



Inclusive Access to a Diploma:
Reimagining Proficiency
for Students with Disabilities



Mathematics I

Systems of Equations

Option #1 Performance Task |
Student Document

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Directions

Please review the task below and answer the various questions within the task to the best of your ability. If needed, you may have an adult or peer read the task out loud to aid your understanding. You may use tools and embedded resources such as word walls, notebooks, word banks, and a glossary to support your understanding. These tools must be used independently without the support of a peer or teacher. Additionally, feel free to use the following resources when explaining your reasoning and graphing systems when answering each item:

- Options for explaining reasoning
 - using paper and pen or pencil
 - typing a response using a word processor
 - using speech-to-text software
 - dictating to a scribe
 - explaining in words to the teacher
- Options for graphing systems
 - using paper and pencil
 - using a handheld graphing calculator
 - using graphing software such as Desmos





Word Bank. Here are some words that might help you in explaining your thinking for the questions in this task. (You will probably not use every word for every question, so pick and choose the words that make sense for each question.)

system	equation	system of equations	expression	graph
input	output	variable	dependent variable	independent variable
point	coordinates	value	evaluate	substitute
intersect	point of intersection	linear	linear equation	x-axis
y-axis	y-intercept	slope	rate of change	unit rate
common difference	interval	represent / representation	solution	solution set
product	sum	ordered pair		





PART 1. Spirit Bracelets

Investigating Systems of Equations

Deborah is making spirit bracelets to sell at the fundraiser for a school club. She wants to sell as many bracelets as possible and raise as much money as possible.

Item 1. Directions

Item 1 has one task. Complete the task below.

Item 1 Task

Deborah's club decided they would sell two different types of spirit bracelets—**basic** Spirit Bracelets and **ornate** Spirit Bracelets. They decided to sell the basic bracelets for \$5 each and the ornate bracelets for \$8 each. Their fundraising goal is to make more than \$5,000. A local craft store has donated enough materials to make up to 800 bracelets in total, but the club needs to decide how many of each type to make.

Deborah writes the following system of equations to represent the situation above, where x represents the number of basic bracelets made and y represents the number of ornate bracelets made:

$$\begin{cases} 5x + 8y = 5,000 \\ x + y = 800 \end{cases}$$

Show and explain at least **TWO** different ways that the club could use a system of inequalities to determine the number of each type of bracelet to make and explore how much money they could potentially earn by doing so.

One of your methods should use technology such as a graphing calculator or computer algebra software, one should include a graphical representation, and one should use algebraic equations.





PART 2. Proving A Property of Systems

Type III Operations

Item 1. Directions

Item 1 has one task and builds on content from Part 1. Complete the task below.

Item 1 Task

The following year, Deborah’s club created the following system of equations to determine how much to charge for their spirit bracelets.

SYSTEM A:
$$\begin{cases} 5x + 10y = 6,000 \\ x + y = 1,000 \end{cases}$$

Deborah first multiplied both sides of the second equation by 2:

$$\begin{cases} 5x + 10y = 6,000 \\ 2x + 2y = 2 \cdot 1,000 \end{cases} \quad \rightarrow \quad \begin{cases} 5x + 10y = 6,000 \\ 2x + 2y = 2,000 \end{cases}$$

Then she replaced the second equation with the **sum** of the two equations:

$$\begin{array}{c} \begin{array}{c} \curvearrowright \quad \quad \quad \curvearrowright \\ \hline 5x + 10y = 6,000 \\ \hline 2x + 2y = 2,000 \\ \hline 5x + 10y + 2x + 2y = 6,000 + 2,000 \end{array} \end{array}$$

SYSTEM B:
$$\begin{cases} 5x + 10y = 6,000 \\ 7x + 12y = 8,000 \end{cases}$$

She says that any time you follow this process, the new system you get will have the **same solution set** as the original system.

Use mathematics tools and strategies to show and explain why this is true.





Item 2. Directions

Item 2 is one task and builds on content from Parts 1 and 2. Complete the task below.

Item 2 Task

Fernando likes to solve systems of equations by first rewriting both equations as **linear functions**. He rewrote Deborah’s system like this:

$$\begin{cases} f(x) = 600 - \frac{1}{2}x \\ g(x) = 1,000 - x \end{cases}$$

“Now it is easy to solve. Because we want to find the point where both $f(x)$ and $g(x)$ give the same output for the same input (x value), we can find the solution by setting $600 - \frac{1}{2}x$ and $1000 - x$ equal to each other and solving for x .”

$$600 - \frac{1}{2}x = 1,000 - x$$

Explain using a **graphical representation** why Fernando is correct. Then find the approximate solution using any mathematical method that makes sense to you.





PART 3. Spirit Bracelets Revisited

Applying Systems of Equations

Item 1. Directions

Item 1 has one task and builds content from Parts 1, 2, and 3. Complete the task below.

Item 1 Task

One year, the club needs to make \$4,500 and has enough materials to make 1,000 bracelets. They decided to charge \$5 for **basic** bracelets and \$10 for **ornate** bracelets. Deborah represented the two constraints using the following system of equations:

$$\begin{cases} 4x + 8y = 6,400 \\ x + y = 900 \end{cases}$$

Lian points out to Deborah that the club wants to make *more* than \$6,400, not \$6,400 exactly. “It is also okay if we sell less than 900 bracelets. It’s just that we can only make *up to* 900 bracelets.” Lian says that this means they actually need a system of *inequalities*, rather than a system of *equations*.

Lian adjusts Deborah’s system of equations so that it is a system of inequalities instead:

$$\begin{cases} 4x + 8y > 6,400 \\ x + y \leq 900 \end{cases}$$

Represent and solve Lian’s system of inequalities graphically.

