MATHEMATICS TEACHING RESEARCH JOURNAL 21
Vol 13, no 3
FALL 2021

Analysis and comparison of commitment, homework, extra hours, preliminary grades and testing of students in Mathematics using linear regression model

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Abstract: *In this paper, a simple and multiple linear regression model has been developed to analyze and compare math test results of two student groups in the medical high school "Rezonanca", more precisely the students of the two tenth grades in the subject of mathematics of classes X- 3 and X - 7. This paper also presents some exam exercises, which were solved by students who did not show much success in the exam, students who showed average success in the exam and those who showed excellent success. This model is based on student data, including homework, their classroom commitment, extra hours, pre-grades, and finally testing. The research in this paper shows that in reality homework activity during lessons, commitment, extra lessons and pre-test have a major impact on the student's final grade. Statistical meanings of the relationship between variables are provided. Excel and SPSS were used to obtain the results.*

Keywords: Simple linear regression, multiple linear regression, homework, student commitment, extra hours, pre- grades, finally testing.

1 Introduction

Homework in Mathematics, are exercises assigned to students by their teachers, to be solved outside the classroom, respectively non-school hours. Homework is assigned for a variety of reasons such as to supplement learning activities and to practice concepts (Cooper, H., Robinson, J., Patall, E.,2006). Common homework assignments may include required reading, a written or typing project, math exercises to be completed, information to be reviewed before a knowledge testing. Some educators argue that homework is beneficial to students, as it enhances learning,

develops the skills taught in class, and lets educators verify that students comprehend their lessons (Grohnke, Kennedy, and Jake Merritt.,2016). The advantages and disadvantages of homework remain many debated issue in educational psychology. There is growing evidence that homework can be an effective addition to school learning. At the same time, it can overwhelm students, causing unpleasant emotions to both students and their parents, with negative implications for family life (Dettmers, S., Trautwein, U., Lüdtke, O., Goetz, T., Frenzel, A. C., & Pekrun, R.,2011). In his early meta-analysis, Cooper (1989a) reported the following effect sizes (p. 71): Grades 4–6: ES = .15 (Percentile gain = 6), Grades 7–9: ES = .31 (Percentile gain = 12) and Grades 10–12: ES = .64 (Percentile gain = 24) The pattern clearly indicates that homework has smaller effects at lower grade levels and bigger effect in secondary school. Knowledge testing in addition to homework, intuitively is influenced by class commitment, extra hours and preliminary grades, and this influence was evaluated in detail using the linear regression model.

The data used in the paper was taken by the first author during the teaching hours where the preliminary test activity was evaluated, additional hours, activity in class and homework. During this observation period the following topics were studied and explained: exponentials, radicals, complex numbers, and second degree equations. The data obtained from each lesson have had a positive impact on students in terms of being more active in the classroom, because in fact the activity has also influenced the final assessment. Usually in teaching it is applied to keep an evidence for each student, and we have also applied this method. So there were a total of five exercises that had to be done by the students, the commitment in the classroom was assessed in the method that the student came up with on the board to solve the exercise or solved in his notebook. Homework were given from the textbook of Mathematics for X grade, provided according to the school curriculum and as such do not present an overload for the student. Extra hours in total have been five hours where during these hours additional exercises have been developed for students who have lagged behind but also for those who had desired to expand their mathematical knowledge. While the preliminary mark is the grade they received in the pre-test. The part of additional hours in the subject of mathematics has also been mandatory for all but especially for those students who have had stagnation in terms of units and for those students who have not shown much success during the lessons.

1.1 Theoretical Framework

Simple linear regression is a statistical method that represents the process of explaining the relationship between a dependent variable denoted by y and an independent variable denoted by x or the relationship between a dependent variable and more than one variable of independently with

a mathematical equation. The simple linear regression model may be suitable for many situations, but in real life to explain many models may require two or more explanatory variables (Agresti, A.,1990). Models with more than one explanatory variable are called multiple linear regression model. Multiple linear regression is used to analyze data from random comparisons, correlations, or any experimental study. Multiple linear regression is one of the most widely used statistical methods in educational research (Allison, Paul D.,1999). Multiple linear regression is defined as a multivariate technique for determining the correlation between the variable y and some of the combinations of two or more independent variables, x. The importance of these four independent variables such as homework, classroom commitment, extra hours and pre-grades actually have a very high importance and a great impact on student assessment. In fact, the student's engagement with homework helps the student to be constantly in the course and will normally be reflected in the final test because the exercises in the test will be similar to the homework they had. According to Kohn (2006), teachers should assign homework only when they can justify that the assignments are beneficial. Kohn (2006) believes that teachers should try to involve students in deciding what homework, and how much, they should do. Homework can even give parents an opportunity to know what has been taught at school. Parents daily can see the hopeful progress or lack of progress with their child.(Costley, K. C.,2013).

Classroom commitment also has a big impact because it helps the student understand the homework in the classroom and will make it easier for them to do their homework. Also extra hours have a big impact especially for some students who may find it a little harder to accept the knowledge and learning units in mathematics, for those who catch the extra hours more easily affect the reinforcement of mathematical knowledge. The positive effects that extracurricular activities have on students are behavior, better grades, school completion, positive aspects to become successful adults, and a social aspect (Massoni, E.,2011). While pre-grades is normally a pre-test which will be similar but not the same as the final test and helps prepare students for the final test which is also crucial.

1.2 Purpose of Study

The purpose of this paper is to contribute to the knowledge about the use of simple and multiple linear regression in research in education by establishing a suitable linear regression model to analyze the relationship between the student test variable in Mathematics (where y is considered as a dependent variable) depending on homework completion, student commitment in the

classroom, extra hours and the pre-grades (where x is considered as an independent variable). The motivation of this study is to analyze the impact of homework, classroom commitment, extra hours and pre-grades on test results. Considering that many teachers do not practice this method, so continuing in the traditional teaching our motivation has been that through this analysis to present that part of these components that are mentioned in the paper are extremely important because homework in a way their constant activation in class, holding additional classes, etc., helps students to be continuously active and prepared for the test they will have at the end of the semester. Analysis for a teacher are important for getting students' reflection on our performance. Because if they reflect positively on the homework test in overtime, etc. then it shows that the method we are practicing is also acceptable by the students but if they show lower performance then this clearly shows the strategy of achieving the lesson should be changed teaching.

Research data was collected from a sample of 36 students, 18 from class X-3 and 18 from class X-7 in the medical high school "Rezonanca" in Prishtina. In order to determine the regression coefficients and analyze the data, several mathematical software applications were used.

