Algebra 2/Trig
Unit 2 Notes Packet

Name:
Date:
Period:

Quadratic Equations

(1) Page 253 #4 – 6 **Check on graphing calculator**
(2) Page 253 – 254 #20, 26, 32**Check on graphing calculator**
(3) Page 253 – 254 #10 – 12, 21, 27, 33**Check on graphing calculator**
(4) Page 253 – 254 #22, 28, 34, **Check on graphing calculator** and # 38- 40
(5) Page 253 – 254 #23, 29, 35, **Check on graphing calculator** And #41 – 43
(6) Page 260 #4 – 15
(7) Page 261 #65 – 79 Odd
(8) Page 261 #66 – 78 Even
(9) Page 267 - 268 #51 – 67 Odd
(10) Page 267 – 268 #52 – 68 Even
(11) Page 286 #4 – 6, #10 – 12
(12) Page 286 – 287 #32 – 61 Column; #63, 65, 67
(13) Page 286 – 287 #25 – 62 Column; #64, 66, 68
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(16) Page 441 – 442 #17- 53 Column **Skipping #44**
(17) Page 441 – 442 #18 – 54 Column **Skipping #28**
(18) Chapter Review *****Test Tomorrow*****

Unit 6: Overview of Quadratics

5.1: Solving Quadratic Equations by Graphing

Key terms to know:

- Quadratic Function
- Parabola
- Vertex
- Axis of symmetry
- Zeros/Roots/x-intercepts
- Standard form
- Vertex form
- Intercept form
- Parabola

5.2 Solving Equations by Factoring

Key terms to know:

- Zero Product Property (ZPP)
- Factor
  - GCF, DOTS, Sum/Diff. of Cubes, Guess and Check, Grouping

5.3 Solving Quadratic Equations by Finding Square Roots

Key terms to know:

- Radical
  - Index, radicand, radical sign, simplify
- Square
- Square Root
- Positive and Negative Root

5.5 Solving Quadratic Equations by Completing the Square

Key terms to know:

- Perfect Square Trinomial (PST)

5.6 Solving Quadratic Equations by using the Quadratic Formula

Key terms to know:

- Quadratic Formula
- Discriminant

7.6 Solving Radical Equations

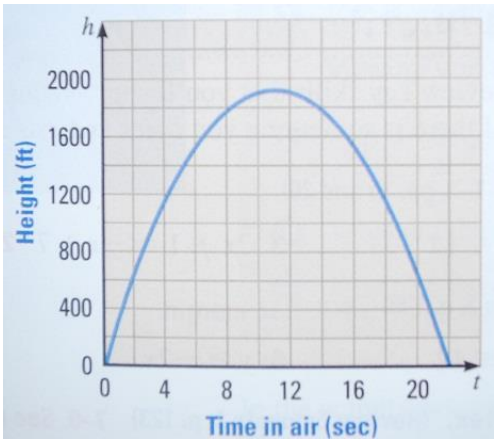
Key terms to know:

- Radical
- Rational Exponents
- Extraneous Solutions

Unit 2: Quadratic Functions Introduction

Application: Volcanoes
Volcanic eruptions can eject lava hundreds of feet into the air, creating spectacular but dangerous "lava fountains." As the lava cools and hardens, it may accumulate to form the cone shape of a volcano.

The highest recorded lava fountain occurred during a 1959 eruption at Kilauea Iki Crater in Hawaii. The graph models the height of a typical lava fragment in the fountain while the fragment is in the air.



