

GUIDED PRACTICE

Class: Precalculus

Date assigned: July 23, 2018

Date due: July 30, 2018

Time estimate to complete this assignment: 100 - 130 minutes

Overview

Finding solutions of a quadratic equation in the form of $ax^2 + bx + c = 0$, where $a \neq 0$, a, b, c are real numbers.

Learning Objectives

Basic objectives

Upon successful completion of the activity/preparation work, the student will be able to

1. Identify whether the given equation is quadratic equation
2. **Perform** the factoring technique
3. **Perform** the technique of completing the square
4. State and be able to apply the quadratic formula

Advanced objectives

1. Determine which method is the best to solve the problem (Factoring, Completing the square, Quadratic formula)

Read: Please take notes as you are reading our Pre-Cal book section 2.3 from the OpenStex for the following topics.

- Factoring the trinomial
- Completing the square
- Quadratic formula

Watch: Please watch them without skipping any half seconds. They are very short but very clear and understandable.

1. Watching the Video (Factoring) (7:18)

<https://www.youtube.com/watch?v=SDe-1lGeS0U>

2. Watching the Video (Completing the Square) (4:36)

<https://www.youtube.com/watch?v=xGOQYTo9AKY>

3. Watching the Video (Quadratic Formula) (4:27)

<https://www.youtube.com/watch?v=JSwjmTFMDwg>

Short Quiz (Please complete the following problems on Letter Size line paper and upload it to me through Moodle by 11:59pm 7/30)

1. Which of the follow is a quadratic equation:

$$x - 2 + 3x^3 = 0$$

$$x^2 + x^{1/2} = 2$$

$$\frac{2}{3}x^2 - 3x + 1 = 0$$

$$x - y^2 - 1 = 0$$

2. Factoring the following trinomial:

$$x^2 - 3x - 4$$

$$x^2 - 6x + 5$$

$$2x^2 - 5x + 2$$

$$3x^2 + 3x - 6$$

3. Complete the square by adding the correct number

$$x^2 - 3x + \underline{\quad}$$

$$x^2 - 6x + \underline{\quad}$$

$$2x^2 - 5x + \underline{\quad}$$

$$3x^2 + 3x + \underline{\quad}$$

4. Applying the quadratic formula to check your answer with part 2.

$$x^2 - 3x - 4 = 0$$

$$x^2 - 6x + 5 = 0$$

$$2x^2 - 5x + 2 = 0$$

$$3x^2 + 3x - 6 = 0$$

Homework: MyOpenMath Sec 2.3 7-39 Odd. (Please make sure to finish them before 7/30 since some of those problems maybe my cold call question on the board!)

Lesson Plan

Lesson: Solving Quadratic Equations

Timeframe:

Pre-class activities: 1 week

In-class activities: One 90-min class

Post-class activities: 1 week

Materials needed:

- Phone with Wi-Fi
- 4 – 5 application problems involving quadratic equation (for Peer Lesson activity)
- Scientific calculator
- Chalks (if using chalk board); Markers (if using white board)

Objectives: Upon successful completion of the activity/prep work, the student will be able to

Basic objectives

1. Identify whether the given equation is quadratic equation
2. Perform the factoring technique
3. Perform the technique of completing the square
4. State and be able to apply the quadratic formula

Advanced objectives

1. Determine which method is the best to solve the problem (Factoring, Completing the square, Quadratic formula)

Background to the Lesson:

This is a Precalculus class, which is a prerequisite for Calculus. In a Precalculus class, we are trying to investigate different types of functions that will appear in the following Calculus courses. Quadratic function is one of the types commonly appears in a Calculus class. From this section, students should learn how to solve any types of quadratic equations and the meaning of the zeros

Introduction to Lesson:

Students are required to read the text book from MyOpenMath and watch the assigned videos on how to solve quadratic equations in all three methods in the individual space. The reading and videos also prepare the students for the in-class activities. The in-class activities help students learn how to solve all types of quadratic. In the post-class activity, students will be able to practice how to solve quadratic equation and how to solve the application that involves quadratic. It will prepare them for the next topic, which is graphing quadratic functions.

Procedure [Time needed, include additional steps if needed].

Pre-Class Individual Space Activities and Resources: Outline the major steps for the preparatory activities and be sure to tie the steps to the basic learning objectives you have noted above. Note resources required for learner preparation.

Steps	Purpose	Estimated Time	Learning Objective
Step 1: Read the definitions and examples on MyOpenMath	Review some basic definitions of a quadratic equation.	10 min.	Basic #1
Step 2: Watch the videos listed on the guided practice.	Introduce three techniques needed to solve a quadratic equation.	40 min.	Basic #2, 3, 4
Step 3: Short quiz on the basic objectives.	To check for understanding of the basic objective. Use to check for the preparedness.	40 min.	Basic #2 - 4
Step 5: Practice the Homework problem after the section from MyOpenMath	To prepare for the in-class activity	45 min.	Advanced #1

In-Class Group Space Activities and Resources. Outline the major steps for the in-class activities and be sure to tie the steps to the advanced learning objectives you have noted above. Also note any resources needed/developed to

provide effective active learning activities within class. (Group formed by numbering students from 1 to 8, three people per group)

Steps	Purpose	Estimated Time	Learning Objective
Step 1: #1 Kahoot (2 problems Easy Version) Factoring (Individually) #2 Kahoot (2 problems Harder Version) Factoring (In groups) #3 Kahoot (1 problem Easy Version) Completing the Square (Individually) #4 Kahoot (1 problem Harder Version) Completing the Square (In groups) #5 Kahoot (3 problems 2/1/0 Real/Complex Zeros) Quadratic Formula (Individually)	#1 Check if they completed the individual space activities #2 Check if they know the steps on how to find the zeros of a quadratic equation	45 min.	Basic #1 -4
Step 2: #1 Pick a method to solve a random problem on the board individually #2 Cold Call on a Group to give Presentation on Applying one of the three methods to Solve Quadratic Equation (A random problem created by me)	Have student attempt the problem individually and in a group. To check if they know how to rephrase their understanding to others	40 Min	Advanced #1

Post-Class Individual Space Activities and Resources. Outline the major steps for the post-class activities and be sure to tie the steps to the advanced learning objectives you have noted above. Also note any resources learners will need to complete any post-class activities assigned after the group space activities.

Steps	Purpose	Estimated Time	Learning Objective
Step 1: Complete the homework assignment associated with the advanced objectives	Apply what they learned in class. Practice to gain confidence for the upcoming quiz or exam	120 minutes	All objectives

Evaluation:***Analysis.***

The students will enjoy being able to discuss and share ideas on the problems related to the advanced objectives. Also, they can make sure if they are on the right track during the small group discussion and in the whole class discussion. The challenges that I may face is if the students are able to deal with fractions and radicals correctly. If they have a hard time to simplify radicals or add subtract fractions, they will take much longer time to solve the assigned problems.

Connections to Future Lessons.

This lesson will connect to the next topics for the class, which are graphing quadratic functions and analyzing the meaning of complex zeros regarding to the graph.