Lesson 22A: Solution Sets to Simultaneous Equations

Classwork

**System of Simultaneous Equations or Linear Equations**: Two or more linear equations together

**Solution of the System**: Any point common to all the lines

Solve the system of linear equations by graphing and identify the solution.

y = -x + 4 3x + y = 5

y = 2x + 1 x – y = 7

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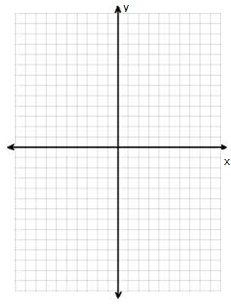
[](http://www.google.com/imgres?imgurl&imgrefurl=http://www.crestviewlocal.k12.oh.us/chs/staff/mcc/cp10.html&h=0&w=0&sz=1&tbnid=r8ugDHFRf1kAzM&tbnh=225&tbnw=224&prev=/search?q=coordinate+plane&tbm=isch&tbo=u&zoom=1&q=coordinate%20plane&docid=bc5yn1XHt6D8NM&hl=en&ei=hny_Ua2aKumSiALt9YHoCw&ved=0CAEQsCU)

2y – 2x = 12 y = ½x – 1

y – x = 6 y = -½x + 3

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| **If 2 linear equations are graphed in the same coordinate plane 1 of 3 things can happen:** | | |
| The lines will intersect  (one solution) | The lines will coincide (infinitely many solutions) | The lines will be parallel  (no solution) |

Exercise 1

a. Solve the following system of equations.

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Problem Set 22A

1. Solve the following system of equations by graphing

[](http://www.google.com/imgres?imgurl&imgrefurl=http://www.crestviewlocal.k12.oh.us/chs/staff/mcc/cp10.html&h=0&w=0&sz=1&tbnid=r8ugDHFRf1kAzM&tbnh=225&tbnw=224&prev=/search?q=coordinate+plane&tbm=isch&tbo=u&zoom=1&q=coordinate%20plane&docid=bc5yn1XHt6D8NM&hl=en&ei=hny_Ua2aKumSiALt9YHoCw&ved=0CAEQsCU)

2. Solve the system of linear equations by graphing and identify the solution.

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y = -x + 5

y = x + 1

3. Solve the system of linear equations by graphing and identify the solution.

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4x + y = 3

-x – y = 6

4. Solve the system of linear equations by graphing and identify the solution.

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2y – 2x = 10

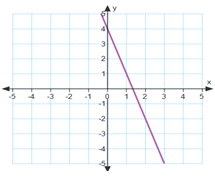
y – x = 5

5. Solve the system of linear equations by graphing and identify the solution.

[](http://www.google.com/imgres?imgurl&imgrefurl=http://www.crestviewlocal.k12.oh.us/chs/staff/mcc/cp10.html&h=0&w=0&sz=1&tbnid=r8ugDHFRf1kAzM&tbnh=225&tbnw=224&prev=/search?q=coordinate+plane&tbm=isch&tbo=u&zoom=1&q=coordinate%20plane&docid=bc5yn1XHt6D8NM&hl=en&ei=hny_Ua2aKumSiALt9YHoCw&ved=0CAEQsCU)y = ½x – 2

y = -½x + 6

6. Consider two linear equations. The graph of the first equation is shown. And a table of values satisfying the second equation is given. What is the solution to the system of the two equations?



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7. Solve the system of linear equations by graphing and identify the solution. [](http://www.google.com/imgres?imgurl&imgrefurl=http://www.crestviewlocal.k12.oh.us/chs/staff/mcc/cp10.html&h=0&w=0&sz=1&tbnid=r8ugDHFRf1kAzM&tbnh=225&tbnw=224&prev=/search?q=coordinate+plane&tbm=isch&tbo=u&zoom=1&q=coordinate%20plane&docid=bc5yn1XHt6D8NM&hl=en&ei=hny_Ua2aKumSiALt9YHoCw&ved=0CAEQsCU)

8. Solve the system of linear equations by graphing and identify the solution.

[](http://www.google.com/imgres?imgurl&imgrefurl=http://www.crestviewlocal.k12.oh.us/chs/staff/mcc/cp10.html&h=0&w=0&sz=1&tbnid=r8ugDHFRf1kAzM&tbnh=225&tbnw=224&prev=/search?q=coordinate+plane&tbm=isch&tbo=u&zoom=1&q=coordinate%20plane&docid=bc5yn1XHt6D8NM&hl=en&ei=hny_Ua2aKumSiALt9YHoCw&ved=0CAEQsCU)

Lesson 22B: Solution Sets to Simultaneous Inequalities

Opening Exercise

Consider the following compound sentence: and

* 1. Circle all the ordered pairs that are solutions   
     to the inequality (below).
  2. Underline all the ordered pairs that are solutions  
     to the equation

* 1. List the ordered pair(s) from above that are solutions to the compound sentence and
  2. List three additional ordered pairs that are solutions to the compound sentence and .