1. Estimate the lava fragment's maximum height above the ground.
2. For how long was the lava fragment in the air?

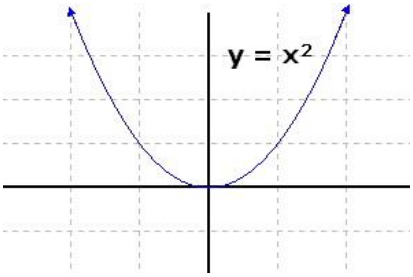
Quadratic Function
A quadratic function is a function that can be written in the form:

$$f(x) = ax^2 + bx + c$$

where a, b and c are constants and

$$a \neq 0$$

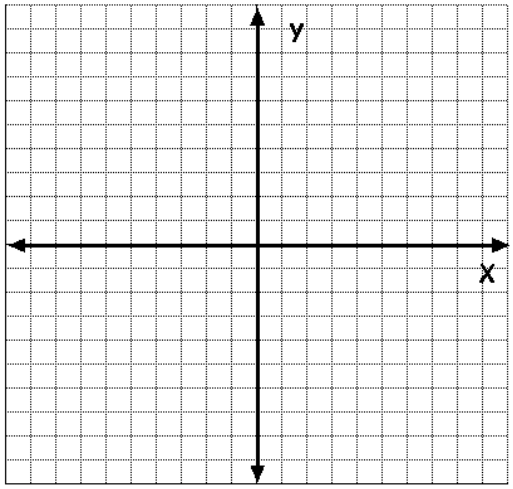
Graphs of quadratic functions are called *parabolas*.



Where have you seen this shape before? Not in math class, but in other areas of life? Discuss this and prepare at least one idea to share with the class.

E1. Standard Form with Graphing Calculator

a. Graph the function: $y = 2x^2 - 8x + 6$



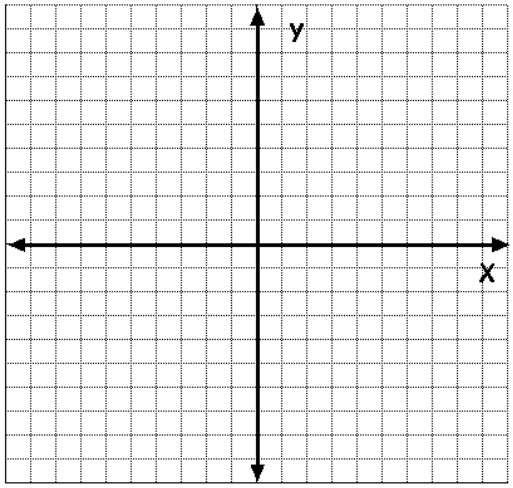
b. State the vertex

c. State the axis of symmetry

d. Find the zeros/roots/x-intercepts

E1. Standard Form without a Graphing Calculator

a. Graph the function: $y = 2x^2 - 8x + 6$



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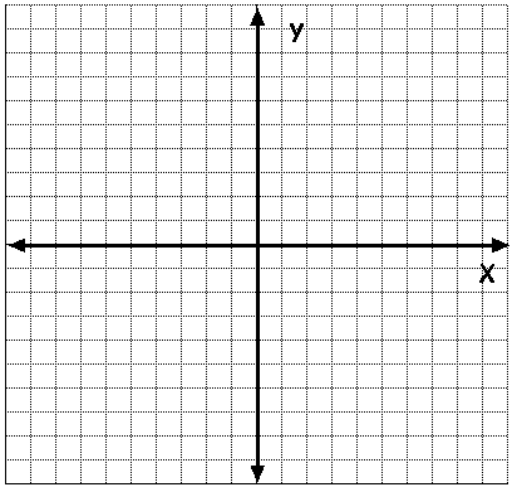

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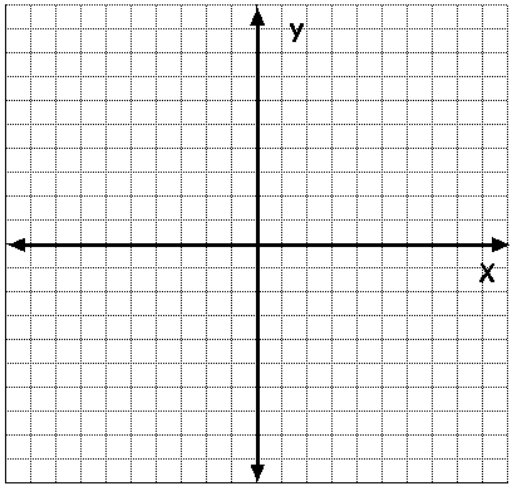

