

Solve the following problems in a way that makes sense to you. Show your complete thought process.

1. An exam worth 145 points contains 50 questions. The multiple choice questions on the exam are worth two points each and open response questions are worth five points each. How many of each type of question does the exam have?

x = multiple guess; y = open response

$$x+y=50$$

$$2x+5y=145$$

$$\begin{bmatrix} 1 & 1 & 50 \\ 2 & 5 & 145 \end{bmatrix} \xrightarrow{\text{rref}} \begin{bmatrix} 1 & 0 & 35 \\ 0 & 1 & 15 \end{bmatrix}$$

15 Open and 35 multiple guess

2. A soccer team bought ice-cream cones to celebrate their last victory. The total cost of 12 double cones and 8 single cones was \$17. The cost of a double cone is \$0.25 more than the cost of a single cone. What was the price for each type of cone?

x = double in cents and y = single in cents

$$12x+8y=1700$$

$$y+25=x$$

3. The school that Lisa goes to is selling tickets to the annual talent show. On the first day of ticket sales the school sold 4 senior citizen tickets and 5 student tickets for a total of \$102. The school took in \$126 on the second day by selling 7 senior citizen tickets and 5 student tickets. What is the price each of one senior citizen ticket and one student ticket?

x = senior and y = student

$$4x+5y=102$$

$$7x+5y=126$$

4. There are 13 animals in the barn. Some are chickens and some are pigs. There are 40 legs in all. How many of each animal are there?

c = chicken and p = pig

$$c+p=13$$

$$2c+4p=40$$

5. Halley's Comet appears about every 75 years. One appearance of the comet was during the year that Mark Twain was born, and the next appearance was during the year he died. The sum of these two years is 3745. In what year did Mark Twain die?

x = birth year and y = death year

$$x+y=3745$$

$$y-x=75$$

6. A manufacturing company purchased new injection-mold equipment to make plastic forks, knives, and spoons. The cost of the new equipment was \$82,800 and the cost of making a package of plastic utensils is \$0.36. The company sells each package for \$1.08. How many packages must be sold for the company to break even?

y = packages and M = money

$$1.08 * y = M$$

$$0.36 * y + 82800 = M$$

7. Austin is moving into an apartment for college. He knows that the move will take only one day, but thinks that he may need to make several trips back and forth between his parents' house and the apartment in order to move everything. He checks with moving two moving companies about renting a moving van for the day. You need to help Austin determine the mileage at which it is better to rent from each of the two companies so he can plan his move.

Rent-a-Truck charges \$59.95 for the day plus \$0.49 per mile

U-Move-It charges \$81 per day plus \$0.38 per mile

m = miles and c = cost to rent

$$59.95 + 0.49m = c$$

$$81 + 0.38m = c$$

8. Terri Shackelford is the Chief Executive Officer (CEO) for a commuter airline company. One day, the business section of the newspaper reported that a competing airline had purchased eight new aircraft. The purchased two different sizes of planes for \$13.5 million. Ms. Shackelford called the manufacturer and learned that the small planes cost \$1.5 million and the larger planes cost \$2 million. How many of each type of plane did the competing airline purchase?

s = small plane and l = large plane

$$1.5s + 2l = 13.5$$

$$s + l = 8$$

9. Frank Jones is starting a business selling t-shirts on the beach in Florida. His startup costs for the business are \$200 and each t-shirt costs \$9 to produce. He can sell the t-shirts for \$18. How many shirts must Frank sell before he makes a profit?

t = number of t-shirts

d = amount of money

$$18T = D$$

$$9T + 200 = D$$

$$18T + 1D = 0$$

$$-9T + 1D = 200$$

$$\begin{bmatrix} 18 & 1 & 0 \\ -9 & 1 & 200 \end{bmatrix}$$

10. A veterinarian needs to make 60 pounds of dog food that is 15% protein. He will combine a beef mix that is 18% protein with a bacon mix that is 9% protein. How many pounds of each does he need to make the 15% protein mix?

b = beef

m = mix bacon

$$b + m = 60$$

$$0.18b + 0.09m = 0.15(60)$$