NAME DATE PERIOD

Lesson 1: Planning a Pizza Party

Success Criteria: I can explain the meaning of the term "constraints." I can tell which quantities in a situation can vary and which ones cannot. I can use letters and numbers to write expressions representing the quantities in a situation.

As a reward for achieving their goals, all students in the ninth grade are invited to an ice cream party.
1. Write an expression that could represent an estimated cost for the party. Use at least one letter. State what each part of the expression represents.

2. Choose a letter in your expression. Describe the values that would be reasonable for the quantity that the letter represents.

Evaluate yourself using the success criteria at the top of this page

Beginning:	**Approaching:**	**Proficient:**	**Excelling:**
Incorrect answer. Work/Explanation shows no understanding of current concept	Incorrect answer, but work/explanation shows some evidence of understanding	Right answer with correct work but missing or incomplete explanation. - OR- Wrong answer due to minor calculation error	Right answer with correct work AND explanation is complete with appropriate grade level vocabulary

NAME DATE PERIOD

Lesson 2: Writing Equations to Model

Success Criteria: I can tell which quantities in a situation can vary and which ones cannot. I can use letters and numbers to write equations representing the relationships in a situation.

A school choir needs to make T-shirts for its 75 members and has set aside some money in their budget to pay for them. The members of the choir decided to order from a printing company that charges $3 per shirt, plus a $50 fee for each color to be printed on the shirts.

1. Write an equation that represents the relationship between the number of T-shirts ordered, the number of colors on the shirts, and the total cost of the order. If you use a variable, specify what it represents.

2. In this situation, which quantities do you think can vary? Which might be fixed?

Evaluate yourself using the success criteria at the top of this page

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NAME DATE PERIOD

Lesson 3: Writing Equations to Model

Success Criteria: I can use words and equations to describe the patterns I see in a table of values or in a set of calculations. When given a description of a situation, I can use representations like diagrams and tables to help make sense of the situation and write equations for it.

Clare volunteers at a local library during the summer. Her work includes putting labels on 750 books.
1. How many minutes will she need to finish labeling all books if If she takes no breaks and labels:

a. 10 books a minute

b. 15 books a minute

2. Suppose Clare labels the books at a constant speed of books per minute. Write an equation that represents the relationship between her labeling speed and the number of minutes it would take her to finish labeling.

Evaluate yourself using the success criteria at the top of this page

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NAME DATE PERIOD

Lesson 4: Equations and Their Solutions

Success Criteria: I can explain what it means for a value or pair of values to be a solution to an equation. I can find solutions to equations by reasoning about a situation or by using algebra.

An empty shipping box weighs 250 grams. The box is then filled with T-shirts. Each T-shirt weighs 132.5 grams. The equation $W = 250 + 132.5T$ represents the relationship between the quantities in this situation, where is the weight, in grams, of the filled box and the number of shirts in the box.

1. Name two possible solutions to the equation $W = 250 + 132.5T$. What do the solutions mean in this situation?

2. Consider the equation $2{,}900 = 250 + 132.5T$. In this situation, what does the solution to this equation tell us?

Evaluate yourself using the success criteria at the top of this page

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NAME DATE PERIOD

Lesson 5: Equations and Their Graphs

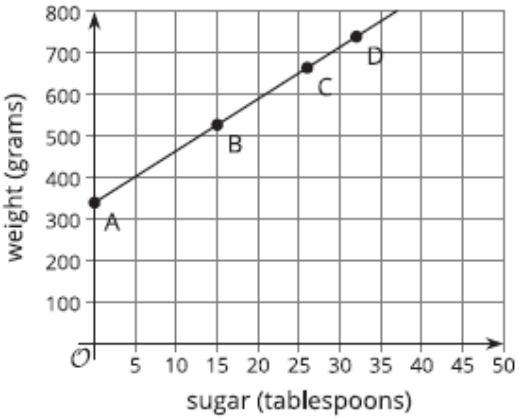
Success Criteria: I can use graphing technology to graph linear equations and identify solutions to the equations. I understand how the coordinates of the points on the graph of a linear equation are related to the equation. When given the graph of a linear equation, I can explain the meaning of the points on the graph in terms of the situation it represents.

A ceramic sugar bowl weighs 340 grams when empty. It is then filled with sugar. One tablespoon of sugar weighs 12.5 grams.

1. Write an equation to represent the relationship between the total weight of the bowl in grams and tablespoons of sugar.

