Chapters 7, 8 Review Questions

1. Find the number of solutions to the system of equations below:

   $6x - 3y = 6$

   $-12x + 6y = -12$

2. Find the solution to the system of equations below:

   $3x + 4y = 9$

   $-x + 5y = -22$

3. Find the solution to the system of equations below:

   $3x - 4y + 3z = 1$

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

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

4. Find the solution to the system of equations below:

   $x = 6y$

   $x^2 + 6y^2 = 36$

5. Find the thirteenth (a_{13}) value in the arithmetic sequence $\{a_n\} = \{-4, -1, 6, 11, ...\}$

6. If $a_8 = 25$ and $a_{12} = 45$, find the second term (a_2) of the arithmetic sequence

7. Challenge question: Find the recursive formula of the sequence $\{a_n\} = \{-5, -7, -11, -19, ...\}$. Hint: set up a 2×2 linear system of recursive equations (i.e., use $a_{n+1} = b \cdot a_n + c$ for two values of n and solve for b and c)

8. Find a_n as a function of n for the given sequence, $\{a_n\} = \{-1, 2, -4, 8, ...\}$

9. Find the value of $S = 7 + 12 + 17 + ... + 42 + 47$. Hint: find the explicit formula of the sequence $\{7, 12, ..., 47\}$ and solve for n when $a_n = 47$ to find how many terms are in the series

10. Find $\sum_{n=1}^{10} 3n + 8$

11. Find the value of $S = 2 + \frac{4}{5} + \frac{8}{25} + \frac{16}{125} + ...$

12. Find $\sum_{k=1}^{5} 4(\frac{1}{3})^k$

13. In the expansion of $(x + y)^5$, what is the coefficient of the term x^3y^2?

14. In the expansion of $(x - y)^5$, what is the coefficient of the term x^2y^3?

15. How many words can be made out of the letters 'a', 'b', 'c', 'd', 'd', 'd', 'e'?

16. Challenge question: How many words can be made out of the letters 'A', 'B', 'c', 'd', 'd', 'd', 'e' where every word starts with a capital letter?