

4.5 Day 1 Notes

Objectives: Solve Quadratic equations using the Square Root Property and Completing the Square.

Warm-up: Factor the following quadratics

1) $x^2 + 6x + 9$

2) $4x^2 - 20x + 25$

Solve $x^2 + 6x + 9 = 36$ by using the Square Root Property.

- 1) Factor the perfect Square Trinomial
- 2) Use Square Root Property
- 3) Solve the equation

Solve the following equations using the Square Root Property.

3. $x^2 - 12x + 36 = 25$

4. $x^2 - 16x + 64 = 49$

Roots that are irrational numbers can be written as exact answers in radical form.

Ex. $x^2 - 10x + 25 = 27$

5. $x^2 + 8x + 16 = 20$

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

7. $x^2 + 18x + 81 = 15$

To complete the square for any quadratic expression of the form $x^2 + bx$, follow the steps below.

Step 1: Find half of "b", the coefficient of x

Step 2: Square the result in Step 1

Step 3: Add the result of Step 2 to $x^2 + bx$

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

8) Find the value of "c" that makes $x^2 - 14x + c$ a perfect square. Then write the trinomial as a perfect square.

Completing the Square: All quadratic equations can be solved using the Square Root Property by manipulating the equation until one side is a perfect square. This method is called completing the square.

Consider $x^2 + 16x = 9$. Remember to perform each operation on each side of the equation.

$x^2 + 16x + \underline{\hspace{2cm}} = 9$ 1) What value is needed for the Perfect Square

$x^2 + 16x + \underline{\hspace{2cm}} = 9 + \underline{\hspace{2cm}}$ 2) Add the number to both sides

$x^2 + 16x + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$ 3) Simplify

$(x + \underline{\hspace{2cm}})^2 = \underline{\hspace{2cm}}$ 4) Factor the Perfect Square Trinomial

5) Use the Square Root Property

Solve each equation by completing the square.

9) $x^2 - 10x + 24 = 0$

10) $x^2 + 10x - 11 = 0$