Math 100: Practice Problems for Chapter 4

1. Solve the system of equalities \( \begin{align*} x + 3y &= 12 \\ 2x + 8y &= 4 \end{align*} \) by using (a) substitution, (b) addition-elimination.

2. Solve the system of equations \( \begin{align*} x + 3y &= 12 \\ 2x + 8y &= 4 \end{align*} \) by carefully graphing each line.

3. Solve each system of equations using any method.
   
   (a) \( \begin{align*} 2x + 3y &= 1 \\ 5x + 2y &= 6 \end{align*} \)
   
   (b) \( \begin{align*} \frac{x}{4} + \frac{y}{3} &= \frac{5}{2} \\ \frac{x}{2} - \frac{y}{6} &= \frac{1}{3} \end{align*} \)
   
   (c) \( \begin{align*} 6x + 3y &= 12 \\ y &= 1 - 2x \end{align*} \)
   
   (d) \( \begin{align*} y &= 3 + 6x \\ y &= 1 - 2x \end{align*} \)

4. Find specific real number values for \( m \) and for \( b \) so that the system \( \begin{align*} 2x + 3y &= 12 \\ y &= mx + b \end{align*} \) will have:
   
   (a) no solution
   
   (b) one solution
   
   (c) infinitely many solutions

5. The sum of two numbers is four times the smaller. Their difference is the larger, less seven. What are the numbers?

6. How many liters each of a 50% and 80% saline solution should be combined to make 10 liters of a 60% solution?