1.2.1 Research Methods

Our work is based on making the connection and correlation between the dependent variable which in our case is testing with each of the independent variables which are homework, classroom commitment, extra hours and preliminary grades. In order to achieve the objectives of this paper, this research question was raised with its specific hypotheses:

Hypothesis H_0 in the linear multiple regression model is created in the form that all regression coefficients are equal to zero (H_0: $\beta_1 = \beta_2 = \ldots = \beta_p = 0$), which means that the independent variables have no effect on the dependent variable.

Hypothesis H_A is created in the form that at least one β_i is different from zero. Which means that independent variables have an impact on the dependent variable. And in our case the H_A hypothesis is expected to stand. To test statistically the significance of the parameters separately the T test is used and to test the model whether it is important as a whole the F test is used (Kallajxhë, SH, 2016; Rexhepi Sh, Iseni E, Kera S, 2021).

2. Simple and multiple linear regression model

Simple linear regression is applied to estimate the relationship between the dependent variable, y, and the single explanatory variable, x, by taking a set of data that includes observations of these two variables for a given population.

2.1 Simple linear regression model

Simple linear regression model is given by the equation:

$y = \beta_0 + \beta_1 x + \varepsilon$, where

β_0 presents termination on the y-axis in the population,

β_1 presents population slope, and

ε presents random error.

2.2 Multiple linear regression model

The simple linear regression model may be suitable for many situations, but in real life to explain many models may require two or more explanatory variables. Models with more than one explanatory variable are called multiple linear regression models (Cochrane, D., Orcutt, GH, 1949).

Multiple linear regression model is given by the equation:

$y = \beta_0 + \beta_1 x_1 + \cdots + \beta_i x_i + \varepsilon$, where

y presents dependent variable,

x_i presents independent variable,

β_i presents estimated parameters, and

ε presents random error.

3. Data analyzed with Excel from X-7

Let us denote the independent variables such as homework, classroom commitment, extra hours and pre-grades, by X_1, X_2, X_3 and X_4 respectively, and by Y testing the dependent variable.

The equation of the multiple linear regression model is:

$$Y = -2.18 + 2.55X_1 + 2.81X_2 + 4.81X_3 + 9.14X_4$$

Regression statistics for the multiple regression model are presented in (Table 1).
The regression equation of the simple linear model for the variable X_1 (homework) is:

$Y = 3.51 + 17.14X_1$

The regression statistics of the simple linear model for the variable X_1 is given in (Table 2).

The regression equation of the simple linear model for the variable X_2 (classroom commitment) is:

$Y = 8.89 + 15.88X_2$

The regression statistics of the simple linear model for the variable X_2 given in (Table 3).

The regression equation of the simple linear model for the variable X_3 (extra hours) is:

$Y = 6.65 + 18.55X_3$

The regression statistics of the simple linear model for the variable X_3 is given in (Table 4).

The regression equation of the simple linear model for the variable X_4 (pre- grades) is:

$Y = -10.84 + 20.61X_4$

The regression statistics of the simple linear model for the variable X_4 is given in (Table 5).

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.994252							
R Square	0.988537							
Adjusted R Square	0.98501							
Standard Error	4.030869							
Observations	18							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regression	4	18214.78	4553.694	280.2635	1.8E-12			
Residual	13	211.2227	16.2479					
Total	17	18426						
	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	-2.18635	3.513181	-0.62233	0.544488	-9.77611	5.403419	-9.77611	5.403419
X1	2.55157	2.589048	0.985524	0.342355	-3.04173	8.144868	-3.04173	8.144868
X2	2.817638	2.346709	1.200676	0.251298	-2.25212	7.887395	-2.25212	7.887395
X3	4.814649	2.493478	1.930897	0.075597	-0.57218	10.20148	-0.57218	10.20148
X4	9.144993	4.304749	2.124396	0.053392	-0.15485	18.44484	-0.15485	18.44484

Table 1. Multiple regression model

Here we analyze the data in Excel where the independent variables are: X1 (homework), X2 (classroom commitment), X3 (extra hours) and X4 (pre- grades) while the dependent variable is the final test result (Y). Then from the statistics obtained from the marked data we get that multiple R is 0.99 which means that the correlation between the final test result and the four independent variables is relatively high. Also R Square is 0.98 which means that only 0.02 is explained by variables which are not included in the model by random error which we explained above.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.966067							
R Square	0.933286							
Adjusted R Square	0.929117							
Standard Error	8.765219							
Observations	18							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regression	1	17196.74	17196.74	223.8311	7.95E-11			
Residual	16	1229.265	76.82906					
Total	17	18426						
	Coefficients	*tandard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	3.518519	3.230105	1.089289	0.292161	-3.329	10.36603	-3.329	10.36603
X1	17.1453	1.146001	14.96099	7.95E-11	14.71589	19.57471	14.71589	19.57471

Table 2. Simple linear regression model for variable X1 (Homework)

Here we analyze the data in Excel where homework is taken as an independent variable while as a dependent variable is the final test result. From the obtained statistical data, we see that multiple R is 0.96 which means that the relationship between the independent variable which is homework and depend variable is very close. Also, R square is 0.93 which means that 93% of the change of dependent variable is explained by the independent variable that are homework.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.97913							
R Square	0.958695							
Adjusted R Square	0.956113							
Standard Error	6.896945							
Observations	18							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regression	1	17664.91	17664.91	371.3624	1.7E-12			
Residual	16	761.0857	47.56786					
Total	17	18426						
	Coefficients	*tandard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	8.895238	2.315345	3.841863	0.00144	3.986926	13.80355	3.986926	13.80355
X2	15.88571	0.824343	19.27077	1.7E-12	14.13819	17.63324	14.13819	17.63324

Table 3. Simple linear regression model for variable X2 (Classroom commitment)

For the model where the independent variable is classroom commitment and the dependent variable is the final test, the statistical results are above. From the obtained statistical data, it can be observed that multiple R is 0.97 which means that the correlation between the independent variable (classroom commitment) and depend variable is relatively close. Also R square is 0.95 which means that 95% of the change of dependent variable is explained by the independent variable.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.971356							
R Square	0.943532							
Adjusted R Square	0.940003							
Standard Error	8.0641							
Observations	18							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regression	1	17385.52	17385.52	267.3474	2.08E-11			
Residual	16	1040.475	65.0297					
Total	17	18426						
	Coefficients	*tandard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	6.650165	2.817964	2.359918	0.031315	0.676348	12.62398	0.676348	12.62398
X3	18.55446	1.134776	16.35076	2.08E-11	16.14884	20.96007	16.14884	20.96007

Table 4. Simple linear regression model for variable X3 (Extra hours)

