Today’s agenda:

1. Announcements, Hidden Figures Dates, Unit Map
2. Whole class lesson using PearDeck - Systems of Quadratic and Linear Equations
3. Classwork/Homework Assigned
4. Independent Work:
    a. Systems of Quadratic and Linear Equations homework
    b. Quadratic Word Problems Worksheet
    c. Factoring Test Corrections
    d. Hidden Figures Worksheet
5. During class today - intense review of Quadratics Word Problems - you will want to have your worksheet completed!

Announcements

Complete Hidden Figures by FRIDAY

Factoring Test Corrections due Thursday. (If you are going to be absent on Thursday for any reason, they need to be turned in sooner)

Thursday is the last day of the quarter

Test on **Friday**. This is a date change. This will be a Quarter 4 grade

Hidden Figures Due Dates

- 21-23 due March 29 (FRIDAY) → Book completed!

When we have finished the novel,
we will watch the movie!

Unit Map - Quadratics

~~Tuesday, 3/12/2019 - Standard Form of Graphing Quadratics~~
~~Wednesday, 3/13/2019 - Half-Day, HF Reading Day with Substitute Ms. Krupski~~
~~Thursday, 3/14/2019 - Quadratic Functions~~
~~Friday, 3/15/2019 - Solving Quadratic Equations by Graphing with Substitute Ms. Mitchell~~
~~Monday, 3/18/2019 - Solving Quadratic Equations by Factoring~~
~~Tuesday, 3/19/2019 - Review Day~~
~~Wednesday, 3/20/2019 - The Quadratic Formula~~
~~Thursday, 3/21/2019 - Vertex Form~~
~~Friday, 3/22/2019 - Quadratic Word Problems~~
~~Monday, 3/25/2019 - Word Problems Continued (NC Check-Ins) with Substitute Ms. Mitchell~~
Tuesday, 3/26/2019 - Systems of Linear and Quadratic Equations
Wednesday, 3/27/2019 - Review Day
Thursday, 3/28/2019 - Begin watching Hidden Figures
Friday, 3/29/2019 - Test Day

The Quadratics Test will be the first grade of the 4th Quarter.

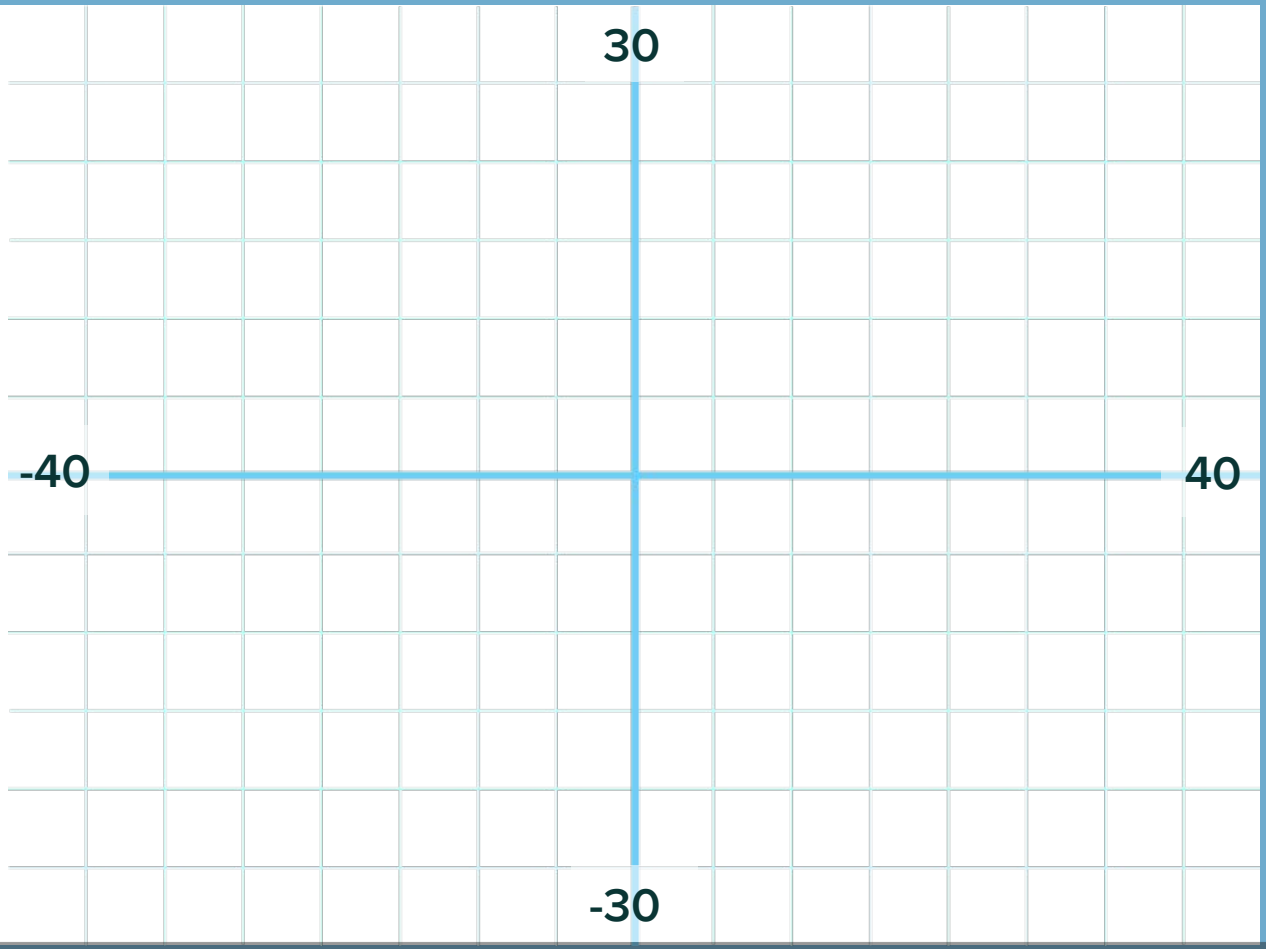
Systems of Quadratic and Linear Equations

