SCED 370 FINAL PROJECT

**EDA ARSLAN 2009107096**

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**SUBMITTED TO ASSIST. PROF. FATMA ASLAN TUTAK**

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**TOPIC:**  Polynomials

**GRADE LEVEL:** 10th grade

**OBJECTIVES:**

**10.7.1.** **Polinom Kavramı ve Polinomlarla İşlemler**

10.7.1.1. Gerçek katsayılı ve bir değişkenli polinom kavramını açıklar.

10.7.1.2. Polinomlarla toplama, çıkarma, çarpma ve bölme işlemlerini yapar.

10.7.1.3. Bir p(x) polinomunun q(x) polinomuna bölümünden kalanı bulur.

10.7.1.4. Katsayıları tam sayı ve en yüksek dereceli terimin katsayısı 1 olan polinomların

tam sayı sıfırlarının, sabit terimin çarpanları arasından olacağını örneklerle gösterir.

**10.7.2.** **Polinomlarda Çarpanlara Ayırma**

10.7.2.1. Gerçek katsayılı bir polinomu çarpanlarına ayırır.

**10.7.3 Polinom ve rasyonel denklemlerin çözüm kümeleri**

***10.7.3.1. Rasyonel ifade kavramını örneklerle açıklar ve rasyonel ifadelerin sadeleştirilmesi***

***ile ilgili uygulamalar yapar.***

***10.7.3.2. Polinom ve rasyonel denklemlerle ilgili uygulamalar yapar.***

**OBJECTIVE 1:** 10.7.3.1. Rasyonel ifade kavramını örneklerle açıklar ve rasyonel ifadelerin sadeleştirilmesi ile ilgili uygulamalar yapar.

**TEACHING GUIDE:**

Students should have a prior knowledge about rational numbers and factorization in polynomials in order to acquire these two objectives. Therefore, we will start by asking short answer questions related to factorization of polynomial and we will want students to solve those questions on the board. While students answering questions, we will want others watch student on the board, write correct answer and keep it until student finishes his/her work on the board. After,determining mistakes and missing points,we will make a short review of the explanation of factorization rules to students. Then, with a simple analogy ( giving rational number examples and asking what if polynomials instead numbers ? ), we ask students to construct some rational expression examples. Additionally, we will give some rational expressions. After that, again by using rational numbers, we will ask students to simplify a rational numbers and remind them how they are making factorization of numbers and cancel them. Next, we will give some rational expression examples and ask students simplify them on board by factorizing polynomials in both denominator and nominator.Next, we will apply a little activity “ A HELP FOR A FRIEND” . ( Activity will be done by pairs that teacher has determined.) At the end of the lecture,we will make a simple quiz consisting 5 multiple choice questions in order to understand that what they have learned from today’s lesson and what are the missing points in this topic. Finally, we will give an essay question, Business Trip Sheet , as an assignment and students will solve this question by themselves.

**ASSESSMENT PLAN**:

1. Placement assesment : We will prepare 3 short answer questions which will assess students’ prerequisite knowledge. We will give it at the beginning of course.We will use short answer questions because we want students to show some basic skills for factorization not a complicated skills . And, if needed we will make a short review according to result of assessment.
2. Formative assessment : We will prepare 5 short answer questions related to simplification of rational expressions. We will use short answer questions because we want students to show some basic skills for simplification. Then, we will assess students’ progress through an essay question because we want students make some decisions based on mathematical reasoning. We will give feed backs after finishing discussion of results in essay question.
3. Summative assessment : A short quiz consisting 10 multiple choice questions will be done at the end of class and it will be evaluated for the next lecture. We use multiple choice questions because we want to measue student’s knowledge level and multiple choice questions are helpful to measure lower level of Bloom’s Taxonomy.

* We will expect from students to choose 3 polynomials with lowest degrees and they will discuss whether it should be also monic or not but there will not be exact solution, every pairs will decide with their own judgements , then all suggestions will be discussed in class. We will give an essay question “Business Trip” as homework since we want students to strengthen the subject and we want to see their whole work for the question explicitly.

**SHORT ANSWER QUESTIONS :**

For Prerequsite knowledge :

1. Given for (x + y)2 = 25 and x. y = 6 then what is (x – y)2 ?

Solution : (x – y)2 = (x + y)2 – 4xy →

= 25 – 4. 6 = 1 is founded.

2. Factorize this expression, a2b2 + x2y2+ a2x2+ b2y2  .

Solution : a2 b2+ x2y2+ a2x2+ b2y 2 =

a2(x2+ b2) + y2(x2+ b2) =

(x2+ b2) (a2+ y2) is founded.

For objective 1:

1. Factorize this expression ,(a6+27)/ (a2+3)2-9a2

Answer: a2+3

1. Let k be a natural number. If the expression, (x2-x-20) / (x2-k) can be factorized then what is/ are the value(s) that k can take?