For the model where extra hours is an independent variable while as a dependent variable is the final test result, multiple R is 0.97 which means that the relationship between the independent variable which is extra hours and depend variable is very close. Also R square is 0.94 which means that 94% of the change of dependent variable is explained by the independent variable that are extra hours and only 0.06 is explained by variables which are not included in the model.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.989906							
R Square	0.979915							
Adjusted R Square	0.978659							
Standard Error	4.809458							
Observations	18							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regression	1	18055.91	18055.91	780.5974	5.25E-15			
Residual	16	370.0941	23.13088					
Total	17	18426						
	Coefficients	*tandard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	-10.8627	2.164867	-5.01774	0.000126	-15.4521	-6.27343	-15.4521	-6.27343
X4	20.61176	0.737737	27.93917	5.25E-15	19.04783	22.1757	19.04783	22.1757

Table 5. Simple linear regression model for variable X4 (Pre- grades)

For the model with pre-grades as an independent variable and final test result as a dependent variable, multiple R is 0.98 which means that the relationship between the independent variable which is pre- grades and dependent variable which is final test is relatively very close. Also R square is 0.97 which means that 97% of the change of dependent variable is explained by the independent variable that are pre- grades and only 0.03 is explained by variables which are not included in the model.

Figures of data analyses from SPSS for class X-7 for independent variables X1 (Homework), X2 (Classroom Commitment), X3 (Extra hours), X4 (Preliminary grades) and final test as a depend variables for simple and multiple linear regression are shown in Appendix, and similar results are obtained as in Excel.

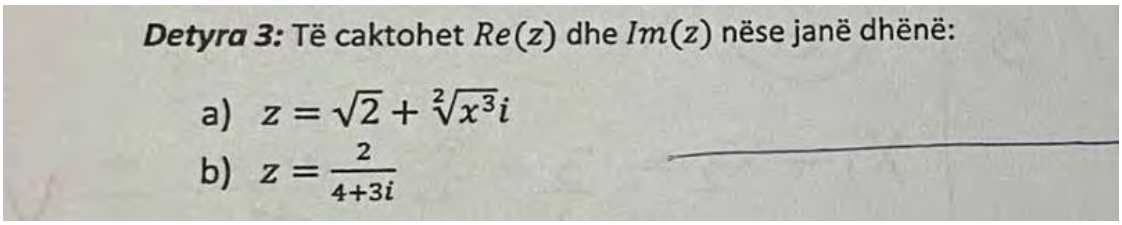
3.1 Interpretation of results for class X- 7 and discussion

Meaning of irrational numbers are essential for expanding and reconstructing the concept of number from the rational number system to the real number system (Kidron, I.,2016). Generally the exam contains exercises of irrational numbers. In general, students have problem generally with irrational numbers but also with the part of rationalization, although the maximum effort was made to explain and make it clear. Maybe the expectations of where they might make mistakes, may have been accurate because part of the rationalization only those who were active doing their homework and regularly attending extra hours did not make mistakes. While those who have not been very regular with homework but also have not shown activities during school hours have encountered difficulties in solving the exercises with rationalization and radicals. The part of rationalization and expressing the radical into an exponent has been explained in class earlier so it would not be much of a problem for students but the poor commitment of students has resulted in unsatisfactory results. From the analyses made using the two software applications we see the same result obtained from the tables. Some of the individual parameters are interpreted as follows: The multiple correlation coefficient (R) represents the level of the relationship between the dependent variable and two or more independent variables. The closer to the unit, the greater the relationship between the dependent variable and the independent ones. In our results we see that $R > 0.96$ in all cases, which means that the correlation between the variable Y and the variables X_1, X_2, X_3, X_4 is relatively strong. R^2 is a statistical measure which shows the proportion of variance for the dependent variable which is explained by the independent variables in the regression model. The value $R^2 > 0.93$ or 93% of the change in the dependent variable is explained by the variables of homework, classroom commitment, extra hours and preliminary grades. The remaining 7% is explained by variables which are not included in the model by random error. The value $R^2 > 0.93$ means that the found linear regression models are representative. We also see from the tables that the most representative is the multiple linear regression model. The statistical significance of the regression model is determined based on the values of the empirical ratio F, i.e. the corresponding value p, where in the case of the multiple model is $1.8 \cdot 10^{-12}$ with the risk level p <0.01 we can say that at least one of the regression variables has an impact on the significance of statistics in the last test in mathematics, respectively multiple linear regression is statistically significant. In the following cases, the statistical significance of regression models is of great value. The data obtained from the extraction of regression tables provide information on the statistical significance of the respective regression coefficients. The statistical significance of the regression coefficients was determined based on the T-test i.e., the corresponding values P. In our case this value is less than 0.05, so we can conclude that the alternative H_A hypothesis is

accepted which means that all variables independent have an impact on the dependent variable, therefore in conclusion the linear regression models of the four variables have an impact on the statistical significance "in the test in mathematics".

In terms of homework, the students had a total of five homework assignments, class activities were usually group work with students, i.e. they were given a mathematical problem and were asked to work in groups on the given exercises. There was a very good result working in groups with students. The other activity is the use of the program GeoGebra and Mathematica for solving exercises by students then solving exercises on the whiteboard. X classes students in high school find themselves better when working with GeoGebra, compared to lower classes (Mollakuqe V, Rexhepi S, Iseni E.,2019). All these are part of the activation of students during the lesson in mathematics. The test has been similar to homework normally done with some added requirements that distinguishes the test at least slightly from homework and classroom activities. Tests are usually based on Bloom's taxonomy. So first is recognition, understanding, implementation, analysis, evaluation and creative work. Below are some exercises solved by the students, while some of the tests are presented in the appendix. The solved exercises are from those students who have worked very well in the test, are from those who have worked moderately in the test and from those who have worked poorly.