[](http://www.google.com/imgres?imgurl&imgrefurl=http://www.crestviewlocal.k12.oh.us/chs/staff/mcc/cp10.html&h=0&w=0&sz=1&tbnid=r8ugDHFRf1kAzM&tbnh=225&tbnw=224&prev=/search?q=coordinate+plane&tbm=isch&tbo=u&zoom=1&q=coordinate%20plane&docid=bc5yn1XHt6D8NM&hl=en&ei=hny_Ua2aKumSiALt9YHoCw&ved=0CAEQsCU)

* 1. Sketch the solution set to the inequality and the solution set to on the same set of coordinate axes. Highlight the points that lie in BOTH solution sets.
  2. Describe the solution set to and .

Example 2

[](http://www.google.com/imgres?imgurl&imgrefurl=http://www.crestviewlocal.k12.oh.us/chs/staff/mcc/cp10.html&h=0&w=0&sz=1&tbnid=r8ugDHFRf1kAzM&tbnh=225&tbnw=224&prev=/search?q=coordinate+plane&tbm=isch&tbo=u&zoom=1&q=coordinate%20plane&docid=bc5yn1XHt6D8NM&hl=en&ei=hny_Ua2aKumSiALt9YHoCw&ved=0CAEQsCU)Graph the solution set to the system of inequalities:

**Example 3**

Graph the solution set to the system of inequalities.

[](http://www.google.com/imgres?imgurl&imgrefurl=http://www.crestviewlocal.k12.oh.us/chs/staff/mcc/cp10.html&h=0&w=0&sz=1&tbnid=r8ugDHFRf1kAzM&tbnh=225&tbnw=224&prev=/search?q=coordinate+plane&tbm=isch&tbo=u&zoom=1&q=coordinate%20plane&docid=bc5yn1XHt6D8NM&hl=en&ei=hny_Ua2aKumSiALt9YHoCw&ved=0CAEQsCU)and

Exercise 2

Graph the solution set to each system of inequalities.

* 1. [](http://www.google.com/imgres?imgurl&imgrefurl=http://www.crestviewlocal.k12.oh.us/chs/staff/mcc/cp10.html&h=0&w=0&sz=1&tbnid=r8ugDHFRf1kAzM&tbnh=225&tbnw=224&prev=/search?q=coordinate+plane&tbm=isch&tbo=u&zoom=1&q=coordinate%20plane&docid=bc5yn1XHt6D8NM&hl=en&ei=hny_Ua2aKumSiALt9YHoCw&ved=0CAEQsCU)
  2. [](http://www.google.com/imgres?imgurl&imgrefurl=http://www.crestviewlocal.k12.oh.us/chs/staff/mcc/cp10.html&h=0&w=0&sz=1&tbnid=r8ugDHFRf1kAzM&tbnh=225&tbnw=224&prev=/search?q=coordinate+plane&tbm=isch&tbo=u&zoom=1&q=coordinate%20plane&docid=bc5yn1XHt6D8NM&hl=en&ei=hny_Ua2aKumSiALt9YHoCw&ved=0CAEQsCU)

Problem Set 22B

1. Graph the following Systems of Inequalities.

Write three ordered pairs that are solutions to both linear inequalities.

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[](http://www.google.com/imgres?imgurl&imgrefurl=http://www.crestviewlocal.k12.oh.us/chs/staff/mcc/cp10.html&h=0&w=0&sz=1&tbnid=r8ugDHFRf1kAzM&tbnh=225&tbnw=224&prev=/search?q=coordinate+plane&tbm=isch&tbo=u&zoom=1&q=coordinate%20plane&docid=bc5yn1XHt6D8NM&hl=en&ei=hny_Ua2aKumSiALt9YHoCw&ved=0CAEQsCU)

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y + 3x > - 4 y > x - 4

2. The graphs of the equations x = 4, y – x = 1, and y = -x + 3 contain the sides of a triangle.

* Graph each line on the coordinate plane below.
* Shade in the region that represents the triangle.
* Identify the coordinates of the vertices of the triangle.

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Write three inequalities that make up the shaded region.

* Find the y-intercept
* Find the slope
* Write the inequality in slope-intercept form
* Determine whether the shaded region is above or below the line.
* Place the appropriate inequality label.

a. b. c.

What kind of triangle is it? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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4. For each question below, provide an explanation or an example to support your claim.

a. Is it possible to have a system of equations that has no solution?

b. Is it possible to have a system of equations that has more than one solution?

c. Is it possible to have a system of inequalities that has no solution?