

Advanced Algebra Chapter 6 Outline

6-1

14, 16, 18, 20, 22, 24, 32, 34, 36, 38, 40, 42, 44, 45, 48, 49, 50, 64, 66, 68 (20)

6-2

14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 42, 43, 44, 46, 50, 58, 60, 63 (20)

6-3

14, 16, 18, 20, 22, 24, 26, 28, 30, 34, 36, 38, 42, 44, 51, 52, 54, 57, 58, 64 (20)

Worksheets on 6-1, 6-2, and 6-3

Quiz on 6-1, 6-2, and 6-3

6-4

Day 1: 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31 (16)

Day 2: 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 48, 49, 50, 57, 58, 61, 64, 69, 70 (20)

6-5

14, 16, 18, 20, 22, 24, 28, 29, 30, 40, 41, 42, 43, 44, 48, 49, 52, 55, 56, 57 (20)

6-6

16, 18, 20, 22, 24, 26, 28, 30, 32, 40, 42, 44, 45, 46, 48, 49, 50, 55, 56, 60 (20)

Quiz on 6-4 and 6-5

6-7

14, 16, 18, 20, 22, 26, 27, 28, 29, 30, 32, 34, 36, 38, 40, 43, 52, 59, 62, 63 (20)

Review

Page 342, 1-30

Review

Page 336-340, 1-59 odd

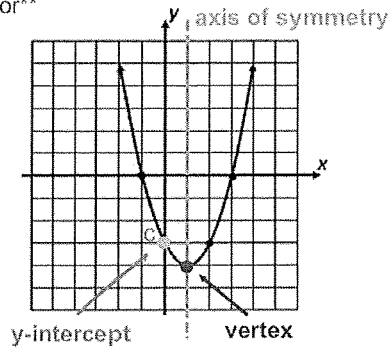
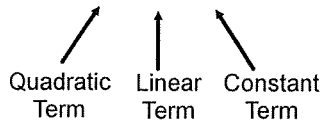
Chapter 6 Test

6-1 Graphing Quadratic Functions

Objective: Graph quadratic functions.
Find and interpret the maximum and minimum values of quadratic functions.

**** Use Graphing Calculator****

$$f(x) = ax^2 + bx + c, \text{ where } a \neq 0$$



$$\text{Axis of symmetry : } x = \frac{-b}{2a}$$

$$\text{Vertex: } x \text{ coordinate is } \frac{-b}{2a}$$

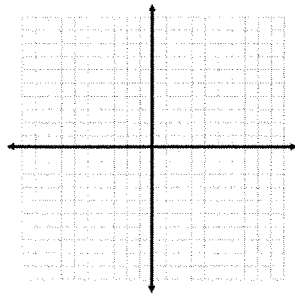
Y-intercept is when $x = 0$, so $a(0)^2 + b(0) + c$, is just c

Max: opens down and a is negative

Min: opens up and a is positive



Ex1) Graph $f(x) = x^2 + 8x + 9$ with a calculator and use formulas.



Vertex:

Line of symmetry:

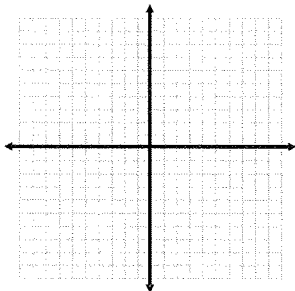
Y-intercept:

Min/Max:

Table of values:

x		y
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Ex2) Graph $f(x) = x^2 + 3x - 1$ with a calculator and use formulas.



Vertex:

Line of symmetry:

Y-intercept:

Min/Max:

Table of values:

x		y
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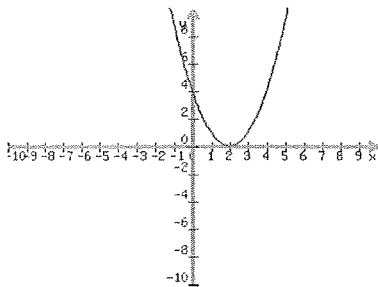
** Do #14 from the Homework

6-2 Solving Quadratic Equations by Graphing

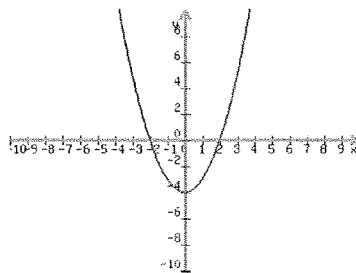
Objective: Solve quadratic equations by graphing.
Estimate solutions of quadratic equations by graphing.