Exercise: Find $Re(z)$ and $Im(z)$ if the following equalities are given:



Solution:

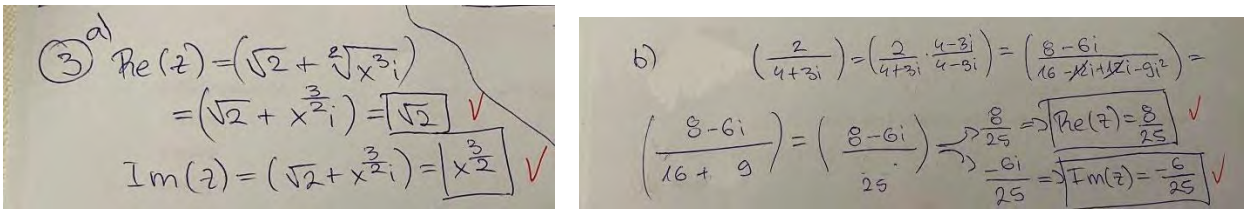


Figure 1. This exercise is solved by a student who has worked hard in the test

a)

$$\text{Re}(z) = (\sqrt{2} + \sqrt[2]{x^3 i}) = (\sqrt{2} + x^{\frac{3}{2}} i) = \sqrt{2}$$

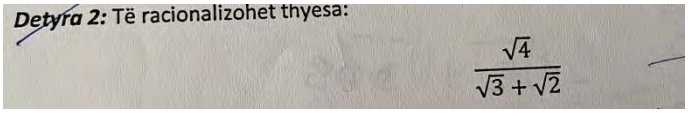
$$\text{Im}(z) = (\sqrt{2} + x^{\frac{3}{2}} i) = x^{\frac{3}{2}}$$

b)

$$\left(\frac{2}{4+3i}\right) = \left(\frac{2}{4+3i} \cdot \frac{4-3i}{4-3i}\right) = \left(\frac{8-6i}{16-12i+12i-9i^2}\right) = \left(\frac{8-6i}{16+9}\right) = \left(\frac{8-6i}{25}\right) \Rightarrow \text{Re}(z) = \frac{8}{25}, \text{Im}(z) = -\frac{6}{25}$$

The exercise taken in this test is a homework done both in class and in homework. So it is a frequent exercise and is considered an easy exercise that enters the part of understanding complex numbers. This student has done all the homework and has been active in almost all classes, as well as in extra lessons.

Exercise: Rationalize the following fraction.



Solution:

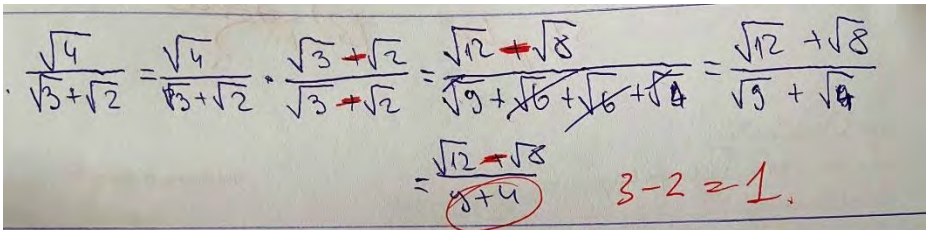


Figure 2. This exercise was done by a student who worked on average in the test.

$$\frac{\sqrt{4}}{\sqrt{3}+\sqrt{2}}=\frac{\sqrt{4}}{\sqrt{3}+\sqrt{2}}\cdot\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}-\sqrt{2}}=\frac{\sqrt{12}-\sqrt{8}}{\sqrt{9}-\sqrt{6}+\sqrt{6}-\sqrt{4}}=\frac{\sqrt{12}+\sqrt{8}}{\sqrt{9}-\sqrt{4}}=\frac{\sqrt{12}-\sqrt{8}}{3-2}=\sqrt{12}-\sqrt{8}$$

This test was performed by a student who worked on average in the test. Also his activity in the classroom has been unsatisfactory and also has not completed all homework. The exercise is done in extra hours in math and in the class so it is similar there may be a change in number or root but it is almost the same, but the student was not present in all extra hours so the exercise is not realized correctly but with some mistakes as seen to have been improved during the test control. In the class and extra lessons it was mentioned to distinguish rationalization, when the fraction has monomial denominator, the numerator and denominator of the fraction is multiplied by same denominator and in binomial denominator, the numerator and denominator of the fraction is multiplied by the conjugate of the denominator in order to use the famous formula $(a-b)(a+b)=a^2-b^2.$ These kind of exercises usually requires more to practice and solve homework, that some of students have not done.

Exercise:

a) Turn the radical into exponential.

b) Applying the properties of exponentials calculate the value of the following expression.

Solution:

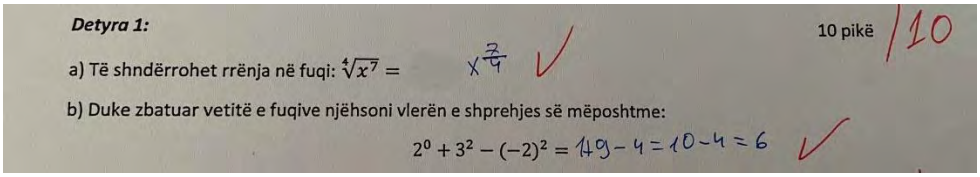


Figure 3. Exercise done by the student who did poorly in the test.

a) $\sqrt[4]{x^7}=x^{\frac{7}{4}}$

b) $2^0+3^2-(-2)^2=1+9-4=6$

This exercise is solved by the student who is not active in the class, did not do all the homework on time, and also in the extra hours did not always participate and therefore in the test showed unsatisfactory success. This exercise is one of the simple exercises which is done by the student because in fact it is an exercise which is part of the recognition because it is foreseen that this part of empowerment and rooting has passed in the IX grade, so they already had known this part, therefore also does not have many points in the test. The exercise is correctly solved by the student but they are not enough to get a good grade classified in students who have worked poorly. this exercise is done in class in homework in activities organized during the lesson and also in extra hours.

As for the test questions, for example, the first question is very simple and is an exercise worked in the classroom, maybe it can just be different numbers. The second exercise is from the given homework. While the last exercises are usually from those similar exercises that have been worked on in the classroom but with different numbers and a little more difficult and are required to be solved by the student.

4. Data analyzed with Excel from X - 3

The equation of the multiple linear regression model is:

$$Y = 21.72 + 1.83X_1 + 7.2X_2 + 9.47X_3 - 4.31X_4$$

Regression statistics for the multiple regression model are presented in (Table 6).

The regression equation of the simple linear model for the variable X_1 (homework) is:

$$Y = 17.29 + 14.59X_1$$

The regression statistics of the simple linear model for the variable X_1 is given in (Table 7).

The regression equation of the simple linear model for the variable X_2 (classroom commitment) is:

$$Y = 19.57 + 14.30X_2$$

The regression statistics of the simple linear model for the variable X_2 is given in (Table 8).

The regression equation of the simple linear model for the variable X_3 (extra hours) is:

$Y = 17.35 + 14.92X_3$

The regression statistics of the simple linear model for the variable X_3 is given in (Table 9).

The regression equation of the simple linear model for the variable X_4 (pre- grades) is:

$Y = 4.57 + 16.47X_4$

The regression statistics of the simple linear model for the variable X_4 is given in (Table 10).