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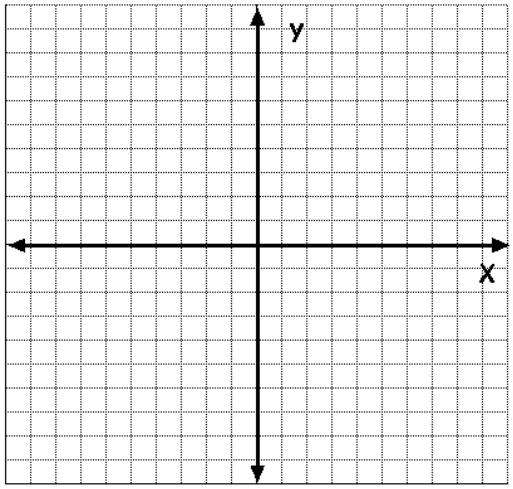
E2. Vertex Form with Graphing Calculator

a. Graph the function: $y = (x - 1)^2 + 2$



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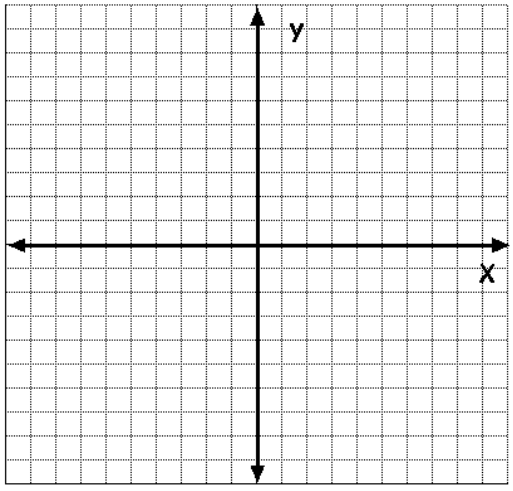

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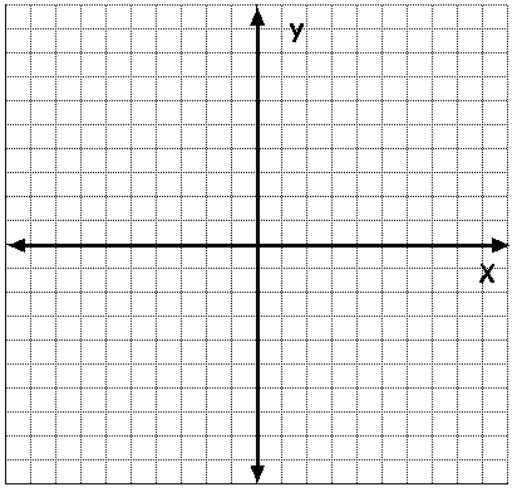
P2. Vertex Form with Graphing Calculator

a. Graph the function: $y = -\frac{1}{2}(x+1)^2 + 2$



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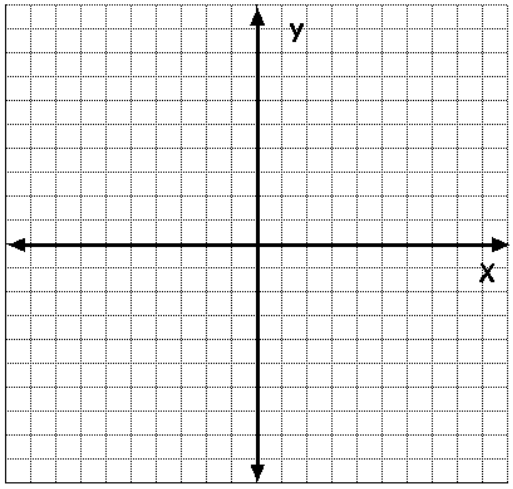