3/25/2019

Let’s reflect on what we remember about systems of equations...

Students, write your response!

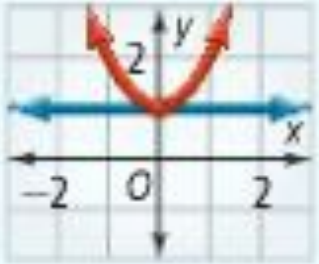
Please draw a graph with one quadratic function AND one linear function



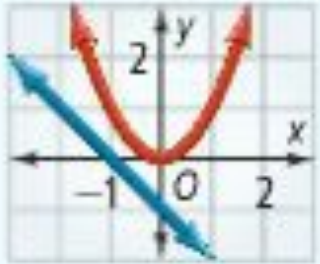
Students, draw anywhere on this slide!

Essential Understanding You can solve systems of linear and quadratic equations graphically and algebraically. This type of system can have two solutions, one solution, or no solutions.

Two solutions

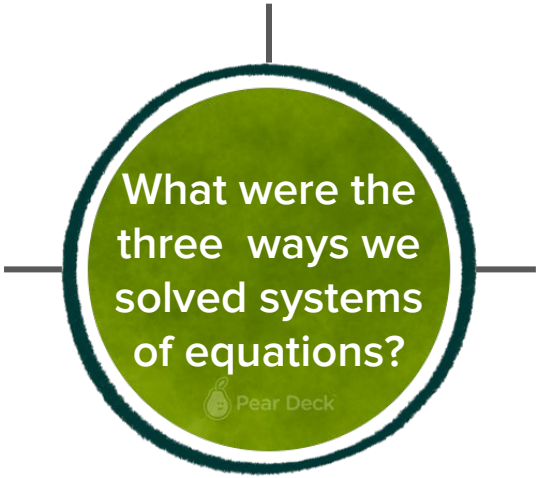


One solution



No solutions

Start a Mind Map by drawing or typing anywhere:



Students, draw anywhere on this slide!

Solve by graphing!

Problem 1 Solving by Graphing

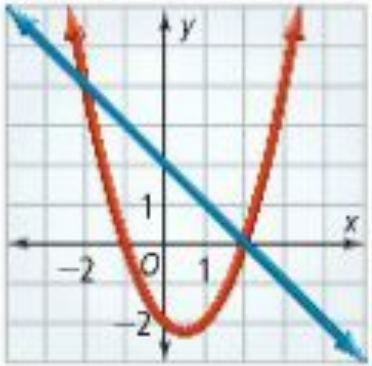
What are the solutions of the system? Solve by graphing. $y = x^2 - x - 2$, $y = -x + 2$

Plan

How can you solve this system by graphing?
The points where the two graphs intersect are the solutions of the system.