2. When the sugar bowl is full, it weighs 740 grams. How many tablespoons of sugar can the bowl hold? Show your reasoning.

3. The graph represents the relationship between the number of teaspoons of sugar in the bowl and the total weight of the bowl. Which point on the graph could represent your answer to the previous question?



4. About how many tablespoons of sugar are in the bowl when the total weight is 600 grams?

Evaluate yourself using the success criteria at the top of this page

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NAME DATE PERIOD

Lesson 6: Equivalent Equations

Success Criteria: I can tell whether two expressions are equivalent and explain why or why not. I know and can identify the moves that can be made to transform an equation into an equivalent one. I understand what it means for two equations to be equivalent, and how equivalent equations can be used to describe the same situation in different ways.

A cardboard box, which weighs 0.6 pound when empty, is filled with 15 bags of beans and a 4-pound bag of rice. The total weight of the box and the contents inside it is 25.6 pounds. One way to represent this situation is with the equation $0.6 + 15b + 4 = 25.6$.

1. In this situation, what does the solution to the equation represent?

2. Select all equations that are also equivalent to $0.6 + 15b + 4 = 25.6$.
   - Equation A: $15b + 4 = 25.6$
   - Equation B: $15b + 4 = 25$
   - Equation C: $3(0.6 + 15b + 4) = 76.8$
   - Equation D: $15b = 25.6$
   - Equation E: $15b = 21$

Evaluate yourself using the success criteria at the top of this page

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NAME DATE PERIOD

Lesson 7: Explaining Steps for Rewriting Equations

Success Criteria: I can explain why some algebraic moves create equivalent equations but some do not. I know how equivalent equations are related to the steps of solving equations. I know what it means for an equation to have no solutions and can recognize such an equation.

1. The equation $4(x - 2) = 100$ is a true equation for a particular value of . Explain why $2(x - 2) = 50$ is also true for the same value of .

2. To solve the equation $7.5d = 2.5d$, Lin divides each side by $2.5d$, and Elena subtracts $2.5d$ from each side.

a. Will both moves lead to the solution? Explain your reasoning.

b. What is the solution?

Evaluate yourself using the success criteria at the top of this page

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NAME DATE PERIOD

Lesson 8: Which Variable to Solve for?

Success Criteria: Given an equation, I can solve for a particular variable (like height, time, or length) when the equation would be more useful in that form. I know the meaning of the phrase "to solve for a variable."

The perimeter of a rectangle is 48 centimeters. The relationship between the length, the width, and the perimeter of the rectangle can be described with the equation $2l + 2w = 48$.
Find the length, in centimeters, if the width is:

1. 10 centimeters

2. 3.6 centimeters

3. w centimeters

Evaluate yourself using the success criteria at the top of this page

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NAME DATE PERIOD

Lesson 9: Which Variable to Solve for?

Success Criteria: I can write an equation to describe a situation that involves multiple quantities whose values are not known, and then solve the equation for a particular variable. I know how solving for a variable can be used to quickly calculate the values of that variable.

A school is holding a carnival and hopes to raise $500. Child tickets cost $3 and adult tickets cost $5. If the school sells child tickets and adult tickets, then the equation $3x + 5y = 500$ expresses the fact that the school raised exactly $500 from ticket sales.

1. Solve the equation for x.

2. Explain when it might be helpful to rewrite the equation this way.

Evaluate yourself using the success criteria at the top of this page

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NAME DATE PERIOD

Lesson 10: Connecting Equations to Graphs

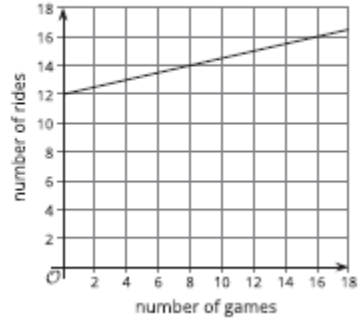
Success Criteria: I can describe the connections between an equation of the form $ax+by=c$, the features of its graph, and the rate of change in the situation. I can graph a linear equation of the form $ax+by=c$. I understand that rewriting the equation for a line in different forms can make it easier to find certain kinds of information about the relationship and about the graph.

Kiran is spending $12 on games and rides at another carnival, where a game costs $0.25 and a ride costs $1.

1. Write an equation to represent the relationship between the dollar amount Kiran is spending and the number of games, *x*, and the number of rides, *y*, he could do.

