

Name: AK Period: \_\_\_\_\_ Date: \_\_\_\_\_

**9.1 - 9.5 Review**

Directions. Check all of your non-calc questions with calculator.

1. (Non-Calc) Solve the system using Gaussian Elimination. Express your answer in the form (x, y, z). If you have infinite solutions, let z = c to express your answer.

$$\begin{aligned} x - y + 3z &= 12 \\ 2x + 8y + z &= -1 \\ 3x - z &= 3 \end{aligned}$$

Check w/ Calc

Menu  
Algebra  
solve systems of Linear Equations

2. (Non-Calc) Solve the system using Gaussian Elimination. Express your answer in the form (x, y, z). If you have infinite solutions, let z = c to express your answer.

$$\begin{aligned} 5x - 2y + z &= 3 \\ 4x - 4y - 8z &= 2 \\ -x + y + 2z &= -3 \end{aligned}$$

check w/ Calc

3. (Non-Calc). Solve the system of equations using substitution.

$$\begin{aligned} y - 5 &= \log(x) &\rightarrow y &= \log x + 5 \\ y &= 6 - \log(x - 3) \end{aligned}$$

$$\begin{aligned} \log x + 5 &= 6 - \log(x - 3) \\ \log x + \log(x - 3) &= 1 \\ \log x(x - 3) &= 1 \end{aligned}$$

$$\begin{aligned} 10 &= x^2 - 3x \\ 0 &= x^2 - 3x - 10 \\ 0 &= (x - 5)(x + 2) \\ x &= \boxed{5} - 2 \end{aligned}$$

4. (Non-Calc) Solve the system using elimination.

$$\begin{aligned} \sqrt{2} \begin{cases} x\sqrt{2} - y\sqrt{3} = \sqrt{6} \\ x + y\sqrt{6} = 6\sqrt{3} \end{cases} &\rightarrow \begin{aligned} x\sqrt{2} - y\sqrt{3} &= \sqrt{6} \\ -x\sqrt{2} - y(2\sqrt{3}) &= -6\sqrt{6} \end{aligned} \\ \hline & \begin{aligned} -3\sqrt{3} y &= -5\sqrt{6} \end{aligned} \end{aligned}$$

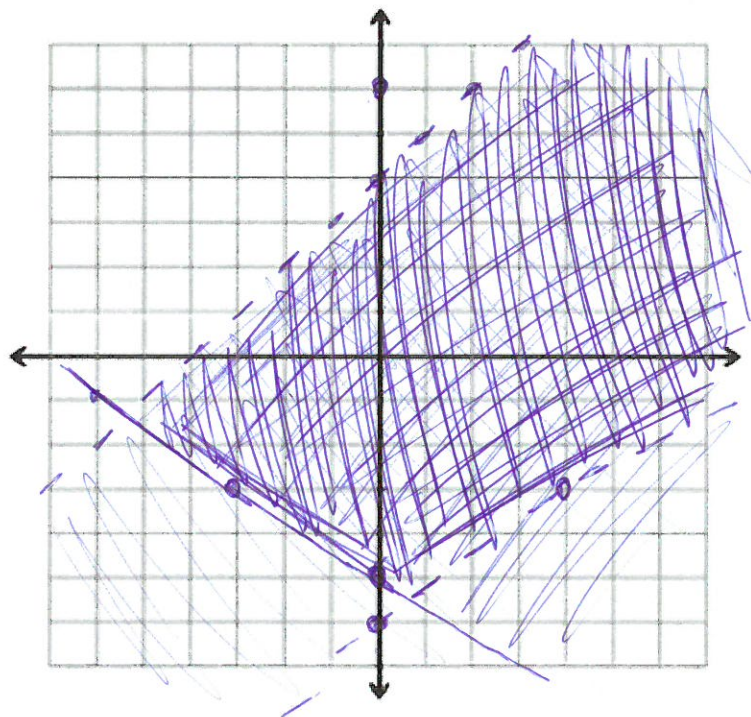
$$\begin{aligned} 2x - y\sqrt{6} &= 2\sqrt{3} \\ 3x &= 8\sqrt{3} \\ x &= \frac{8\sqrt{3}}{3} \end{aligned}$$

$$y = \frac{5\sqrt{6}}{+3\sqrt{3}} = \frac{+5\sqrt{2}}{3}$$

5. (Non-Calc) Solve the system of linear inequalities by shading the region of solutions and indicating the vertices.

$$\begin{cases} y - x < 4 \rightarrow y = x + 4 \\ y \geq -\frac{2}{3}x - 6 \\ 4y - 3x + 24 > 0 \end{cases}$$

$$y = \frac{3}{4}x + 6$$



6. (Non-Calc) Solve the system using elimination.

