cleaning business. One of the fluids cost $30 a drum and the other was $20 a drum. The total price of the supplies was $160. How much of each fluid did Mr. George buy?

a = # $30 drums
b = # $20 drums

a + b = 7
30a + 20b = 160

7. The perimeter of a rectangular picture is 86 inches. Twice the width exceeds the length by 2 inches. What are the dimensions of the picture?

L = length
W = width

2L + 2W = 86
2W = L + 2

8. A limited edition of a book published by a historical society was offered for sale to its members. The cost was one book for $12 or two books for $20. The society sold 880 books and the total amount of money taken in was $9840. How many members ordered two books?

a = # of members ordering one
b = # of members ordering two

a + b = 880
12a + 20b = 9840

9. HomeMade Toys manufactures solid pine trucks and cars and usually sells four times as many trucks as cars. The net profit from each truck is $6 and the profit from each car is $5. If the company wants a total profit of $29,000, how many trucks and cars should they sell?

T = # of trucks
C = # of cars

T = 4C → T – 4C = 0
6T + 5C = 29000

10. Mr. Griffin wants to plant soybeans and corn on 100 acres of land. Soybeans require 6 hours of labor per acre, and corn requires 8 hours of labor per acre. If Mr. Griffin has 660 hours available, how many acres of each crop should he plant?

s = # of acres of soybeans
c = # of acres of corn

s + c = 100
6s + 8c = 660

ANSWERS

1. 2 three point, 7 two point baskets
2. 5 pkgs are greater than or equal to 3 lbs, 7 pkgs are less than 3 lbs
3. $6 @ restaurant, $5 @ babysitting
4. Break even point is (2, 11). Opt 1 is better for more than 2 hr., opt 2 is better for less than 2 hr. 5. 20 ml of 10%, 70 ml of 1%
6. 5 drums costing $20; 2 drums costing $30
7. width 15 in; length 28 in.
8. 180 members bought 2 books
9. 1000 cars; 4000 trucks
10. 30 acres of corn, 70 acres of soybeans