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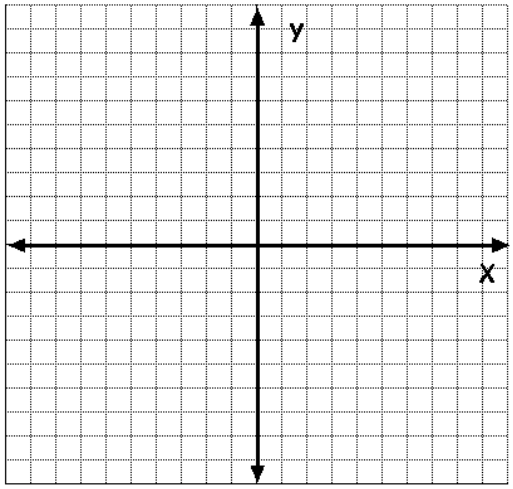
E3. Intercept Form with Graphing Calculator

a. Graph the function: y = - (x + 2)(x - 4)



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E3. Intercept Form without a Graphing Calculator

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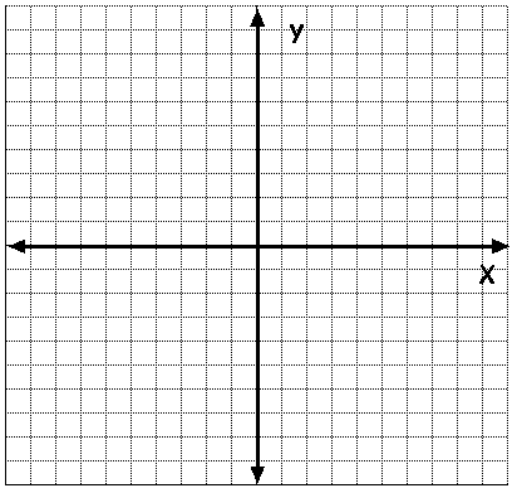

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P3. Intercept Form with Graphing Calculator

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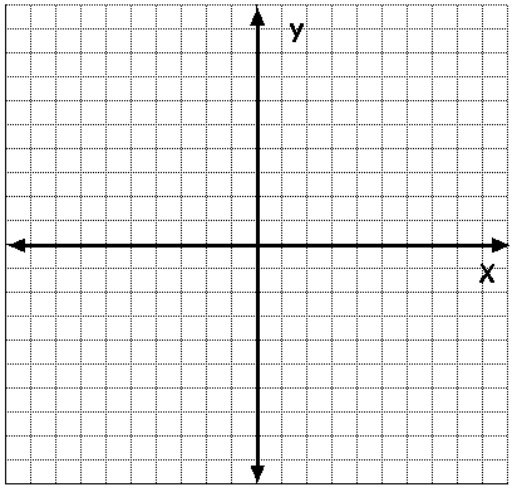

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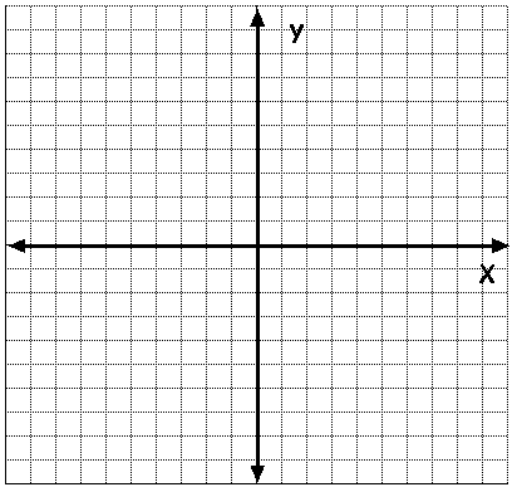

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You now have learned **3** different variations to graphing a quadratic equation.

Imagine after learning standard form you got bored and drooled on the desk while I presented vertex form and intercept form (I know…bored with math…impossible). Given an equation in vertex form, how could you use what you know to graph the function?

Write the quadratic function in standard form.

1. $y = -(x + 4)(x - 9)$

2. $y = \frac{1}{2}(x + 2)^2 - 3$

3. $y = 3(x - 1)^2 + 8$

4. $y = -3(x + 1)(x - 5)$

This method is used only if you can factor the equation.