2. Which graph represents the relationship between the quantities in this situation? Explain how you know.

A



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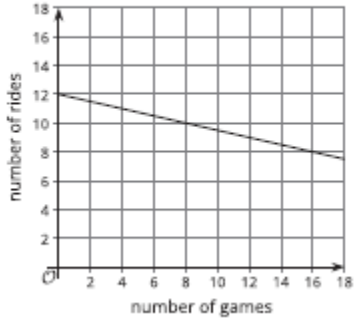

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NAME DATE PERIOD

Lesson 11: Connecting Equations to Graphs

Success Criteria: I can find the slope and vertical intercept of a line with equation $ax+by=c$. I can take an equation of the form $ax+by=c$ and rearrange it into the equivalent form $y=mx+b$. I can use a variety of strategies to find the slope and vertical intercept of the graph of a linear equation given in different forms.

Consider the equation $1.5x + 4.5y = 18$. For each question, explain or show your reasoning.

1. If we graph the equation, what is the slope of the graph?

2. Where does the graph intersects the -axis?

3. Where does it intersects the -axis?

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NAME DATE PERIOD

Lesson 12: Writing and Graphing Systems of Linear Equations

Success Criteria: I can explain what we mean by "the solution to a system of linear equations" and can explain how the solution is represented graphically. I can explain what we mean when we refer to two equations as a system of equations. I can use tables and graphs to solve systems of equations.

At a fabric store, fabrics are sold by the yard. A dressmaker spent $36.35 on 4.25 yards of silk and cotton fabrics for a dress. Silk is $16.90 per yard and cotton is $4 per yard.

Here is a system of equations that represent the constraints in the situation.

$$\begin{cases} x + y = 4.25 \\ 16.90x + 4y = 36.35 \end{cases}$$

1. What does the solution to the system represent?

2. Find the solution to the system of equations. Explain or show your reasoning.

Evaluate yourself using the success criteria at the top of this page

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NAME DATE PERIOD

Lesson 13: Solving Systems by Substitution

Success Criteria: I can solve systems of equations by substituting a variable or an expression. I know more than one way to perform substitution and can decide which way or what to substitute based on how the given equations are written.

Solve this system of equations without graphing and show your reasoning:

$$\begin{cases} 5x + y = 7 \\ 20x + 2 = y \end{cases}$$

Evaluate yourself using the success criteria at the top of this page

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NAME DATE PERIOD

Lesson 14: Solving Systems by Elimination

Success Criteria: I can solve systems of equations by adding or subtracting them to eliminate a variable. I know that adding or subtracting equations in a system creates a new equation, where one of the solutions to this equation is the solution to the system.

Here is a system of linear equations:

$$\begin{cases} 2x + \frac{1}{2}y = 7 \\ 6x - \frac{1}{2}y = 5 \end{cases}$$

1. Which would be a more helpful for solving the system: adding the two equations or subtracting one from the other? Explain your reasoning.

2. Solve the system without graphing. Show your reasoning.

Evaluate yourself using the success criteria at the top of this page

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NAME DATE PERIOD

Lesson 15: Solving Systems by Elimination

Success Criteria: I can explain why adding or subtracting two equations that share a solution results in a new equation that also shares the same solution.

On a family outing, Tyler bought 5 cups of hot cocoa and 4 pretzels for $18.40. Some of his family members would like a second serving, so he went back to the same food stand and bought another 2 cups of hot cocoa and 4 pretzels for $11.20. Here is a system of equations that represent the quantities and constraints in this situation.

$$\begin{cases} 5c + 4p = 18.40 \\ 2c + 4p = 11.20 \end{cases}$$

1. What does the solution to the system, *(c, p)* , represent in this situation?

2. If we add the second equation to the first equation, we have a new equation *7c + 8p = 29.60*
Explain why the same pair *(c, p)* that is a solution to the two original equations is also a solution to this new equation.

3. Does the equation *7c + 8p = 29.60* help us solve the original system? If you think so, explain how it helps. If you don't think so, explain why not and what would help us solve the system.

Evaluate yourself using the success criteria at the top of this page

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NAME DATE PERIOD

Lesson 16: Solving Systems by Elimination

Success Criteria: I can solve systems of equations by multiplying each side of one or both equations by a factor, then adding or subtracting the equations to eliminate a variable. I understand that multiplying each side of an equation by a factor creates an equivalent equation whose graph and solutions are the same as that of the original equation.

Lin and Priya were working on solving this system of equations.

$$\begin{cases} \frac{1}{3}x + 2y = 4 \\ x + y = -3 \end{cases}$$

Lin's first move is to multiply the first equation by 3.