**The solutions to a quadratic are called roots. We find them by finding the zeros of the function. The zeros are the x-intercepts.

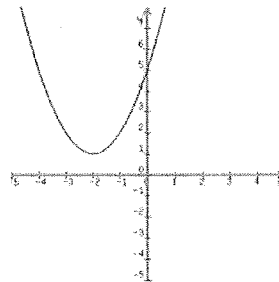
3 Possibilities



One Real
Solution



Two Real
Solutions



No Real
Solutions

EX 1. Solve $x^2 - 3x - 4 = 0$ by graphing.

EX 2. Solve $x^2 - 4x = -4$ by graphing.

EX 3. Solve $x^2 + 5 = 4x$ by graphing.

EX 4. P.296 discuss Ex 5., graphs, and do #22.

6.3 Solving Quadratic Equations by Factoring

Zero Product Property

$ab=0$ Either a or b, or both are equal to 0

$(x+5)(x+7) = 0$, then $x+5=0$ or $x + 7 = 0$

Objective:

*Solve by Factoring

*Write a quadratic with given roots

I. Solve by Factoring

EX 1. $x^2 = 6x$

EX 2. $x^2 = -4x$

EX 3. $x^2 - 16x + 64 = 0$

EX 4. $4x^2 - 7x = n$

EX 5. $x^2 - 3x - 28 = 0$

EX 6. $3x^2 + 10x - 8 = 0$

II. Write an equation given roots

EX 7. $x = -2, 7$

EX 8. $x = -6, -8$

EX 9. $x = 1/3, 5$

6.4 Completing the Square Day 1

Objective: Solve quadratic equations by using the Square Root Property and completing the square.

Square Root Property

$$x^2 = n$$

$$x = \pm\sqrt{n}$$

EX 1. $x^2 + 10x + 25 = 49$

EX 2. $x^2 + 14x + 49 = 64$

EX 3. $x^2 - 10x + 25 = 12$

EX 4. $x^2 - 6x + 9 = 32$

**II. Find the value of C that makes each trinomial a perfect square.
Then write each as a perfect square.**

EX 5. $x^2 + 16x + c$

EX 8. $x^2 - .8x + c$

EX 6. $x^2 + 12x + c$

EX 9. $x^2 + 1.2x + c$

EX 7. $x^2 - 5x + c$

6. 4 Completing the Square Day 2

I. Completing the Square (when $a = 1$ of $ax^2 + bx + c = 0$)

$$\text{EX 1. } x^2 + 8x - 20 = 0$$

$$\text{EX 2. } x^2 + 4x - 12 = 0$$

II. Completing the Square (when $a \neq 1$ of $ax^2 + bx + c = 0$)

$$\text{EX 3. } 2x^2 - 6x - 2 = 0$$

$$\text{EX 4. } 2x^2 - 5x + 3 = 0$$

III. Equation with Complex Solutions

EX 5. $x^2 + 4x + 11 = 0$

EX 6. $x^2 + 2x + 3 = 0$

6.5 The Quadratic Formula & The Discriminant

Objective: Solve quadratic equations by using the quadratic formula.
Use the discriminant to determine the number and type of solutions.

Quadratic Formula: If $ax^2 + bx + c = 0$, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

I. Solve using the Quadratic Formula

EX 1. $x^2 - 8x = 33$

EX 2. $x^2 - 34x + 289 = 0$

EX 3. $2x^2 + 4x - 5 = 0$

EX 4. $x^2 - 4x = -13$

Discriminant- Tells how many and what kind of solutions.

$$b^2 - 4ac > 0 \quad 2 \text{ real roots (rational/irrational)}$$

$$b^2 - 4ac = 0 \quad 1 \text{ real root}$$

$$b^2 - 4ac < 0 \quad \text{No real roots, 2 complex (imaginary).}$$

NOTE: if $b^2 - 4ac > 0$ and it is a perfect square: rational
and it is not a perfect square: irrational

II. How many roots and what type?

EX 5. $x^2 + 6x + 9 = 0$

EX7. $x^2 + 8x - 4 = 0$

EX 6. $x^2 + 3x + 5 = 0$

6.6 Analyzing Graphs of Quadratic Functions

Objective: Analyze quadratic functions of the form
 $y = a(x - h)^2 + k$ and write a quadratic in vertex form.