Steps:
(1) Set the equation to zero
(2) Factor the non-zero side of the equation
(3) Apply the zero product property (ZPP)-set each factor to zero and solve
(4) Check all answers

Directions: Solve by factoring

E1. $x^2 + 3x - 10 = 0$

P1. $x^2 - 14x - 15 = 0$

E2. $5x^2 + 4x = 12$

P2. $36x^2 = 49$

E3. $16x^2 + 24x = -9$

P3. $14x^2 + 11x + 3 = 2x^2 - 3x + 3$

E4. $2x^4 - 16x^2 = -32$

P4. $3x^4 - 54x^2 = -243$

Steps:
(1) Put the equation in the form $x^2 = n \ \ or \ (x+h)^2 = n$
(2) Solve the equation by taking the square root of both sides of the equation
(3) Don't forget your positive and negative root $\pm$
(4) Check all possible solutions

Directions: Solve each equation by finding square roots

E1. $4x^2 - 6 = 42$

P1. $x^2 = 81$

E2. $2(x-3)^2 = 64$

P2. $2x^2 + 7 = 15$

E3. $x^2 = -81$

P3. $\frac{1}{2}(x+1)^2 = -5$

E4. $2x^2 + 1 = -15$

P4. $-3(x-1)^2 = 9$

This method is a combination of the factoring method and square root method

Steps:
(1) Divide by the leading coefficient (if necessary)
(2) Move the constant to the right
(3) Make a Perfect Square Trinomial (PST)
  (a) Cut the coefficient of x in half and square it
  (b) Add the result of (part a) to both sides of the equation
(4) Factor the Perfect Square Trinomial (PST)
(5) Solve

E1. Find the value of c that makes $x^2 - 3x + c$ a perfect square trinomial. Then write the expression as a square of the binomial.

P1. Find the value of c that makes $x^2 + 16x + c$ a perfect square trinomial. Then write the expression as a square of the binomial.

Directions: Solve each equation by C.T.S. (completing the square)

E2. $x^2 + 6x - 8 = 0$

P2. $x^2 + 4x - 1 = 0$

E3. $x^2 - 4x + 7 = 0$

P3. $x^2 + 10x - 3 = 0$

E4. $3x^2 - 12x = -16$

P4. $5x^2 - 10x + 30 = 0$

Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Steps:
(1) Put the quadratic equation in standard form $(ax^2 + bx + c = 0)$
(2) Determine the values for a, b, and c
(3) Plug the values into the formula
(4) Simplify as much as possible

Things to know:

_____ the part that is **UNDER** the radical is called the discriminant. It can help you determine how many solutions and the type of solutions:

If _____, then the equation has ***2 real solutions.***

If _____, then the equation has ***1 real solution.***

If _____, then the equation has ***2 imaginary solutions.***

Directions: (a) Find the discriminant of the quadratic equation. (b) Give the number and types of solutions of the equation

E1. $9x^2 + 6x + 1 = 0$

P1. $9x^2 + 6x - 4 = 0$

E2. $9x^2 + 6x = -5$

P2. $5x^2 + 3x = -1$

Directions: Solve each quadratic equation using the quadratic formula.

E3. $3x^2 + 8x = 35$

P3. $x^2 - 16x = 64$

E4. $2x^2 + x = x^2 - 2x + 4$

P4. $12x - 5 = 2x^2 + 13$

Radical Equation - an equation that contains _____ or _____ exponents.

Steps:
(1) Isolate the radical or power
(2) Use inverse operations to undo the radical or rational exponent
(3) Solve and simplify
(4) Check – watch out for _____ solutions

E1. $\sqrt[4]{x} - 5 = 0$

P1. $\sqrt[6]{x} - 2 = 0$

E2. $3x^{\frac{4}{3}} = 243$

P2. $2x^{\frac{3}{2}} = 250$

E3. $\sqrt{2x + 8} - 4 = 6$

P3. $\sqrt{4x - 7} + 2 = 5$

E4. $\sqrt{4x + 28} - 3\sqrt{2x} = 0$

P4. $\sqrt{3x + 2} - 2\sqrt{x} = 0$

*E5. $x + 2 = \sqrt{2x + 28}$

*P5. $x - 3 = \sqrt{4x}$

Warm-ups

Use the provided spaces to complete any warm-up problem or activity

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