

GUIDED NOTES – 2.5 QUADRATIC EQUATIONS

LEARNING OBJECTIVES

In this section, you will:

- Solve quadratic equations by factoring.
- Solve quadratic equations by the square root property.
- Solve quadratic equations by completing the square.
- Solve quadratic equations by using the quadratic formula.

SOLVING QUADRATIC EQUATIONS BY FACTORING

- Give an example of a quadratic equation below.

Study the box in your textbook section titled “the zero-product property and quadratic equations.”

- Solving by factoring depends on the zero-product property that states if $a \cdot b = 0$, then _____.

- Write the standard form of a quadratic equation below.

- Write out the 3 step process for factoring a quadratic equation with a leading coefficient of 1.

1.

2.

3.

Try It: Read Example 1 in the text, then answer the following.

Factor and solve the quadratic equation: $x^2 - 5x - 6 = 0$.

Try It: Read Example 2 in the text, then answer the following.

Factor and solve the quadratic equation: $x^2 - 4x - 21 = 0$.

Try It: Read Example 3 in the text, then answer the following.

Factor and solve the quadratic equation: $x^2 - 25 = 0$.

- Write out the 6 step process for factoring and solving a quadratic equation of higher order.

1.

2.

3.

4.

5.

6.

Try It: Read Example 4 in the text, then answer the following.

Solve using factoring by grouping: $12x^2 + 11x + 2 = 0$.

Try It: Read Example 5 in the text, then answer the following.

Solve by factoring: $x^3 + 11x^2 + 10x = 0$.

USING SQUARE ROOT PROPERTY

Study the box in your textbook section titled “the square root property.”

- When x^2 is isolated, the square root property states that if $x^2 = k$, then _____.
- Write out the 3 step process for using the square root property to solve a quadratic with an x^2 term but no x term.

- 1.
- 2.
- 3.

Try It: Read Examples 6 and 7 in the text, then answer the following.

Solve the quadratic equation using the square root property: $(x - 5)^2 = 12$.

COMPLETING THE SQUARE

- Not all quadratic equations can be factored or can be solved in their original form using the square root property. In these cases, we use a method called _____.
- Write out the 5 step process for solving a quadratic equation using completing the square.

* Note: To complete the square, the leading coefficient, a , must equal _____. If it does not, then divide the entire equation by _____.

- 1.
- 2.
- 3.

4.

5.

Try It: Read Example 8 in the text, then answer the following.

Solve by completing the square: $x^2 - 6x = 13$.

USING THE QUADRATIC FORMULA

- The quadratic formula is a formula that will solve _____ quadratic equations, but be careful when substituting values and use parenthesis when inserting a negative number.

Study the box in your textbook section titled “the quadratic formula.”

- Write the quadratic formula below:

- Write out the 4 step process for solving a quadratic equation using the quadratic formula.

1.

2.

3.

4.

Try It: Read Examples 9 and 10 in the text, then answer the following.

Solve the quadratic equation using the quadratic formula: $9x^2 + 3x - 2 = 0$.

THE DISCRIMINANT

- When we use the quadratic formula, it not only generates the solutions to a quadratic equation, it also tells us about the nature of the solutions. The expression under the radical, _____, is known as the discriminant. Please list the two things that the discriminant can tell us:
- Please fill out the table below.

Value of the Discriminant	Results
$b^2 - 4ac = 0$	
	Two rational solutions
	Two irrational solution
$b^2 - 4ac < 0$	

Try It: Read Examples 9, 10, and 11 in the text, then answer the following.

Use $6x^2 - x - 2 = 0$ for the following questions.

a. Use the discriminant to state the expected type of solutions.

b. Use the quadratic formula to solve the quadratic equation.