Step 1 Graph both equations in the same coordinate plane.

Step 2 Identify the point(s) of intersection, if any. The points of intersection are $(-2, 4)$ and $(2, 0)$.



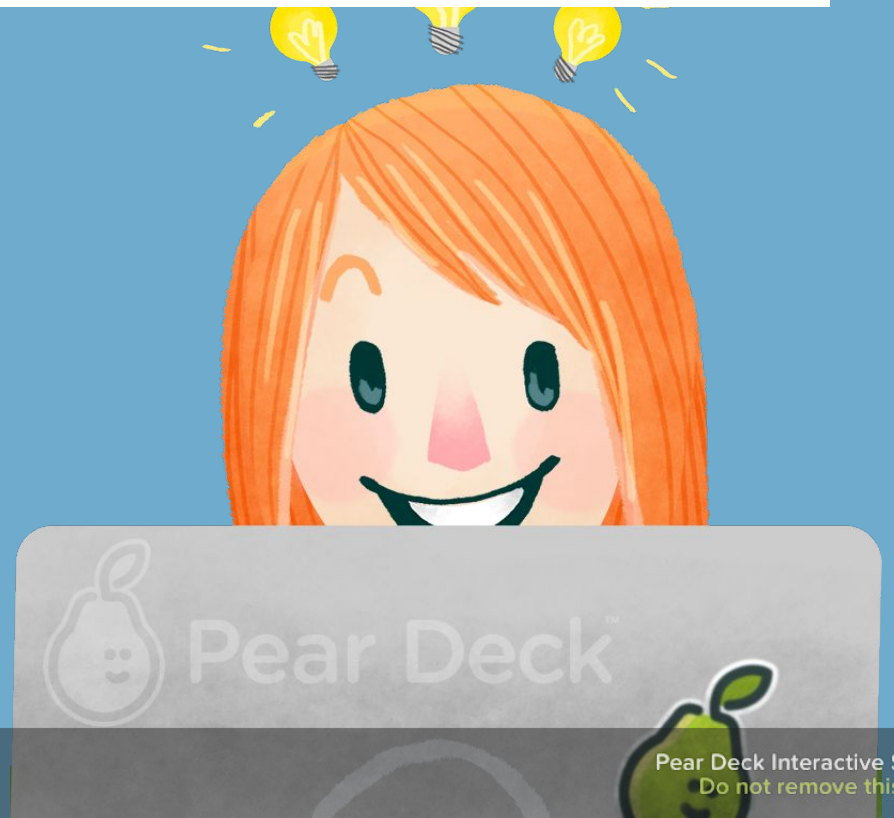
The solutions of the system are $(-2, 4)$ and $(2, 0)$.

Got It? 1. What are the solutions of each system? Solve by graphing.

a. $y = 2x^2 + 1$
$y = -2x + 5$

b. $y = x^2 + x + 3$
$y = -x$

Solve by graphing



Students, write your response!

But of course, there is always our graphing calculator and Desmos...

On the graphing calculator...

Graph one equation in y1

Graph the other equation in y2

2nd Trace intersect

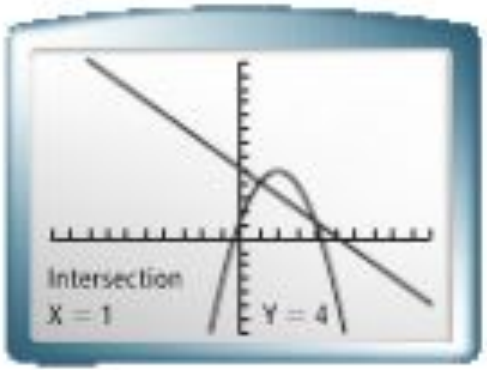
Problem 4 Solving With a Graphing Calculator

What are the solutions of the system? Use a graphing calculator.

$$y = -x + 5$$
$$y = -x^2 + 4x + 1$$

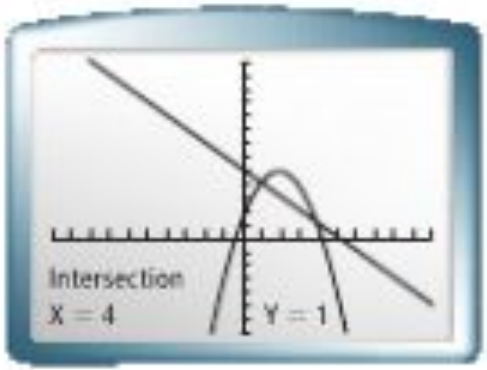
Step 1 Enter the equations on the **Y=** screen. Press graph to display the system.