Priya's first move is to multiply the second equation by 2.

1. Explain why either move creates a new equation with the same solutions as the original equation.

2. Whose first move would you choose to do to solve the system? Explain your Reasoning.

Evaluate yourself using the success criteria at the top of this page

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NAME DATE PERIOD

Lesson 17: Systems of Linear Equations and Their Solutions

Success Criteria: I can tell how many solutions a system has by graphing the equations or by analyzing the parts of the equations and considering how they affect the features of the graphs. I know the possibilities for the number of solutions a system of equations could have.

Mai is given these two systems of linear equations to solve:

System 1:

$$\begin{cases} 5x + y = 13 \\ 20x + 4y = 64 \end{cases}$$

System 2:

$$\begin{cases} 5x + y = 13 \\ 20x = 52 - 4y \end{cases}$$

She analyzed them for a moment, and then—without graphing the equations—said, "I got it! One of the systems has no solution and the other has infinitely many solutions!" Mai is right!
Which system has no solution and which one has many solutions? Explain or show how you know (without graphing the equations).

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NAME DATE PERIOD

Lesson 18: Representing Situations with Inequalities

Success Criteria: I can explain the meaning of the term "constraints." I can tell which quantities in a situation can vary and which ones cannot. I can use letters and numbers to write expressions representing the quantities in a situation.

Han has a budget of $25 to buy grapes. Write inequalities to represent the number of pounds of grapes that Han could buy in each situation:

1. Grapes cost $1.99 per pound.

2. Grapes cost $2.49 per pound.

3. Grapes cost $\$x$ per pound.

Evaluate yourself using the success criteria at the top of this page

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NAME DATE PERIOD

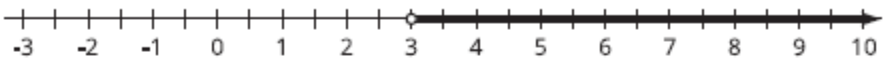
Lesson 19: Solutions to Inequalities in One Variable

Success Criteria: I can tell which quantities in a situation can vary and which ones cannot. I can use letters and numbers to write equations representing the relationships in a situation.

Which graph correctly shows the solution to the inequality. Show or explain your reasoning.

$$\frac{7x-3}{9} \geq 8-2x?$$

A



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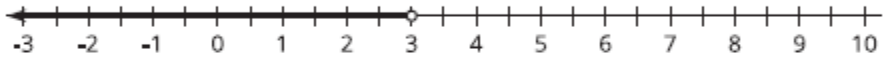

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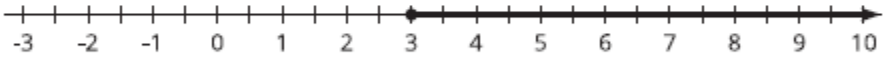

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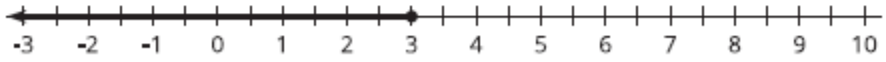

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NAME DATE PERIOD

Lesson 20: Writing and Solving Inequalities in One Variable

Success Criteria: I can use words and equations to describe the patterns I see in a table of values or in a set of calculations. When given a description of a situation, I can use representations like diagrams and tables to help make sense of the situation and write equations for it.

Lin's job pays $8.25 an hour plus $10 of transportation allowance each week. She has to work at least 5 hours a week to keep the job, and can earn up to $175 per week (including the allowance).

1. Represent this situation mathematically. If you use variables, specify what each one means.

2. How many hours per week can Lin work? Explain or show your reasoning.

Evaluate yourself using the success criteria at the top of this page

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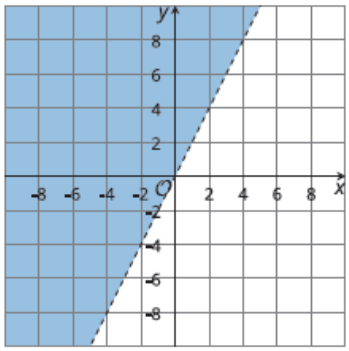
NAME DATE PERIOD

Lesson 21: Graphing Linear Inequalities in Two Variables

Success Criteria: I can explain what it means for a value or pair of values to be a solution to an equation. I can find solutions to equations by reasoning about a situation or by using algebra.

