1. (20 pts) Find the solution set:

a) $6x - 2(x + 3) = 5(x - 1) + 4$

b) $2|3x - 1| - 3 = 7$

2. (10 pts) Graph the solution set to the inequality $2x - 3y > 12$.

3. (20 pts) Solve the inequality, express the solution set in interval notation and graph the solution set on a number line.

a) $-1 \le 2x + 3 < 7$

b) $|3x - 1| < 7$

4. (13 pts) You want to mix a 45% alcohol solution with a 5% alcohol solution to get 100 liters of a mixture that is 11% alcohol. How much of each should you use?

5. (10 pts) Let $f(x) = x^2 - x - 1$ and find $f(a + h)$. Simplify your answer.

6. (12 pts) Find the slope intercept form of the equation for the line parallel to $2x - 5y = 6$ with the same y-intercept as $4y = 9x + 20$.

7. (20 pts) Find the solution to the system of equations.

a) Use **Cramer's Rule**: $\begin{aligned} 5x + 3y &= 2 \\ 2x - 3y &= 3 \end{aligned}$

b) Use **Any Method**: $\begin{aligned} 2x - y &= 6 \\ -9x + 2y &= 3 \end{aligned}$

8. (10 pts) Simplify $\left(x^{-5}\left(x^{-3}\right)^2\right)^{-4}$ as much as possible and leave your answer with only positive exponents.

9. (10 pts) Find the vertex and intercepts for the parabola given by the quadratic function $f(x) = x^2 - 4x + 3$.

10. (10 pts) Perform the indicated operation and leave your answer as simple as possible. $\left(2x + 3y^2\right)\left(4x^2 - 6xy^2 + 9y^4\right)$

11. (20 pts) Factor completely:

a) $8x^3y - 18xy$

b) $8x^3 - 27$

12. (20 pts) Solve the equation by factoring

a) $(x + 1)(x - 5) = 7$

b) $x^2(3x - 2) = x$