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.985647							
R Square	0.9715							
Adjusted R Square	0.962731							
Standard Error	5.040359							
Observations	18							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regression	4	11258.23	2814.558	110.7866	6.62E-10			
Residual	13	330.2679	25.40522					
Total	17	11588.5						
	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	21.72244	3.969488	5.472353	0.000107	13.14688	30.29799	13.14688	30.29799
X1	1.832689	3.298012	0.555695	0.587856	-5.29223	8.95761	-5.29223	8.95761
X2	7.202128	3.54653	2.030754	0.063251	-0.45968	14.86394	-0.45968	14.86394
X3	9.479691	3.633136	2.609231	0.021624	1.630777	17.3286	1.630777	17.3286
X4	-4.31238	3.553983	-1.21339	0.246566	-11.9903	3.365533	-11.9903	3.365533

Table 6. Statistical regression for the multiple regression model.

Here are analyzed the data in Excel for class X- 3 where as independent variables are: X1 (homework), X2 (classroom commitment), X3 (extra hours) and X4 (pre- grades) while the dependent variable is the final test. Then from the statistics obtained from the marked data we get that multiple R is 0.98 which means that the correlation between final test and four these

independent variables is relatively strong. Also R Square is 0.97 which means that 97% of the change of depend variable is explained by independent variables of homework, classroom commitment, extra hours and preliminary grades and 0.03 is explained by variables which are included in the model by random error which we explained above.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.961382							
R Square	0.924254							
Adjusted R Square	0.91952							
Standard Error	7.406825							
Observations	18							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regression	1	10710.72	10710.72	195.2337	2.2E-10			
Residual	16	877.7768	54.86105					
Total	17	11588.5						
	Coefficients	*tandard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	17.29945	3.045464	5.680398	3.41E-05	10.84335	23.75554	10.84335	23.75554
X1	14.59558	1.044586	13.9726	2.2E-10	12.38116	16.81	12.38116	16.81

Table 7. Statistical regression for the simple regression model for variable X1 (Homework)

Data analyzed in Excel in which the independent variable is homework and dependent variable is the final test the statistical results are provided in Table 7 above. From the obtained statistical data it can be noticed that multiple R is 0.96 which means that the correlation between the independent variable (homework) and depend variable is relatively close. Also R square is 0.92 which means that 92% of the change of dependent variable is explained by the independent variable.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.973304							
R Square	0.947322							
Adjusted R Square	0.944029							
Standard Error	6.176894							
Observations	18							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regression	1	10978.04	10978.04	287.7295	1.19E-11			
Residual	16	610.4642	38.15402					
Total	17	11588.5						
	Coefficients	*tandard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	19.57202	2.410822	8.118402	4.58E-07	14.46131	24.68273	14.46131	24.68273
X2	14.30984	0.843612	16.96259	1.19E-11	12.52147	16.09822	12.52147	16.09822

Table 8. Statistical regression for the simple regression model for variable X2 (Classroom commitment).

Here are the data analyzed in Excel which the independent variable is classroom commitment and dependent variable is the final test. From the obtained statistical data we see that multiple R is 0.97 which means that the correlation between the independent variable (classroom commitment) and depend variable which is final test is relatively close. Also R square is 0.94 which means that 94% of the change of dependent variable is explained by the independent variable and only 6% is explained by variables which are not included in the model.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.980032							
R Square	0.960463							
Adjusted R Square	0.957991							
Standard Error	5.351285							
Observations	18							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regression	1	11130.32	11130.32	388.6794	1.19E-12			
Residual	16	458.18	28.63625					
Total	17	11588.5						
	Coefficients	*tandard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	17.35333	2.17004	7.996782	5.57E-07	12.75305	21.95361	12.75305	21.95361
X3	14.92	0.756786	19.71495	1.19E-12	13.31569	16.52431	13.31569	16.52431

Table 9. Statistical regression for the simple regression model for variable X3 (Extra hours).

Data analyzed in Excel which the independent variable is extra hours and dependent variable is the final test. From the obtained statistical data we see that multiple R is 0.98 which means that the correlation between the independent variable (extra hours) and depend variable which is final test is relatively strong. Also R square is 0.96 which means that 96% of the change of dependent variable is explained by the independent variable and only 4% is explained by variables which are not included in the model.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.94057							
R Square	0.884672							
Adjusted R Square	0.877464							
Standard Error	9.139453							
Observations	18							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regression	1	10252.03	10252.03	122.7353	6.49E-09			
Residual	16	1336.474	83.5296					
Total	17	11588.5						
	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	4.576471	4.805567	0.952327	0.355097	-5.61088	14.76382	-5.61088	14.76382
X4	16.47353	1.486969	11.07859	6.49E-09	13.3213	19.62576	13.3213	19.62576

Table 10. Statistical regression for the simple regression model for variable X4 (Pre- grades).

Here are the data analyzed in Excel which the independent variable is pre- grades and dependent variable is the final test. From the obtained statistical data we see that multiple R is 0.94 which means that the correlation between the independent variable (pre- grades) and depend variable which is final test is relatively close. Also R square is 0.88 which means that 88% of the change of dependent variable is explained by the independent variable and only 12% is explained by variables which are not included in the model.

Figures of data analyses from SPSS for class X-3 for independent variables X1 (Homework), X2 (Classroom Commitment), X3 (Extra hours), X4 (Preliminary grades) and final test as a depend variables for simple and multiple linear regression are shown in Appendix, and similar results are obtained as in Excel.

4.1 Interpretation of results for class X- 3

The test generally contains tasks of irrational numbers. In general, students have a problem with this part of irrational numbers even though they learned this part of irrational numbers and rationalization in the previous grade. However, watching and observing the students during the class, it was expected that they could make mistakes in the part of rationalization, therefore to the