1. The line in each graph represents $y = 2x$. Which graph represents $2x > y$?

A



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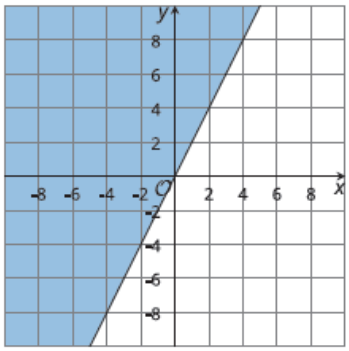

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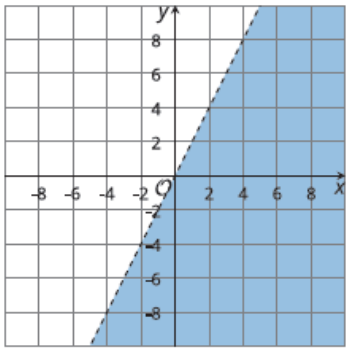

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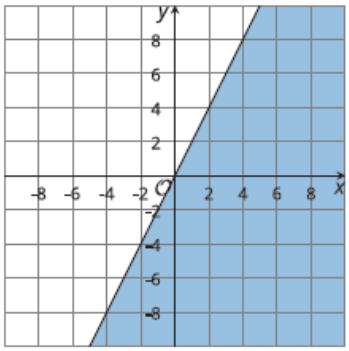

2. Explain your reasons for choosing that graph.

Evaluate yourself using the success criteria at the top of this page

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NAME DATE PERIOD

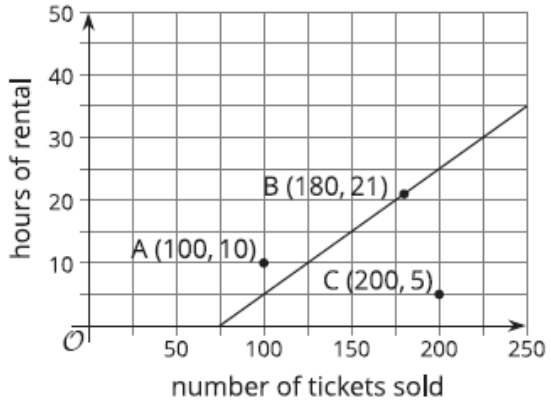
Lesson 22: Graphing Linear Inequalities in Two Variables

Success Criteria: I can use graphing technology to graph linear equations and identify solutions to the equations. I understand how the coordinates of the points on the graph of a linear equation are related to the equation. When given the graph of a linear equation, I can explain the meaning of the points on the graph in terms of the situation it represents.

To raise money for after-school programs at an elementary school, a group of parents is holding a weekend of games in a community center. They charge $8 per person for entry into the event. The group would like to earn at least $600, after paying for the cost of renting the space, which is $40 an hour.

1. If x represents the number of entry tickets sold and y the hours of space rental, which inequality represents the constraints in the situation?
   a. $8x - 40y < 600$
   b. $8x - 40y \leq 600$
   c. $8x - 40y > 600$
   d. $8x - 40y \geq 600$

2. The line is the graph of $8x - 40y = 600$. Select all points whose (x, y) values represent the group reaching its fundraising goal. Explain or show your reasoning.



3. Complete the graph so that it represents solutions to an inequality that represents this situation. (Be clear about whether you want to use a solid or dashed line.)

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NAME DATE PERIOD

Lesson 23: Solving Problems with Inequalities in Two Variables

Success Criteria: I can explain what it means for a value or pair of values to be a solution to an equation. I can find solutions to equations by reasoning about a situation or by using algebra.

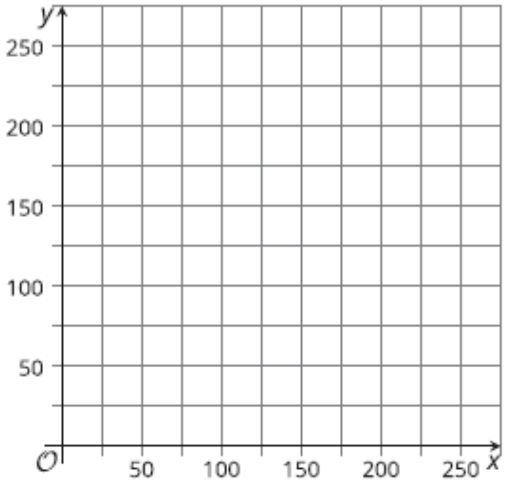
A band is playing at an auditorium with floor seats and balcony seats. The band wants to sell the floor tickets for $15 each and balcony tickets for $12 each. They want to make at least $3,000 in ticket sales.

