

**Practice Quiz 5 – Systems using Elimination - Application**

1. Consider the equation  $2x + 2y = 8$ .

*Part A:* Write an equivalent equation by multiplying the equation by 3. Does the equation have the same solution set? Use Desmos to check your answer.

*Part B:* Write an equivalent equation by dividing the equation by 2. Does the equation have the same solution set? Use Desmos to check your answer.

2. Consider the following system that has a solution of  $(5, 3)$ .  $\begin{cases} x + y = 8 & \text{Equation 1} \\ x - y = 2 & \text{Equation 2} \end{cases}$

Complete the following table by performing the operations to write equivalent systems. Use Desmos to verify that the systems have the same solution.

<u>Operation to Perform</u>	<u>Equivalent System</u>	<u>Solution</u>
Multiply Equation 1 by 4; keep Equation 2 the same.		
Keep Equation 1 the same; add Equation 1 and Equation 2.		
Subtract Equation 2 from Equation 1; Keep Equation 2 the same.		
Multiply the sum of Equation 1 and Equation 2 by 3. Keep Equation 2 the same.		

3. Given a system of equations, list 3 ways that we can write new equations that can be used to create equivalent systems.

4. Consider the following system which has a solution of  $(-1, 4)$  and  $Q, R, S, T, U,$  and  $V$  are non-zero real numbers.

$$\begin{cases} Qx + Ry = S \\ Tx + Uy = V \end{cases}$$

Write two new equations that could be used to create an equivalent system of equations.

5. Aaliyah owns a cake shop. She is currently preparing cakes for two anniversary parties. The first cake has 3 small tiers and 1 medium tier and will serve a total of 100 guests. The second one has 3 small tiers and 2 medium tiers and will serve a total of 140 guests. *Part A:* Represent the situation with a system of equations.

*Part B:* Solve the system of equations.

*Part C:* How many guests will a small tier and a medium tier serve?

6. During their last game, the Detroit Lions scored 6 times for a total score of 30 points. They scored 7 points for each touchdown and 3 points for each field goal. Write and solve the system of equations (using elimination) to find the total touchdowns and field goals scored.

7. Janiah and Robert are hosting a FIFA World Cup Finals party and have purchased dinnerware to represent their favorite teams. Janiah, a fan of team Germany, bought 25 cups and 40 plates with the German flag printed on them. Robert, who is rooting for Argentina, bought 20 cups and 35 plates with the Argentinian flag printed on them. Janiah spent a total of \$445.00 and Robert spent a total of \$380.00. Which of the following equations could be used in a system of equations to represent the situation? Select all that apply. **Tell what each term in each equation represents.**

$25c + 40p = 445$

$25c + 25c = 445$

$20c + 35p = 380$

$35p + 40p = 380$

$45c + 75p = 825$

8. Anthony and Kyle went shopping for soccer cleats and practice uniforms. Anthony spent \$451, before taxes, and purchased three uniforms and one pair of cleats. Kyle spent \$757, before taxes, and purchased five uniforms and two pair of cleats.

*Part A:* Assuming all the uniforms cost the same amount and all the cleats cost the same amount, write a system of equations to represent each boy's total purchases.

*Part B:* Use the elimination method to find the price of each uniform and each pair of cleats.

9. JaTayna volunteers at the Salvation Army. She has been tasked with buying non-perishable items for families that were displaced by a recent flood. She finds a company willing to sell her cans of food at a discounted price. In the system below,  $x$  represents the number of small cans she purchased, and  $y$  represents the number of large cans she purchased.

$$\begin{cases} 2.25x + 4.75y = 714.75 \\ x + y = 181 \end{cases}$$

*Part A:* How many cans did JaTayna purchase?

*Part B:* What was the total amount JaTayna spent on the purchase?

*Part C:* How many small cans did JaTayna purchase?

*Part D:* How many large cans did JaTayna purchase?

*Part E:* How much does a small can cost?

*Part F:* How much does a large can cost?

10: The sum of two different integers is 7. The following system represents the two integers.  $\begin{cases} x + y = 7 \\ 3x + 2y = 46 \end{cases}$

Which of the following statements about the solutions to the systems is true? Select all that apply.

YOU MUST SHOW ALL YOUR THINKING. CHECKMARKS WITHOUT WORK WILL NOT BE ACCEPTED.

- There are infinite solutions to the system since there are infinitely many integers whose sum is 7.
- There are two solutions to the system, one that satisfies the first equation and a second solution that satisfies the second equation.
- The two solutions are (3, 4) and (10, 8)
- There is exactly one solution to the system that satisfies both equations.
- The solution to the system is (32, -25).
- There is no solution to the system since there is no solution that would satisfy both equations.

11: Bates Elementary School has a mother/daughter painting weekend. On Saturday, eight mothers worked with 12 daughters to paint 220 square feet of a large mural on a wall in the gymnasium. The next day, six moms worked with eight daughters to paint another 152 square feet of the mural in the gym.

Write and solve a system of equations to find how many square feet each mom painted and how many square feet each daughter painted. Assume all moms painted at the same rate and all daughters painted at the same rate.

12. Fill in the missing operation or missing equation to complete the table.

<u>Operations</u>	<u>Equations</u>	<u>Labels</u>
Solve by elimination	$\begin{cases} 5x - 2y = 17 \\ 3x + 7y = 43 \end{cases}$	Equation 1 Equation 2
	$-15x + 6y = -51$	New Equation 1
Multiply Equation 2 by 5		New Equation 2
	$\begin{array}{r} -15x + 6y = -51 \\ +15x + 35y = 215 \\ \hline 41y = 164 \end{array}$	
Divide by 41		
Solve for x		
Write x and y as coordinates		Solution to the system