Section 1.4 Guided Notebook

Section 1.4 Quadratic Equations

- ☐ Work through Section 1.4 TTK
- ☐ Work through Objective 1
- ☐ Work through Objective 2
- ☐ Work through Objective 3
- ☐ Work through Objective 4
- ☐ Work through Objective 5

Section 1.4 Quadratic Equations

1.4 Things To Know

Make sure that you spend some time convincing yourself that you understand each of the following objectives. You may want to do at least one "You Try It" problem for each objective before starting this section.

1. Simplifying Radical Expressions Using the Product Rule
2. Simplifying Radicals with Negative Radicands
3. Factoring Trinomials with a Leading Coefficient Equal to 1
4. Factoring Trinomials with a Leading Coefficient Not Equal to 1.

What is the definition of a **quadratic equation in one variable**?

Section 1.4 Objective 1 Solving Quadratic Equations by Factoring and the Zero Product Property

Watch the video located under Objective 1 and take notes here: (Be sure that you write down and understand the **zero product property.**)

Work through Example 1. Watch the video to check your solution.
Solve $6x^2 - 17x = -12$.

Section 1.4 Objective 2 Solving Quadratic Equations Using the Square Root Property

Watch the video located just under Objective 2 and take notes on this page:

What is the square root property and when can we use it when solving quadratic equations?

Work through Example 2 in your eText (as seen in the video) and take notes here:

a) $x^2 - 16 = 0$

b) $2x^2 + 72 = 0$

c) $(x-1)^2 = 7$

Section 1.4 Objective 3 Solving Quadratic Equations by Completing the Square

Write down three perfect square trinomials and factor each as a binomial squared.

What is the relationship between the linear term (x-term) and the constant term of every perfect square trinomial?

Work through Example 3 and take notes here.
What number should be added to each binomial to make it a perfect square trinomial?
a) $x^2 - 12x$

b) $x^2 + 5x$

c) $x^2 - \frac{3}{2}x$

Write down the **5 Steps for Solving $ax^2 + bx + c = 0$, $a \neq 0$ by Completing the Square.**

1.

2.

3.

4.

5.

Work through Example 4. Be sure to use the 5 steps listed on your previous page of notes. Watch the video to check your solution.

Solve $3x^2 - 18x + 19 = 0$ by completing the square.

Work through Example 5. Be sure to use the 5 steps listed on your previous page of notes:

Solve $2x^2 - 10x - 6 = 0$ by completing the square.

Section 1.4 Objective 4 Solving Quadratic Equations Using the Quadratic Formula

You have all probably seen the quadratic formula, but where does it come from? Work through the animation that shows how to derive the quadratic formula and take notes here:

Deriving the Quadratic Formula

Start with the equation $ax^2 + bx + c = 0,\ a \neq 0$ and solve for x.

Step 1.

Step 2.

Step 3.

Step 4.

Step 5.

Write down the **Quadratic Formula:**

Work through the Example 6 video and write your notes here.
Solve $3x^2 + 2x - 2 = 0$ using the quadratic formula.

Work through the Example 7 video and write your notes here.
Solve $4x^2 - x + 6 = 0$ using the quadratic formula.

Section 1.4 Objective 5 Using the Discriminant to Determine the Type of Solutions of a Quadratic Equation

Watch the video located under Objective 5 and take notes here:

Work through Example 8 and take notes here. Watch the video to check your solutions.

Use the discriminant to determine the number and nature of the solutions to each of the following quadratic equations:

a) $3x^2 + 2x + 2 = 0$

b) $4x^2 + 1 = 4x$