LESSON
5-6

The Quadratic Formula

Know it!
Note

Lesson Objectives (p. 356):

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Vocabulary

1. Discriminant (p. 357): _____

_____

Key Concepts

2. The Quadratic Formula (p. 356):

3. Discriminant (p. 358):

The discriminant of the quadratic equation $ax^2 + bx + c = 0$ ($a \neq 0$) is $b^2 - 4ac$.

$b^2 - 4ac > 0$	$b^2 - 4ac = 0$	$b^2 - 4ac < 0$

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Note

The Quadratic Formula

Lesson Objectives (p. 356):

solve quadratic equations using the Quadratic Formula; classify roots using

the discriminant.

Vocabulary

1. Discriminant (p. 357): the part of the quadratic formula that you can use to

determine the number of roots of a quadratic equation.
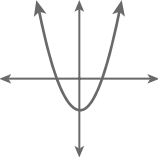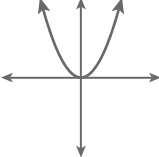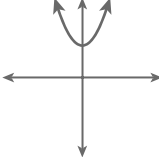
Key Concepts

2. The Quadratic Formula (p. 356):

> **If $ax^2 + bx + c = 0$ ($a \neq 0$), then the solutions, or roots, are**
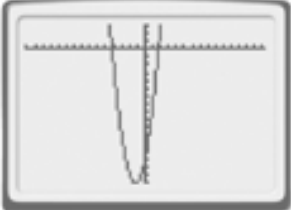> $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

3. Discriminant (p. 358):

The discriminant of the quadratic equation $ax^2 + bx + c = 0$ ($a \neq 0$) is
$b^2 - 4ac$.

$b^2 - 4ac > 0$	$b^2 - 4ac = 0$	$b^2 - 4ac < 0$
two distinct real solutions	one distinct real solution	two distinct nonreal complex solutions

4. Summary of Solving Quadratic Equations (p. 360):

METHOD	WHEN TO USE. . .	EXAMPLES
Graphing		
Factoring		
Square roots		
Completing the square		
Quadratic formula		

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4. Summary of Solving Quadratic Equations (p. 360):

METHOD	WHEN TO USE. . .	EXAMPLES
Graphing	Only approximate solutions or the number of real solutions is needed.	$2x^2 + 5x - 14 = 0$ $x \approx -4.2$ or $x \approx 1.7$
Factoring	$c = 0$ or the expression is easily factorable.	$x^2 + 4x + 3 = 0$ $(x + 3)(x + 1) = 0$ $x = -3$ or $x = -1$
Square roots	The variable side of the equation is a perfect square.	$(x - 5)^2 = 24$ $\sqrt{(x-5)^2} = \pm\sqrt{24}$ $x - 5 = \pm 2\sqrt{6}$ $x = 5 \pm 2\sqrt{6}$
Completing the square	$a = 1$ and b is an even number.	$x^2 + 6x = 10$ $x^2 + 6x + = 10 + $ $x^2 + 6x + \left(\frac{6}{2}\right)^2 = 10 + \left(\frac{6}{2}\right)^2$ $(x + 3)^2 = 19$ $x = -3 \pm \sqrt{19}$
Quadratic formula	Numbers are large or complicated, and the expression does not factor easily.	$5x^2 - 7x - 8 = 10$ $x = \dfrac{-(-7) \pm \sqrt{(-7)^2 - 4(5)(-8)}}{2(5)}$ $x = \dfrac{7 \pm \sqrt{209}}{10}$

Algebra 2

5. Get Organized Describe the possible solution methods for each value of the discriminant. (p. 360).

VALUE OF DISCRIMINANT	TYPE OF SOLUTIONS	POSSIBLE SOLUTION METHODS
Negative		
Zero		
Positive		

Algebra 2

5. Get Organized Describe the possible solution methods for each value of the discriminant. (p. 360).

VALUE OF DISCRIMINANT	TYPE OF SOLUTIONS	POSSIBLE SOLUTION METHODS
Negative	**Two distinct complex nonreal solutions**	**Quadratic Formula, completing the square, square roots**
Zero	**One distinct real solution**	**Quadratic Formula, completing the square, square roots, factoring, graphing**
Positive	**Two distinct real solutions**	**Quadratic Formula, completing the square, square roots, factoring, graphing**

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