

Date: 12.12.2013

Teacher: Ceren Özbay

Number of Students: 11

Grade Level: 10

Time Frame: 40 minutes

Finding Discriminant

1. Goal(s)

- To develop the concepts of discriminant

2A. Specific Objectives (measurable)

- Student will be able to find coefficient of the equation $ax^2 + bx + c = 0$
- Students will be able to learn the formula of the discriminant.
- Students will be able to find the discriminant of the equation $ax^2 + bx + c = 0$

2B. Ministry of National Education (MoNE) Objectives

- 10.6.1. İkinci Dereceden Bir Bilinmeyenli Denklemler (MoNE Curriculum, 2013, p.25)

2C. NCTM-CCSS-IB or IGCSE Standards:

- To understand the meaning of equivalent forms of expressions, equations, inequalities, and relations (NCTM algebra standard: “represent and analyze”) (NCTM, 2002, p.296)

3. Rationale

- Students need to know about discriminant to find the roots of equation $ax^2 + bx + c = 0$
- Quadratic functions are widely used in science, business, and engineering. The U-shape of a parabola can describe the trajectories of water jets in a fountain and a bouncing ball.

4. Materials

- Teacher will distribute two worksheets to students.
- Teacher will need at least two colored-board markers.

5. Resources

- 10. Sınıf matematik konu anlatımlı esen yayınları
- LYS matematik 2 konu anlatımlı final yayınları

6. Getting Ready for the Lesson (Preparation Information)

- Before teaching, teacher will introduce herself.
- Teacher should make sure that she gets worksheets.
- Teacher will need a ball made from paper for engagement part.

7. Prior Background Knowledge (Prerequisite Skills)

- Students should know what quadratic equation means.
- Students should know how to find the range of any quadratic equations.

Lesson Procedures

Transition: My Name is Ceren. I graduated from Hacettepe University, mathematics department. Now, I am a master student at Bilkent University. Today I am going to teach you discriminant.

8A. Engage (3 minutes)

- Take the ball made from paper and try to throw into the trash.
- Ask the students whether they know about this motion or not.
- Remind students that their physics lesson wait for a couple of answers. (It is projectile motion)
- Attract students' attention by saying that from where the ball is thrown and to where the ball falls.

Transition: "now, I am writing a quadratic equation on the board, please note it"

B. Explore (13 minutes)

- Write on the board the equation $x^2 + 2x + 3 = 0$ and say $a=1$, $b=2$, $c=3$
- Then wrote another equation $2x^2 + x - 1 = 0$ and say $a=2$, $b=1$, $c=-1$
- After that ask students that what a , b , and c of the equation $1x^2 -6x + 9 = 0$ is.
- Ask them three questions:
 - What if equation was $1x^2 -6x = 0$, what would be the value of c , then?
 - What if equation was $1x^2 + 9 = 0$, what would be the value of b , then?
 - What if equation was $-6x +9 = 0$, what would be the value of a , is it still a quadratic equation?
- Ask students to make a definition of a , b and c in their own word and students write their own definitions on their notebook.
- Give them the first worksheet to students and let them explore the answers.

Transition: all of you made a good job, now, we learn about discriminant.

C. Explain (6 minutes)

- Asks for justification and clarification from students about coefficient of equation $ax^2 + bx + c = 0$
- Provide the formula of discriminant $\Delta = b^2 - 4ac$. it can be said that Δ is the capital Greek letter. They can also call it as Delta.
- Say that discriminant will help students to find the roots of quadratic equations.
- Back to the first example and write on the board “ the discriminant of the quadratic equation $x^2 + 2x + 3c = 0$, for $a=1$, $b=2$, $c=3$ and

$$\begin{aligned}\Delta &= 2^2 - 4.1.3 \\ &= 4 - 12 \\ &= -8\end{aligned}$$

Transition: let's practice. Teacher will distribute second worksheet.

D. Extend (10minutes)

- Students try to solve questions about quadratic equations on the worksheets.
- Walk around and ask “how did you get this answers?”
- Check the students whether they solve the problems or not.

Transition: ok then, did everybody finished? Check your answers with a person that sits close to you

E. Evaluate (5minutes)

- Assesses students' knowledge and skills through oral questions.
- Observe the students during the lesson and check each student's answer.

9. Closure & Relevance for Future Learning (3 minutes)

- Ask them to explain what they learn today
- Give homework from ÇAP yayınları by asking main teacher Ms. Yolgiden
- State that next class, Tuğba will teach how to find the roots of the equation $ax^2 + bx + c = 0$

11. Modifications

- If students cannot remember previous lesson, give them some clues.
- If students do not give answer to your questions, wait 20 seconds more.
- If a student cannot solve a question, want İdil or Beyza to solve the question on the board.

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Perşembe

Çalışma Kağıdı I

Verilen tabloda boşlukları doldurunuz.

Denklem ($ax^2 + bx + c = 0$)	a	b	c
$3x^2 - 4x - 1 = 0$			
$4x^2 + 2x - 3 = 0$			
$x^2 - 4x = 0$			
$x^2 + 5 = 0$			
$x^2 + \sqrt{2}x + x - 2 = 0$			
	$\frac{1}{2}$	-9	0
	1	$-\sqrt{3}$	9
	$\sqrt[3]{5}$	0	3
	7	0	0
	9	1	2
	-2	-4	8

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Perşembe

Çalışma Kağıdı I I

Verilen denklemlerin diskriminantlarını bulunuz.

1. $3x^2 - 4x - 1 = 0$

$\Delta =$

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

$\Delta =$

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

$\Delta =$

4. $x^2 + 5 = 0$

$\Delta =$

5. $x^2 + \sqrt{2}x + x - 2 = 0$

$\Delta =$

6. $9x^2 - 12x + 5 = 0$

7. $5x^2 = 0$

$\Delta =$

8. $x^2 + 2\sqrt{9}x - 3 = 0$

$\Delta =$

9. $2x^2 + x - \frac{3}{4} = 0$

$\Delta =$

10. $x^2 + \sqrt{2}\frac{3}{4}x + x - 2 = 0$

$\Delta =$

11. $x^2 - \sqrt{2} = 0$

$\Delta =$

12. $x^2 + 9x + 45 = 0$

$\Delta =$