Explore: $y = x^2$ is called a parent function.

Graph and discuss:

1. $y = x^2 + 3$

1. $y = (x - 2)^2$

1. $y = 5(x - 2)^2$

2. $y = x^2 - 6$

2. $y = (x + 6)^2$

2. $y = -4(x + 6)^2$

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

Vertex Form: $y = a(x - h)^2 + k$

Horizontal translation ↙

Vertical Translation ←

$a > 0$, opens up

$a < 0$, opens down

$|a| > 1$, narrower graph of $y = x^2$

$|a| < 1$, wider graph $y = x^2$

(h, k) = vertex

$x = h$ Line of symmetry

I. Write in vertex form, then ID vertex, axis of symmetry, and direction of opening.

EX 1. $y = x^2 + 8x - 5$

EX 2. $y = x^2 + 2x + 4$

EX 3. $y = -3x^2 + 6x - 1$

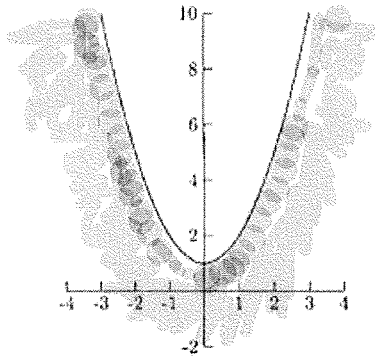
EX 4. $y = -2x^2 - 4x + 2$

II. Write an equation in vertex form given the following points

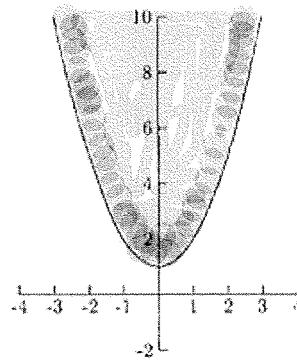
EX 5. Vertex: (1,2)
Point: (3,4)

EX 6. Vertex: (-1,4)
Point: (2,1)

More All Reals & No Solutions



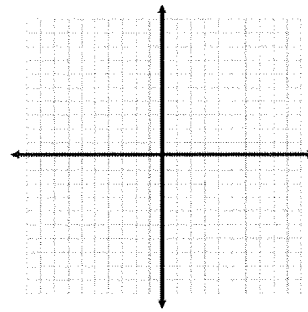
$0 \leq x^2 + 1$
All Reals



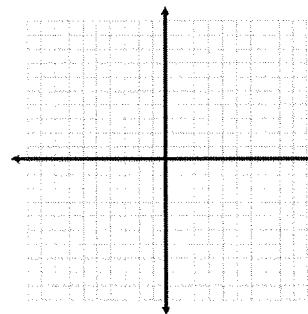
$0 \geq x^2 + 1$
No solution

I. Graph a quadratic inequality.

Ex1) $y > -x^2 - 6x - 7$

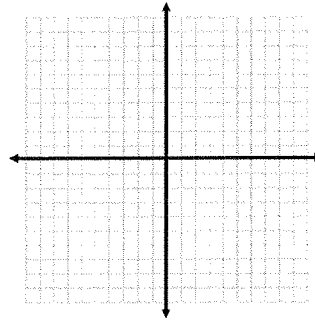


Ex2) $y > x^2 - 3x + 2$

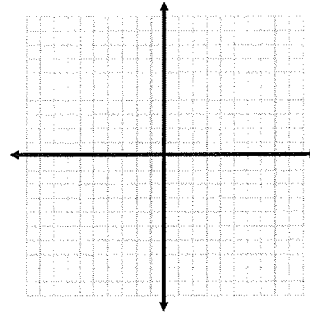


II. Solve by Graphing

Ex3) $x^2 + 2x - 3 > 0$



Ex4) $0 > 3x^2 - 7x - 1$

**III. Solve Algebraically**

Ex5) $x^2 + x > 6$

Ex6) $x^2 + x \leq 2$