

Provide the following for each application problem below:

- Define your variables.
- Write a system of linear equations.
- From your system of linear equations, write a matrix equation.
- Use your calculator to solve your matrix equation.
- Answer the question asked in each problem using a complete sentence.

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?

$$a = \# \text{ of 2-pointers}$$

$$b = \# \text{ of 3-pointers}$$

$$a + b = 9$$

$$2a + 3b = 20$$

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.

$$a = \# \text{ packages} < 3 \text{ pounds}$$

$$b = \# \text{ packages} \geq 3 \text{ pounds}$$

$$a + b = 12$$

$$2a + 3b = 29$$

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?

$$b = \# \text{ hours baby-sitting}$$

$$r = \# \text{ hours at restaurant}$$

$$8b + 3r = 58$$

$$2b + 5r = 40$$

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.

$$C = \text{cost}$$

$$h = \# \text{ of hours}$$

$$C = 7 + 2h$$

$$C = 5 + 3h$$

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?

$$x = \text{amount of 1\%}$$

$$y = \text{amount of 10\%}$$

$$x + y = 90$$

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

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?

$$a = \# \text{ \$30 drums}$$

$$b = \# \text{ \$20 drums}$$

$$a + b = 7$$

$$30a + 20b = 160$$

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?

$$L = \text{length}$$

$$W = \text{width}$$

$$2L + 2W = 86$$

$$2W = L + 2 \rightarrow -L + 2W = 2$$

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?

$$a = \# \text{ of members ordering one} \quad a + 2b = 880$$

$$b = \# \text{ of members ordering two} \quad 12a + 20b = 9840$$

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?

$$T = \# \text{ of trucks}$$

$$C = \# \text{ of cars}$$

$$T = 4C \rightarrow T - 4C = 0$$

$$6T + 5C = 29000$$

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?

$$s = \# \text{ of acres of soybeans}$$

$$c = \# \text{ of acres of corn}$$

$$s + c = 100$$

$$6s + 8c = 660$$

#### 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