$$\begin{cases} \frac{2}{x} - \frac{3}{y} = 8 & 2y - 3x = 8xy \\ \frac{3}{x} + \frac{3}{y} = 2 & 3y + 3x = 2xy \end{cases}$$

$$5y = 10xy$$

$$5y - 10xy = 0$$

$$5y(1 - 2x) = 0$$

$$x = \frac{1}{2}$$

$$y = 0$$

$$\frac{2}{\frac{1}{2}} - \frac{3}{y} = 8$$

$$\frac{4}{1} - \frac{3}{y} = 8$$

$$-\frac{3}{y} = 4$$

$$y = -\frac{3}{4}$$

$$\left(\frac{1}{2}, -\frac{3}{4}\right)$$

7. (Non-Calc) Solve the system of equations.

$$\begin{cases} \log_{10} x + \log_{10} y = 7 & \log_{10} xy = 7 \\ \log_{10} x - \log_{10} y = 3 & \log_{10} \frac{x}{y} = 3 \end{cases}$$

$$10^7 = xy$$

$$10^3 = \frac{x}{y} \rightarrow x = y \cdot 10^3$$

$$10^7 = y \cdot 10^3 \cdot y$$

$$10^4 = y^2$$

$$10^2 = y \quad x = 10^5$$

$$(10^5, 10^2)$$

8. (Calc) Write the equation of the parabola that goes through the points (2, -1), (-1, -4), (3, -8).

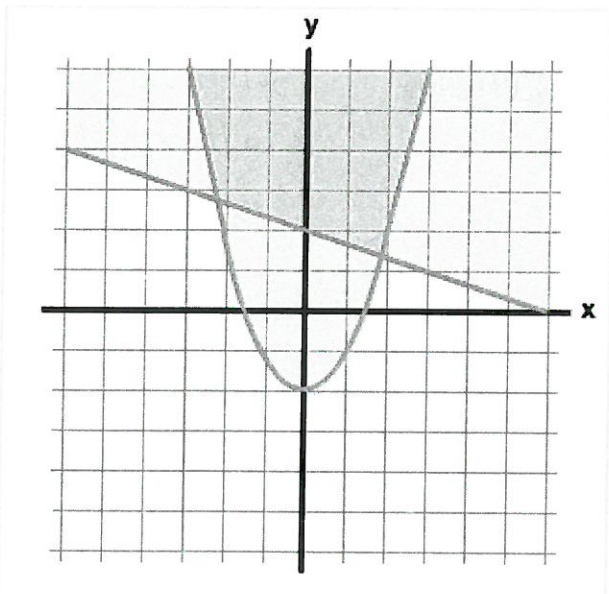
$$-1 = 4a + 2b + c$$

$$-4 = a - b + c$$

$$-8 = 9a + 3b + c$$

$$\underline{y = -2x^2 + 3x + 1}$$

9. (Non-Calc) Write the system of inequalities that would have a solution of the graph below.



$$y \geq -\frac{1}{2}x + 2$$
$$y \geq x^2 - 2$$

10. (Calc) 40% solution of acid is combined with a 15% solution of acid to obtain 30 liters of a 20% solution. How many liters of 40% and 15% solution were needed?

$$.4x + .15y = 30(.2)$$

$$x + y = 30$$

$$40\% \rightarrow 6 \text{ L}$$

$$15\% \rightarrow 24 \text{ L}$$

11. (Calc) Suppose you are setting up for a small business and have invested \$18,000 to produce a toy that will sell for \$20.65. If each unit can be produced for \$13.45, determine the number of units you must sell in order to make a profit.

$$P = R - C$$

$$P = 20.65x - 18000 - 13.45x$$

$$P > 0$$

$$0 = 7.2 - 18000$$

$$\frac{18000}{7.2} = \frac{7.2x}{7.2}$$

$$x = 2500$$

12. (Non-Calc) What does it mean for a system of equations to be consistent? What does it mean for a system of equations to be inconsistent. (Look it up)

↳ No solutions

↳ ~~infinite solutions~~ At least one solution to all equations in system

13. (Non-Calc) The following system has an infinite number of solutions.

$$\begin{cases} 3x + 4y - 2z = 6 \\ x + y + z = 2 \\ x + 2y - 4z = 2 \end{cases}$$

a) Show how x and y are related with respect to z.

$$\{2 - 6c, 5c, c\}$$

b) Find 2 points that satisfy all 3 equations.

$$(2, 0, 0)$$

$$(-4, 5, 1)$$