**Questions/Work**

**Vocabulary**

* Inconsistent system:
* Solution of a system of linear equations:
* System of linear equations:
* System of linear inequalities:

**Solve a System of Linear Equations**

* A system of linear equations is a set of \_\_\_\_\_\_ or more equations using the same \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* The solution of a system of linear equations is the set of all \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that simultaneously make all equations in the system \_\_\_\_\_\_\_\_\_\_\_\_\_.
* There are \_\_\_\_\_\_\_\_ possible outcomes when solving a system of linear equations: \_\_\_\_\_\_\_ solution, \_\_\_\_\_ solution, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ number of solutions.
* You can solve a system by graphing (look at where the graphs intersect) as well as algebraically**.**

**Example 1**

What is the solution of the system of linear equations  ? Sketch the graph of each equation to estimate the solutions. Then solve algebraically.

|  |  |
| --- | --- |
| **Graphically:** | **Algebraically:****Solution:**  |

 **Name**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Period**: \_\_\_\_ **Date**: \_\_\_\_\_\_\_\_\_\_\_\_\_

**Topic**: Linear Systems

**Essential Question**: How can you find and represent solutions of systems of linear equations and inequalities?

**I CAN…**

 **Level 4**: Construct a real-world scenario that is modeled by linear system of equations or inequalities and solve.

 Level 3: Use a variety of tools to solve systems of linear equations and inequalities.

 Level 2: Understand key terminology as well as well as understand the basic processes of the lesson

 Level 1: With help, I can understand key terminology and work with basic processes of the lesson

**Notes 1-6**

**p.1**

**Shading Tip**: $> $means shade above the line. < means shade below the line

**p. 2**

**Try It!**

1. Solve each system of equations. (either by graphing or algebraically)

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| --- | --- |
|  |  |

**Solve a System of Linear Inequalities**

* A system of linear inequalities is a set of \_\_\_\_\_ or more inequalities using the same \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Example 2**

Malcolm earns $20 per hour mowing lawns and $10 per hour walking dogs. His goal is to earn at least $200 each week, but he can work a maximum of 20 h per week. Malcolm must spend at least 5 h per week walking his neighbors’ dogs. For how many hours should Malcolm work at each job in order to meet his goals?

|  |  |
| --- | --- |
| **Step 1** Define the variablesx = y = **Step 3** Solve each inequality for y, then graph the inequalities on the same coordinate plane. | **Step 2** Write inequalities to model the constraints.Malcolm wants to earn at least $200 a week at $20 per hour mowing and $10 per hour walking dogs: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Malcolm can’t work more than 20 h each week: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Malcolm must spend at least 5 h walking dogs each week: \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Work:**Solution:** Any point in the shaded region is a solution. So if Malcolm spends 12 hours mowing lawns and 7 hours walking dogs, he will have met his goal.  |  **Shade** the region that satisfies all three inequalities.  |

**Questions/Work**

**Try It!**

**2.** Sketch the graph of the set of all points that solve this system of linear inequalities.

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**Solve a System of Equations in Three Variables**

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| --- |
| **Solving Algebraically:**You can perform the following operations to solve a system of equations:* Rearrange the order of the list
* Multiplying (or dividing) an equation by a nonzero number
* Adding (or subtracting) one equation to another and replacing one of these equations with the sum

The goal is to simplify the system by making it so you can solve at least one of the equations for 1 variable. Then, this variable can be substituted into the other equations to solve for the rest of the variables.  |

**Example 3**

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| --- | --- |
| **A.** What is the solution of this system?  |  |
|  | Original EquationAdd Equations A and BMultiply Equation B by -3Add Equations E and F togetherDivide Equation H by 4Add Equations K and L together |

**p. 3**

**Questions/Work**

From equation (N): Substituting into (P):

Substituting into (A): Solution is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |
| --- |
| **Types of Systems and Solutions**There are 3 cases for linear systems:1) Consistent system: You have 1 solution. 2) Inconsistent system: You have no solutions to the system. This is obvious if, upon trying to solve algebraically, you get an equation that is not true (i.e: 1 = 5).3) Dependent system: You have an infinite number of solutions. This is obvious if, upon trying to solve algebraically, you get an equation that is always true no matter what (i.e: 5 = 5). |

|  |  |
| --- | --- |
| **B.** What is the solution of this system?  |  |
|  | Original EquationsAdd Equations A and BMultiply Equation B by -2 and add to Equation CMultiply Equation D by 2 and add to Equation FEquation J is not true. There is \_\_\_\_\_ solution for this system of equations; it is an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ system.  |

**Try It!**

**3.** Solve the following system of equations

|  |  |
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**p. 4**

**Questions/Work**

**p. 5**

**Questions**



**Concept Summary**

|  |  |  |
| --- | --- | --- |
|  | **System of linear equations** | **System of linear inequalities** |
| **WORDS** |  |  |
| **ALGEBRA** |  |  |
| **GRAPHS** |  |  |

**Written Summary**

**EQ:** How can you find and represent solutions of systems of linear equations and inequalities?

**p. 6**

**Questions**

**P. 7**

**Questions**

**Questions**

**P. 8**

**Questions**

**Questions**