students were given enough exercises to practice and almost every student is activated to solve such an exercise, then normally that the expectations have been not to make mistakes. We know that not everything depends on us teachers, our part as teachers is to give students and explain the meaning of the methods of what are irrational numbers, but also a large percentage belongs to students to engage in school and in homes to be more demanding and have the proper preparation when undergoing the final test. From the analyzes made using the two software applications we see the same result obtained from the tables. Some of the individual parameters are interpreted as follows: The multiple correlation coefficient (R) represents the level of the relationship between the dependent variable and two or more independent variables. The closer to the unit, the greater the relationship between the dependent variable and the independent ones. In our results we see that $R > 0.94$ in all cases, which means that the correlation between the variable Y and the variables X_1, X_2, X_3, X_4 is relatively strong. R^2 is a statistical measure which shows the proportion of variance for the dependent variable which is explained by the independent variables in the regression model. The value $R^2 > 0.88$ or 88% of the change in the dependent variable is explained by the variables of homework, classroom commitment, extra hours and preliminary grades. The remaining 12% is explained by variables which are not included in the model by random error. The value $R^2 > 0.88$ means that the found linear regression models are representative. We also see from the tables that the most representative is the multiple linear regression model. The statistical significance of the regression model is determined based on the values of the empirical ratio F, i.e. the corresponding value p, where in the case of the multiple model is $6.62 \cdot 10^{-10}$ with the risk level p <0.01 we can say that at least one of the regression variables has an impact on the significance of statistics in the last test in mathematics, respectively multiple linear regression is statistically significant. In the following cases, the statistical significance of regression models is of great value. The data obtained from the extraction of regression tables provide information on the statistical significance of the respective regression coefficients. The statistical significance of the regression coefficients was determined based on the T-test i.e., the corresponding values P. In our case this value is less than 0.05, so it can be concluded that the alternative H_A hypothesis is accepted which means that all variables independent have an impact on the dependent variable, therefore in conclusion the linear regression models of the four variables have an impact on the statistical significance "in the test in mathematics".

5. CONCLUSIONS AND RECOMMENDATIONS

From the above analyzes, our multiple regression model as well as simple linear regression models to predict and analyze the test in the Mathematics subject was adequate and usable. As a result, we saw that the model built above is statistically significant, because based on the analysis we did in

relation to the model we saw that what we wanted to prove was verified with the help of these statistical programs such as Excel and SPSS. So in conclusion this model is of great importance in the mathematics methodology where it shows that independent variables such as: homework, classroom commitment, extra hours and pre-grades have an impact on test results so we can predict from independent variables that what can be expected from students in the test. This built model is not exhaustive except for these independent variables that we mentioned above we can take different examples and analyze them through these statistical programs such as we can look at the methods we use when teaching in the classroom, compare which of them has the greatest impact on school learning and recommend these methods since these methods achieved to increase the success of the students and improve the quality of education in mathematics. The analyzes which have been done on the components mentioned in the paper (homework, activity, etc.) have enabled these components to be presented during the lesson and this has given a positive result and impact to students and this method has reflected in them in grading in the second semester.

We have also reached to a conclusion that critical thinking should be applied to students. All students have the ability to grow and develop critical thinking skills when learning math. For example, during this research in one of the planned hours were complex numbers. As usual at the beginning of the class has been used the brainstorming method. Students were asked the question: What do they know about complex numbers? Normally, we have received various answers that are not necessarily correct but that have given their critical opinion to the question. Critical thinking and reasoning allow students to think about how they utilize their discipline of mathematical skills. Students can develop this ability when confronted with mathematical problems, reaching possible solutions to those mathematical problems, and evaluating and justifying the results obtained, thus allowing students to become confident critical thinkers. Students have had different independent critical thinking about homework, activity, extra hours, etc. In general, there were positive thoughts, the reasons were that the students were constantly in the course of lessons, their activities in the classroom were evaluated, which means that the student was more active because it influenced them to get better grades. Some students were honest and admitted that the poor result in the test was as a result of not doing homework, absence in extra-hour lessons or their lack of interest during the activity in the classroom. While in our opinion the importance of these activities mentioned in the paper is extremely high, which was supported and by statistical methods. For each student we have to keep records every time because the assessment in the end will be more accurate and fairer and the possibility of error will be smaller.

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APPENDIX

Points on Test (100) X-7	Homeworks (5) X-7	Commitment (5) X-7	Extra Hours (5) X-7	Preliminary mark (5) X-7
Y	X1	X2	X3	X4
10	1	0	0	1
28	2	2	1	2
83	5	5	4	5
10	0	0	1	1
30	1	1	1	2
7	0	0	0	1
93	5	5	5	5
34	2	1	1	2
9	1	0	0	1
89	5	5	4	5
26	1	1	2	2
100	5	5	5	5
31	1	1	1	2
63	3	4	3	3
13	0	1	1	1
7	1	0	0	1
29	2	1	1	2
70	4	4	3	4

Points on Test (100) X-3 Y	Homeworks (5) X-3 X1	Commitment (5) X-3 X2	Extra Hours (5) X-3 X3	Preliminary mark (5) X-3 X4
30	1	1	1	2
91	5	5	5	5
29	1	0	0	1
39	3	2	2	3
71	4	3	4	4
31	1	1	1	2
50	2	2	2	3
68	3	4	3	4
42	2	2	2	3
43	2	2	2	3
34	1	1	1	1
29	1	1	1	2
37	1	1	1	2
94	5	5	5	5
28	0	0	1	1
32	1	1	1	1
91	5	5	5	5
100	5	5	5	5

SPSS data analysis for class X -7

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.966[a]	.933	.929	8.76522

a. Predictors: (Constant), X1

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17196.735	1	17196.735	223.831	<.001[b]
	Residual	1229.265	16	76.829		
	Total	18426.000	17			

a. Dependent Variable: Y

b. Predictors: (Constant), X1

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	3.519	3.230		1.089	.292
	X1	17.145	1.146	.966	14.961	<.001

a. Dependent Variable: Y

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.979[a]	.959	.956	6.89695

a. Predictors: (Constant), X2

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17664.914	1	17664.914	371.362	<.001[b]
	Residual	761.086	16	47.568		
	Total	18426.000	17			

a. Dependent Variable: Y

b. Predictors: (Constant), X2

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	8.895	2.315		3.842	.001
	X2	15.886	.824	.979	19.271	<.001

a. Dependent Variable: Y

Table 11. Simple linear regression model for variable X1, for class X - 7

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.971[a]	.944	.940	8.06410

a. Predictors: (Constant), X3

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17385.525	1	17385.525	267.347	<.001[b]
	Residual	1040.475	16	65.030		
	Total	18426.000	17			

a. Dependent Variable: Y

b. Predictors: (Constant), X3

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	6.650	2.818		2.360	.031
	X3	18.554	1.135	.971	16.351	<.001

a. Dependent Variable: Y

Table 13. Simple linear regression model variable for variable X3 for class X-7,

Table 12. Simple linear regression model for variable X2, for class X-7

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.990[a]	.980	.979	4.80946

a. Predictors: (Constant), X4

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18055.906	1	18055.906	780.597	<.001[b]
	Residual	370.094	16	23.131		
	Total	18426.000	17			

a. Dependent Variable: Y

b. Predictors: (Constant), X4

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-10.863	2.165		-5.018	<.001
	X4	20.612	.738	.990	27.939	<.001

