Lesson #3: Understanding and Solving Systems of Three Equations with Three Variables (Reference: Lesson #29 in book)

Problem

1. For each of the following systems of three equations, please solve the system of equations, state your solution as a three dimensional coordinate point, and determine the classification (Consistent or Inconsistent) of the system of equations.(SHOW ALL OF YOUR WORK.)

1. $x + y + z = 4$

$9x + 3y + z = 0$

$4x + 2y + z = 1$

2. $3x + 2y - z = -15$

$5x + 3y + 2z = 0$

$3x + y + 3z = 11$

3. $-x - 5y - 5z = 2$

$4x - 5y + 4z = 19$

$x + 5y - z = -20$

4. $-4x - 5y - z = 18$

$-2x - 5y - 2z = 12$

$-2x + 5y + 2z = 4$

5. $4x + 4y + z = 24$

$2x - 4y + z = 0$

$5x - 4y - 5z = 12$

6. $-6x + 5y + 2z = -11$

$-2x + y + 4z = -9$

$4x - 5y + 5z = -4$

7. $x + 2y - 3z = 4$

$2x + 4y - 6z = 3$

$-x + 5y + 3z = 1$

8. $5x + 5y + 5z = -20$

   $4x + 3y + 3z = -6$

   $-4x + 3y + 3z = 9$

9. $3x - 3y + 4z = -23$

   $x + 2y - 3z = 25$

   $4x - y + z = 25$

10. $2x + 3y + 4z = 12$

    $-6x - 12y - 8z = -56$

    $4x + 6y + 8z = 24$

11. $5x - 9y - 6z = 11$

    $-10x + 18y + 12z = -22$

    $2x - 4y - 3z = 6$

12. $3x + 5y - 2z = 13$

    $-5x - 2y - 4z = 20$

    $-14x - 17y + 2z = -19$

13. **For each of the following application word problems, please create three equations from the given information and then solve the system of three equations. (SHOW ALL OF YOUR WORK.)**

    13. Andrea sells photographs at art fairs. She prices the photos according to size: small photos cost $10, medium photos cost $15, and large photos cost $40. She usually sells as many small photos as medium and large photos combined. She also sells twice as many medium photos as large. A booth at the art fair costs $300. If her sales go as usual, how many of each size photo must she sell to pay for the booth and break even?

    14. The second angle of a triangle is 50 degrees less than 4 times the first angle. The third angle is 40 degrees less than the first. What are the measures of the three angles in this triangle? (HINT: Drawing a picture might help.)

    15. A person invests $12,000 for one year; some is invested at 5%, some at 10%, and the remainder at 13% interest. The combined interest earned at the end of the year from the investments was $920. The amount invested at 10% is $4,000 less than the amount invested at 5% and 13% combined. What is the amount of money invested at each rate?