1. How much money will they collect for selling floor tickets?

2. How much money will they collect for selling balcony tickets?

3. Write an inequality whose solutions are the number of floor and balcony tickets sold if they make at least $3,000 in ticket sales.

4. Use technology to graph the solutions to your inequality, and sketch the graph.



Beginning:	**Approaching:**	**Proficient:**	**Excelling:**
Incorrect answer. Work/Explanation shows no understanding of current concept	Incorrect answer, but work/explanation shows some evidence of understanding	Right answer with correct work but missing or incomplete explanation. -OR- Wrong answer due to minor calculation error	Right answer with correct work AND explanation is complete with appropriate grade level vocabulary

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NAME DATE PERIOD

Lesson 24: Solutions to Systems of Linear Inequalities in Two Variables

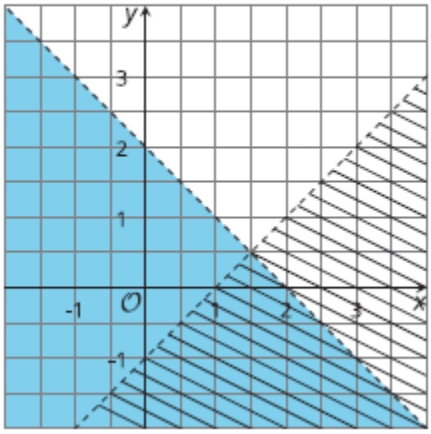
Success Criteria: I can explain what it means for a value or pair of values to be a solution to an equation. I can find solutions to equations by reasoning about a situation or by using algebra.

Here is another riddle:
The sum of two numbers is less than 2. If we subtract the second number from the first, the difference is greater than 1. What are the two numbers?

1. The riddle can be represented by a system of inequalities. Write an inequality for each statement.

2. These graphs represent the inequalities in the system.

Which graph represents which inequality?



3. Name a possible solution to the riddle. Explain or show how you know.

Evaluate yourself using the success criteria at the top of this page

Beginning:	**Approaching:**	**Proficient:**	**Excelling:**
Incorrect answer. Work/Explanation shows no understanding of current concept	Incorrect answer, but work/explanation shows some evidence of understanding	Right answer with correct work but missing or incomplete explanation. -OR- Wrong answer due to minor calculation error	Right answer with correct work AND explanation is complete with appropriate grade level vocabulary

NAME DATE PERIOD

Lesson 25: Solving Problems with Systems of Linear Inequalities in Two Variables

Success Criteria: I can use graphing technology to graph linear equations and identify solutions to the equations. I understand how the coordinates of the points on the graph of a linear equation are related to the equation. When given the graph of a linear equation, I can explain the meaning of the points on the graph in terms of the situation it represents.

A factory produces widgets and zurls. The combined number of widgets and zurls made each day cannot be more than 12. The maximum number of widgets the factory can produce in a day is 4. Let ***x*** be the number of widgets and the ***y*** number of zurls.

1. Select all the inequalities that represent this situation.

a. $x < 4$

b. $x \leq 4$

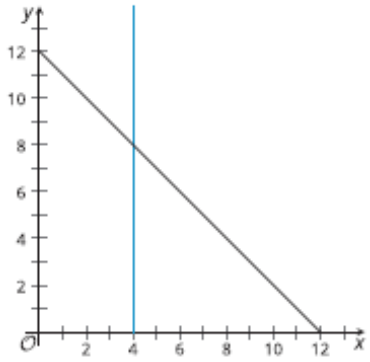
c. $x > 4$

d. $x + y > 12$

e. $x + y \leq 12$

2. Here are graphs of $x = 4$ and $x + y = 12$.

Complete the graphs (by shading regions and adjusting line types as needed) to show all the allowable numbers of widgets and zurls that the factory can produce in one day.



3. Does each ordered pair represent an allowable combination of widgets and zurls produced in one day?

$(4, 5)$ $(11, 1)$ $(4, 12)$ $(3, 9)$

Beginning:	**Approaching:**	**Proficient:**	**Excelling:**
Incorrect answer. Work/Explanation shows no understanding of current concept	Incorrect answer, but work/explanation shows some evidence of understanding	Right answer with correct work but missing or incomplete explanation. -OR- Wrong answer due to minor calculation error	Right answer with correct work AND explanation is complete with appropriate grade level vocabulary