Step 2



Use the **CALC** feature. Select **INTERSECT.** Move the cursor close to a point of intersection. Press enter three times to find the point of intersection.

Step 3



Repeat Step 2 to find the second intersection point.

The solutions are (1, 4) and (4, 1).

On Desmos...

Graph both equations

Click on the intersection

Solve by elimination!

Problem 2 Using Elimination

Recreation Since opening day, attendance at Pool A has increased steadily, while attendance at Pool B first rose and then fell. Equations modeling the daily attendance y at each pool are shown below, where x is the number of days since opening day. On what day(s) was the attendance the same at both pools? What was the attendance?

Pool A: $y = 20x + 124$
Pool B: $y = -x^2 + 39x + 64$

Step 1 Eliminate y.

$$\begin{aligned} y &= -x^2 + 39x + 64 \\ -(y &= \quad 20x + 124) \quad \text{Subtract the two equations.} \\ 0 &= -x^2 + 19x - 60 \quad \text{Subtraction Property of Equality} \end{aligned}$$

Step 2 Factor and solve for x.

$$\begin{aligned} 0 &= -x^2 + 19x - 60 \\ 0 &= -(x^2 - 19x + 60) && \text{Factor out } -1. \\ 0 &= -(x - 4)(x - 15) && \text{Factor.} \\ x - 4 = 0 \quad &\text{or} \quad x - 15 = 0 && \text{Zero-Product Property} \\ x = 4 \quad &\text{or} \quad x = 15 && \text{Solve for } x. \end{aligned}$$

Step 3 Find the corresponding y-values. Use either equation.

$$\begin{aligned} y &= 20x + 124 & y &= 20x + 124 \\ y &= 20(4) + 124 & y &= 20(15) + 124 \\ y &= 204 & y &= 424 \end{aligned}$$

The pools had the same attendance on days 4 and 15. On Day 4, each pool had 204 people. On Day 15, each pool had 424 people.

Problem 2 Using Elimination

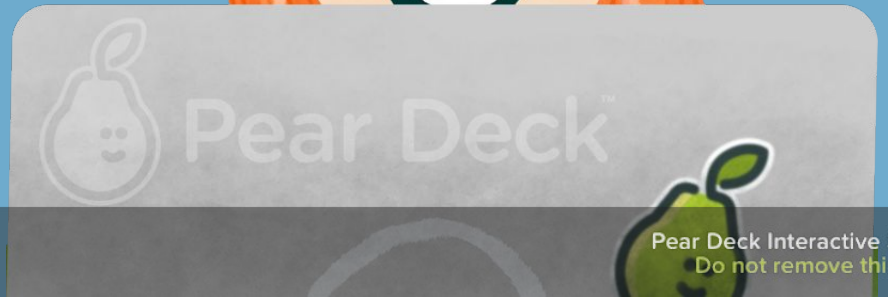
Recreation Since opening day, attendance at Pool A has increased steadily, while attendance at Pool B first rose and then fell. Equations modeling the daily attendance y at each pool are shown below, where x is the number of days since opening day. On what day(s) was the attendance the same at both pools? What was the attendance?

Pool A: $y = 20x + 124$
Pool B: $y = -x^2 + 39x + 64$

Got It? **2.** In Problem 2, suppose the daily attendance y at Pool A can be modeled by the equation $y = 32x + 74$. On what day(s) was the attendance the same at both pools? What was the attendance?

Solve by elimination

Students, write your response!



Solve by substitution!

Problem 3 Using Substitution

What are the solutions of the system?

$$y = x^2 - 6x + 10$$
$$y = 4 - x$$

Step 1 Write a single equation containing only one variable.

$$y = x^2 - 6x + 10$$

$4 - x = x^2 - 6x + 10$ Substitute $4 - x$ for y.

$4 - x - (4 - x) = x^2 - 6x + 10 - (4 - x)$ Subtract $4 - x$ from each side.

$0 = x^2 - 5x + 6$ Write in standard form.

Step 2 Factor and solve for x.

$0 = (x - 2)(x - 3)$ Factor.

$x - 2 = 0$ or $x - 3 = 0$ Zero-Product Property

$x = 2$ or $x = 3$ Solve for x.