Answer: 16 and 25

1. [(x-y)7+(y-x)7+xy] / (x+y)2 - (x-y)2 What is the simplest form of this polynomial expression?

Answer: 1/4

**Resource:**  http://www.soruhane.com/medya/www.soruhane.com-carpanlara\_Ayirma13.pdf

**ESSAY QUESTION :**

A HELP FOR A FRIEND !

While you have visited The Mathematicians Forum , you have seen a message of a 9.grade high school students, that is ;

 *Grayglasses :*  Last week I was sick so I missed one of my math. courses, and I have been given an assignment that I will choose three of the polynomials given in table and draw theirs graphs but since my computer has broken, I have to do it manually so I have to choose simplest ones. They all seems complicated to me. Could you please help me and make some suggestions ? Thanks …

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1. … | 2. … |  |  |  |
| 6. … |  |  |  |  |
|  |  |  |  | 15. |

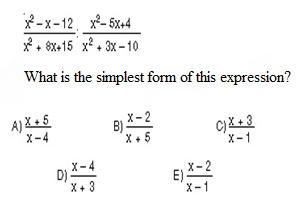
1. Think what may the simplest refer in Grayglasses‘ message ? Discuss with your pair , come up with an idea.

2. Check the table, decide how are you going to solve Grayglasses’problem ?

3. Make three choice of polynomials and explain your reasons for choosing those .Show all your work. ***( In table , we will give several examples rational expressions which will can be cancelled and, they will face more than 3 appropriate results like 2x-4 & x-2 )***

|  |  |
| --- | --- |
| **HOLISTIC RUBRIC** |  |
| **5** | True cancellation of given all polynomials & rational decision making depending on degree of polynomials. |
| **4** | All cancellations are done truely but no decision making or not a rational decison making or irrelevant decisions from polynomials |
| **3** | 5 or less missing/ wrong cancellation ( decision is not important here ) |
| **2** | More than 5 missing or wrong cancellations ( decision is not important here ) |
| **1** | No cancellation &/or decision making irrelevant from mathematical knowledge |
| **0** | No cancellation &/ or decision making without any reason |

**QUIZ :**

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Answer: E

= x2-x-2 is given. If one of the factors of Q(x) is (x-2), then whats is the constant term of P(x)?

a.-4

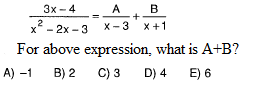
b. -2

c. 2

d.4

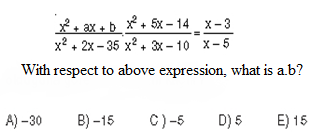
e.6 Answer: B

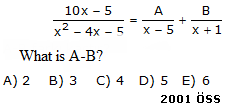
3.



Answer: C

4.

 Answer: A

5.Answer: D

**Resource:** <http://www.ossmat.com/index.php/sinavcozumleri/konulara-gore-cikmis-sorular/matematik-konulari/2650-polinom-sorulari.html>

**ASSIGNMENT ESSAY QUESTION:**

BUSINESS TRIP

You have been going to upstate for business trip. While driving, you have noticed that your phone has not worked anymore. You have decided to buy a new one and you have entered a shop on the road. You have liked most two types of cell phones but you would choose one of them, in that moment; the seller has given informations about cell phones which will help you to differentiate them, because their features are all same except their prices and battery lifes.

1.cell phone

- Price : 350 tl

- Remaining percentage of battery life which respect to usage time,t :

 When not using GPS application : P(t) = (t – 3).( -t 2 +10t +24) / (t2 –t –6 ) %

 When using GPS application : PG(t) = P(t)/ **[** (- t 2  + 13t – 12)/(-t2 +7t – 6)**]** %

2.cell phone

- Price : 300 tl

- Remaining percentage of battery life which respect to usage time, t:

 When not using GPS application : Q(t) = (t – 3).(- t3 +5t2 +15t + 72) / ( t3 – 27) %

 When using GPS application : QG = Q(t) / **[** (-2t2 + 12t + 32 )/ (-2t2 + 8t + 24 ) **]** %

If you will not use GPS (***Global Positioning System; Küresel Konumlama Sistemi***)\* , you will have to call your boss to ask your way and this will reduce your battery with 1 %.Now, decide which phone you will buy and whether you will use GPS or not, give your reasons for your decision clearly and show your all work !

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| --- | --- |
| **HOLISTIC RUBRIC** |  |
| **5** | True cancellation of given four polynomials & rational decision making depending on battery life |
| **4** | 4 cancellation done but no decision making or not a rational decison making or irrelevant decisions from battery life |
| **3** | 1 missing or wrong cancellation ( decision is not important here ) |
| **2** | 2 or 3 missing or wrong cancellations ( decision is not important here ) |
| **1** | No cancellation & decision making irrelevant from battery life |
| **0** | No cancellation & decision making without any reason |