a. Dependent Variable: Y

Table 14. Simple linear regression model for X4 for class X - 7

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.994[a]	.989	.985	4.03087

a. Predictors: (Constant), X4, X3, X2, X1

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18214.777	4	4553.694	280.264	<.001[b]
	Residual	211.223	13	16.248		
	Total	18426.000	17			

a. Dependent Variable: Y

b. Predictors: (Constant), X4, X3, X2, X1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-2.186	3.513		-.622	.544
	X1	2.552	2.589	.144	.986	.342
	X2	2.818	2.347	.174	1.201	.251
	X3	4.815	2.493	.252	1.931	.076
	X4	9.145	4.305	.439	2.124	.053

a. Dependent Variable: Y

Table 15. Multiple linear regression model for class X - 7

Data analysis with SPSS for class X- 3

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.961[a]	.924	.920	7.40682

a. Predictors: (Constant), X1

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10710.723	1	10710.723	195.234	<.001[b]
	Residual	877.777	16	54.861		
	Total	11588.500	17			

a. Dependent Variable: Y

b. Predictors: (Constant), X1

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	17.299	3.045		5.680	<.001
	X1	14.596	1.045	.961	13.973	<.001

a. Dependent Variable: Y

Table 16. Simple linear regression model variable X1, for class X - 3.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.973[a]	.947	.944	6.17689

a. Predictors: (Constant), X2

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10978.036	1	10978.036	287.729	<.001[b]
	Residual	610.464	16	38.154		
	Total	11588.500	17			

a. Dependent Variable: Y

b. Predictors: (Constant), X2

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	19.572	2.411		8.118	<.001
	X2	14.310	.844	.973	16.963	<.001

a. Dependent Variable: Y

Table 17. Simple linear regression model for variable X2, for class X - 3.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.980[a]	.960	.958	5.35128

a. Predictors: (Constant), X3

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11130.320	1	11130.320	388.679	<.001[b]
	Residual	458.180	16	28.636		
	Total	11588.500	17			

a. Dependent Variable: Y

b. Predictors: (Constant), X3

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig
1	(Constant)	17.353	2.170		7.997	<.001
	X3	14.920	.757	.980	19.715	<.001

a. Dependent Variable: Y

Table 18. Simple linear regression model for variable X3, for class X - 3

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.941[a]	.885	.877	9.13945

a. Predictors: (Constant), X4

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10252.026	1	10252.026	122.735	<.001[b]
	Residual	1336.474	16	83.530		
	Total	11588.500	17			

a. Dependent Variable: Y

b. Predictors: (Constant), X4

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4.576	4.806		.952	.355
	X4	16.474	1.487	.941	11.079	<.001

a. Dependent Variable: Y

Table 19. Simple linear regression model for variable X4, for class X - 3

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.986[a]	.972	.963	5.04036

a. Predictors: (Constant), X4, X1, X3, X2

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11258.232	4	2814.558	110.787	<.001[b]
	Residual	330.268	13	25.405		
	Total	11588.500	17			

a. Dependent Variable: Y

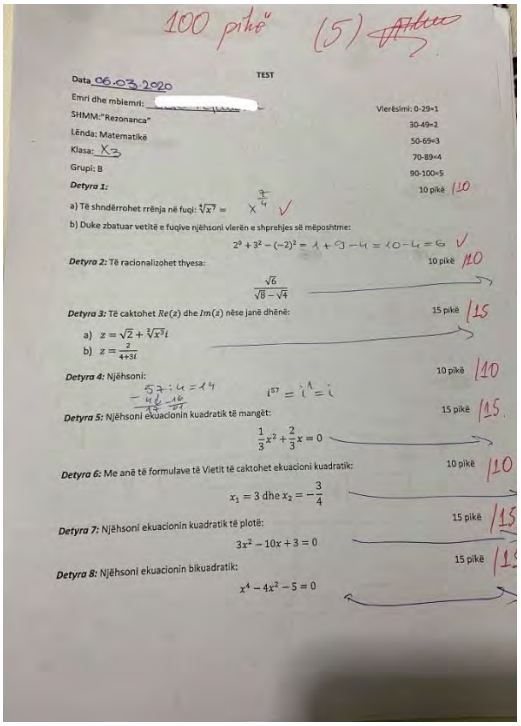
b. Predictors: (Constant), X4, X1, X3, X2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	21.722	3.969		5.472	<.001
	X1	1.833	3.298	.121	.556	.588
	X2	7.202	3.547	.490	2.031	.063
	X3	9.480	3.633	.623	2.609	.022
	X4	-4.312	3.554	-.246	-1.213	.247

a. Dependent Variable: Y

Table 20. Multiple linear regression model for class X – 3



100 pikë (5)

TEST

Data 06.03.2020
Emri dhe mbiemri: [redacted]
SHMM:"Rezonanca"
Lënda: Matematikë
Klasa: X-2
Grupi: B

Vlerësimi: 0-29=1
30-49=2
50-69=3
70-89=4
90-100=5

Detyra 1: 10 pikë /10

a) Të shndërrohet rrënja në fuqi: $\sqrt[4]{x^3} =$ $x^{\frac{3}{4}}$ ✓

b) Duke zbatuar vetitë e fuqive njëhsoni vlerën e shprehjes së mëposhtme:

$2^0 + 3^2 - (-2)^2 = 1 + 9 - 4 = 10 - 4 = 6$ ✓

Detyra 2: Të racionalizohet thyesa: 10 pikë /10

$$\frac{\sqrt{6}}{\sqrt{8}-\sqrt{4}}$$

Detyra 3: Të caktohet $Re(z)$ dhe $Im(z)$ nëse janë dhënë: 15 pikë /15

a) $z = \sqrt{2} + \sqrt[3]{x^3}i$

b) $z = \frac{2}{4+3i}$

Detyra 4: Njëhsoni: 10 pikë /10

$52 : 4 = 14$

$i^{57} = i^1 = i$

Detyra 5: Njëhsoni ekuacionin kuadratik të mangët: 15 pikë /15

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

Detyra 6: Me anë të formulave të Vietit të caktohet ekuacioni kuadratik: 10 pikë /10