Step 3 Find corresponding y-values. Use either original equation.

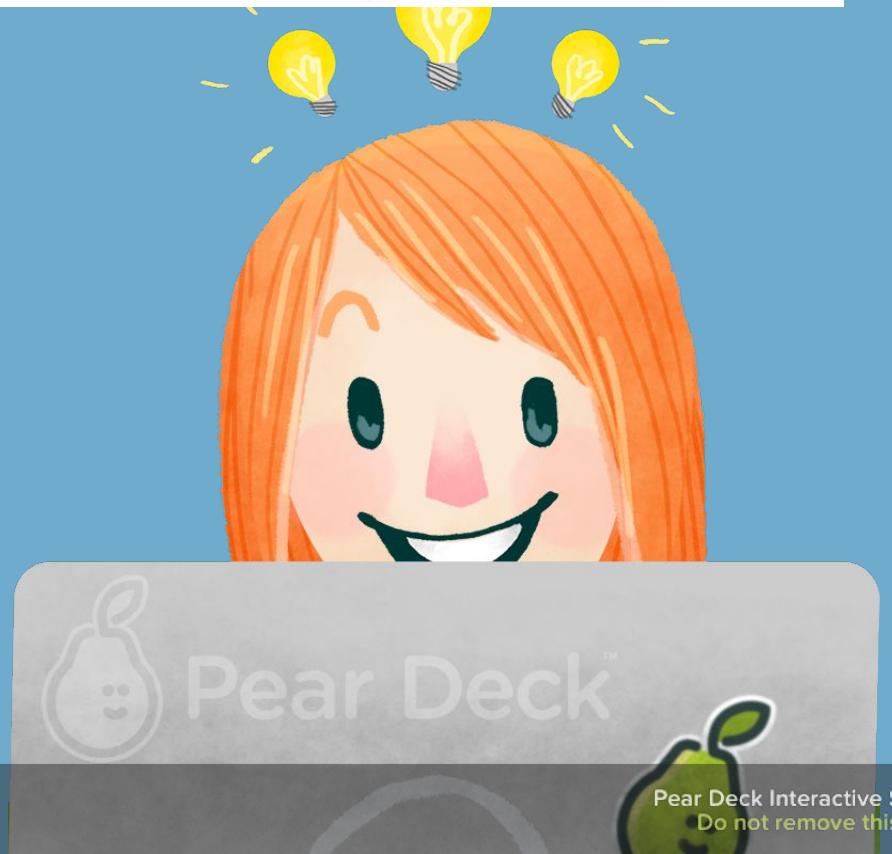
$y = 4 - x = 4 - 2 = 2$ $y = 4 - x = 4 - 3 = 1$

The solutions of the system are $(2, 2)$ and $(3, 1)$.

Got It? 3. What are the solutions of the system?

$$y - 30 = 12x$$
$$y = x^2 + 11x - 12$$

Solve by substitution



Students, write your response!

Got It? 4. a. What are the solutions of the system? Use a graphing calculator.

$$y = x^2 - 2$$
$$y = -x$$

b. **Reasoning** How else can you solve the system in part (a)? Explain.

Lesson Check

Do you know HOW?

1. Use a graph to solve the system $y = x^2 + x - 2$ and $y = x + 2$.
2. Use elimination to solve the system $y = x^2 - 13x + 52$ and $y = -14x + 94$.
3. Use substitution to solve the system $y = x^2 - 6x + 9$ and $y + x = 5$.
4. Use a graphing calculator to solve the system $y = -x^2 + 4x + 1$ and $y = 2x + 2$.

Do you UNDERSTAND?

5. Use two different methods to solve the system $y = x$ and $y = 2x^2 + 10x + 9$. Which method do you prefer? Explain.
6. **Open-Ended** Write a system of linear and quadratic equations with the given number of solutions.
   a. two **b.** exactly one **c.** none
7. **Compare and Contrast** How are solving systems of linear equations and solving systems of linear and quadratic equations alike? How are they different?

Independent Work

1) Quadratics Word Problems - MUST BE DONE WHEN YOU COME TO CLASS LATER TODAY!
2) Worksheet posted online due tomorrow- #4, 6, 10, 12, 16, 18, 22, 24, 28, 30, 31, 39
    a) If you are stuck on something, this worksheet also has some helpful notes at the top!
3) Factoring test corrections are due Thursday
4) Hidden Figures is complete by Friday
5) Quadratics Test is on Friday