Algebra 1 SOL Review Session

Day: 5   **Topics**: Linear Systems of Equations (A.4 d, e) and Inequalities (A.5 d), and Quadratic Equations (A.4 b)

<u>Systems and Quadratic Equations</u>

<u>System of Linear Equations</u>

- A **<u>system</u>** of linear equations is a **<u>set</u>** of two or more linear equations with the **<u>same variables</u>**.
- The solution to system of linear equations is usually an **<u>ordered pair</u>**, but it can also be **<u>infinitely many solutions</u>** or **<u>no solution</u>**.
    - If the graphs of the equations intersect, then the **<u>point of intersection</u>** is the solution.
    - If the equations represent the **<u>same line</u>**, then there are **<u>infinitely many solutions.</u>**
    - If the equations represent **<u>parallel lines</u>**, then there is **<u>no solution</u>**.
- You probably learned three methods to solve a system: **<u>graphing</u>**, **<u>substitution</u>**, and **<u>elimination</u>**.

With Desmos, we can use the graphing method to solve all systems.

Open www.desmos.com/testing/virginia/graphing and type each equation in its own field.

Find the solution to the system:	Find the solution to the system:
$\begin{cases} 3x + 2y = 22 \\ -x + 4y = 2 \end{cases}$	$\begin{cases} 15x + 5y = 20 \\ y = 8 - 3x \end{cases}$

Because we can use Desmos, you may be asked to do more than simply find the solution.

Skyler buys 8 T-shirts and 5 hats for $220. The next day, he buys 5 T-shirts and 1 hat for $112. How much does each T-shirt and each hat cost? Write a system of equations that can be used to solve the problem. Then solve the problem.	As a first step in solving the systems shown, Yumiko multiplies both sides of the equation $2x - 3y = 12$ by 6. By what factor should she multiply both sides of the other equation so she can add the equations and eliminate a variable? $\begin{array}{l} 5x + 6y = 18 \\ 2x - 3y = 12 \end{array}$

<u>System of Linear Inequalities</u>

- A **<u>system</u>** of linear inequalities is a **<u>set</u>** of two or more linear inequalities with the **<u>same variables</u>**.
- The solution to system of linear inequalities is usually a **<u>set of ordered pairs in a shaded region on a graph</u>**, but it can also have **<u>no solution</u>**.
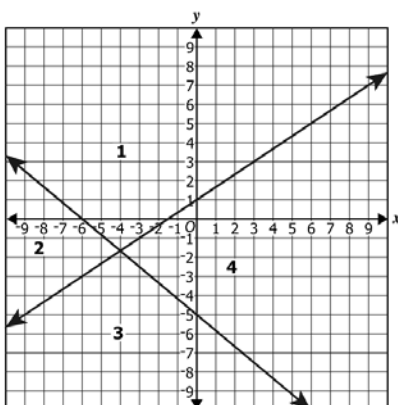- The solution to a system of linear inequalities can only be found by **<u>graphing</u>**.

Graph this system on Desmos and give three ordered pairs that are part of the solution set.

$$\begin{cases} y > \dfrac{1}{2}x + 1 \\ y + 3x \le 6 \end{cases}$$

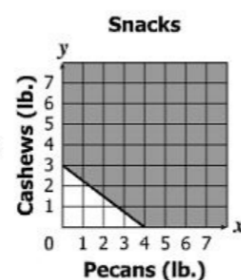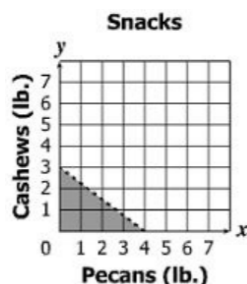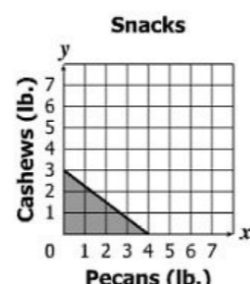|	
Eli began graphing the system shown. Which region on the graph must he shade to complete the graph? $$\begin{cases} y \ge \dfrac{2}{3}x + 1 \\ 5x + 6y \le -30 \end{cases}$$	Malik can spend no more than \$24 to buy pecans and cashews. He will pay \$6 per pound for pecans and \$8 per pound for cashews. Which graph best represents the number of pounds of pecans and cashews Malik can buy?
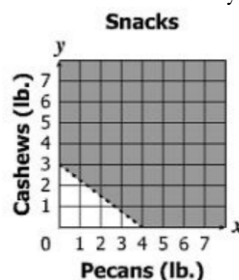
Quadratic Equations

- A **quadratic equation** usually has **two solutions**, but it could also have just **one solution** or **no solution**.
- The **graph** of a quadratic equation is a parabola. The **solutions** are the **x-intercepts**.
- **To graph:** set the equation equal to zero, type the other side into Desmos.

Solve the equation. (Find the *x*-intercepts on the graph.) $$2x^2 + 5x + 3 = 0$$	How many solutions does the equation $12x = 3x^2 + 15$ have?
What are the solutions of the equation $-5x + 2 = -3x^2$?	How many solutions does the equation $\dfrac{1}{2}x^2 + 2x = -2$ have?