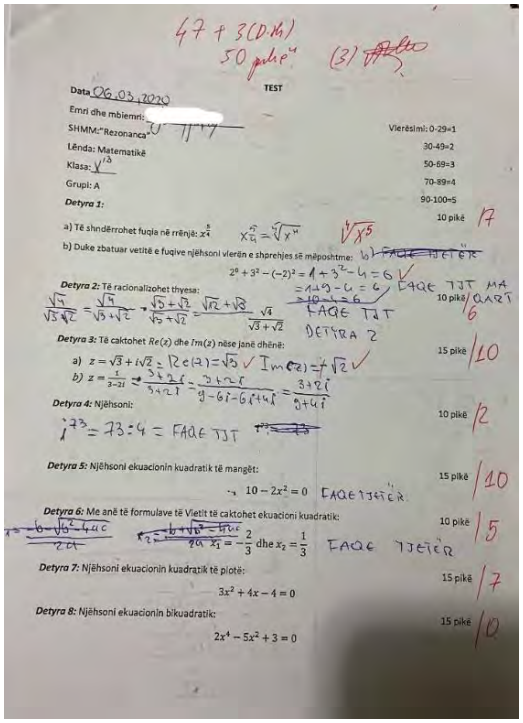
$x_1 = 3$ dhe $x_2 = -\frac{3}{4}$

Detyra 7: Njëhsoni ekuacionin kuadratik të plotë: 15 pikë /15

$3x^2 - 10x + 3 = 0$

Detyra 8: Njëhsoni ekuacionin bikuadratik: 15 pikë /15

$x^4 - 4x^2 - 5 = 0$



47 + 3(D.M.)
50 pikë (3)

TEST

Data 06.03.2020
Emri dhe mbiemri: [redacted]
SHMM:"Rezonanca"
Lënda: Matematikë
Klasa: V-5
Grupi: A

Vlerësimi: 0-29=1
30-49=2
50-69=3
70-89=4
90-100=5

Detyra 1: 10 pikë /7

a) Të shndërrohet fuqia në rrënjë: $x^{\frac{2}{4}}$ $\sqrt[4]{x^2} = \sqrt[4]{x^2}$ $\sqrt[4]{x^5}$

b) Duke zbatuar vetitë e fuqive njëhsoni vlerën e shprehjes së mëposhtme: b) FAQE TJT

$2^0 + 3^2 - (-2)^2 = 1 + 3^2 - 4 = 6$ ✓ FAQE TJT MA

Detyra 2: Të racionalizohet thyesa: 10 pikë /6 GABIM

$\frac{\sqrt{3}}{\sqrt{3}\sqrt{2}} = \frac{\sqrt{3}}{\sqrt{3}+\sqrt{2}} \cdot \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}} = \frac{\sqrt{12}+\sqrt{8}}{\sqrt{3}+\sqrt{2}} = \frac{\sqrt{4}}{\sqrt{3}+\sqrt{2}}$ FAQE TJT

DETYRA 2

Detyra 3: Të caktohet $Re(z)$ dhe $Im(z)$ nëse janë dhënë: 15 pikë /10

a) $z = \sqrt{3} + i\sqrt{2}$ $Re(z) = \sqrt{3}$ ✓ $Im(z) = i\sqrt{2}$ ✓

b) $z = \frac{1}{3-2i} \cdot \frac{3+2i}{3+2i} = \frac{3+2i}{9-6i+6i+4} = \frac{3+2i}{9+4i}$

Detyra 4: Njëhsoni: 10 pikë /2

$i^{73} = 73 : 4 =$ FAQE TJT

Detyra 5: Njëhsoni ekuacionin kuadratik të mangët: 15 pikë /10

$10 - 2x^2 = 0$ FAQE TJETËR

Detyra 6: Me anë të formulave të Vietit të caktohet ekuacioni kuadratik: 10 pikë /5

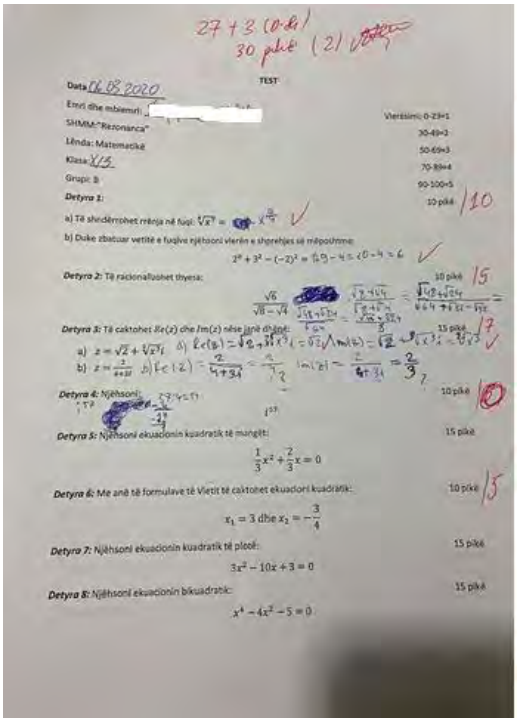
$x_{1,2} = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$ $x_1 + x_2 = -\frac{2}{3}$ dhe $x_2 = \frac{1}{3}$ FAQE TJETËR

Detyra 7: Njëhsoni ekuacionin kuadratik të plotë: 15 pikë /7

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

Detyra 8: Njëhsoni ekuacionin bikuadratik: 15 pikë /10

$2x^4 - 5x^2 + 3 = 0$



TEST

Data 06.05.2020

Emri dhe mbiemri: [redacted]

SHMM-"Rezonanca"

Lënda: Matematikë

Klasa: X/5

Grupi: B

Vlerësimi: 0-23=1
30-49=2
50-69=3
70-89=4
90-100=5

Detyra 1: 10 pikë

a) Të shndërrohet rrënja në fuqi: $\sqrt[3]{x^2} =$

b) Duke zbatuar vetitë e fuqive njëhsoni vlerën e shprehjes së mëposhtme:

$2^0 + 3^2 - (-2)^2 =$

Detyra 2: Të racionalizohet thyesa: 10 pikë

$\frac{\sqrt{6}}{\sqrt{8}-\sqrt{4}}$

Detyra 3: Të caktohet $Re(z)$ dhe $Im(z)$ nëse janë dhënë: 15 pikë

a) $z = \sqrt{2} + \sqrt{2}i$

b) $z = \frac{2}{4+3i}$

Detyra 4: Njëhsoni: 10 pikë

Detyra 5: Njëhsoni ekuacionin kuadratik të mangët: 15 pikë

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

Detyra 6: Me anë të formulave të Vietit të caktohet ekuacioni kuadratik: 10 pikë

$x_1 = 3$ dhe $x_2 = -\frac{3}{4}$

Detyra 7: Njëhsoni ekuacionin kuadratik të plotë: 15 pikë

$$3x^2 - 10x + 3 = 0$$

Detyra 8: Njëhsoni ekuacionin bikuadratik: 15 pikë

$$x^4 - 4x^2 - 5 = 0$$

Some test results from the students