

**THE RELATIONSHIP BETWEEN NUMERICAL ABILITIES, STUDENTS PERCEPTION OF MATHEMATICS, AND SOCIAL ECONOMIC PARENTS TOWARD MATHEMATICS LEARNING OUTCOMES OF STUDENTS IN CLASS X TITL OF SMK**

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**ABSTRACT**

The results of interviews in SMK Negeri 1 Pleret country found some problems that numerical ability is still lacking, assuming that mathematics is a difficult lesson or complicated. Social, economic parents are still less, such as inadequate facilities, and the result of student learning mathematics is still low. This research aims to determine the presence or absence of positive and significant the relationship between numerical ability, student's perception of mathematics, and social, economic parents to mathematics learning outcomes in students class X TITL of State Vocational High School 1 Pleret (SMK Negeri 1 Pleret) Bantul in Even Semester in Academic Year of 2017/2018. This research population was the students of X TITL of SMK Negeri 1 Pleret Bantul in 2017/2018, consisting of class X TITL A, X TITL B, X TITL C, totaling 101 students. Class X TITL B was selected as a class of research samples with a random sampling technique. The writer uses the questionnaire method to collect the data of student's perception of mathematics and social, economic parents, and test method to get data of numerical ability and the resulting learning of math. The research instrument: validity test, different power test, and reliability test. Test requirement analysis includes a test of normality, a test of linearity, and independence. The writer uses product-moment correlation analysis and multiple linear Regression analysis to analyze the data. The results showed a positive and significant relationship between numerical ability, students' perception of mathematics, and social, economic parents with mathematics learning outcomes in students class X TITL of SMK Negeri 1 Pleret Bantul in Even Semester in Academic Year of 2016/2017. It is showed by  $F_{count} > F_{table}$  is  $4,2634 > 2,934$  with  $R = 0,5918$  and  $R^2 = 0,3502$  with  $\hat{Y} = -8,76869 + 0,25932X_1 + 0,49611X_2 + 0,35293X_3$ , with  $RC X_1 = 23,4563\%$ ,  $RC X_2 = 39,9994\%$  and  $RC X_3 = 36,5443\%$ ,  $EC X_1 = 8,21515\%$ ,  $EC X_2 = 14,0091\%$  dan  $EC X_3 = 12,799\%$ .

**Keywords:** Numerical Ability, Student's Perception of Mathematics, Social Economic Parents, Mathematics Learning Outcomes.

**INTRODUCTION**

The development of increasingly advanced technology will influence other fields, one of which is education. Education is part of an effort to enable every human being to develop their potential to grow into a strong and characterful human being and a healthy social life. Education is always changing and developing progressively. The education process to educate the nation and develop its character becomes more moral, called the education system. According to Sudrajat in Arikunto, Sudarwan (2005: 17), the notion of quality education is education that can produce graduates who have abilities or competencies, both academic and vocational competencies, which are based on personal and social competencies, as well as noble moral values, which are overall is a life skill (life skill), quality education is education that can produce a complete human being (plenary human) or human with an integrated personality (integrated personality), that is those who can integrate faith, knowledge, and charity. According to Suherman, Erman et al. (2003: 57), the notion of learning mathematics is nearly high mental activity to understand structures, relationships, symbols, and then apply them in real

situations. Learning mathematics for students is also forming a mindset in understanding an understanding and reasoning, a relationship between notions.

Students' lack of ability to understand mathematical material can be seen from the low learning outcomes of mathematics achieved by students. As the author's observations on SMK Negeri 1 Pleret Bantul Regency, in general, student learning outcomes are still below expectations seen in thickness one below.

**Table 1.** Grades of Even Semester Mathematics Examination Grade X TITL State Vocational School 1 Pleret Bantul Regency Academic Year 2017/2018

Value	Kelas		
	X TITL A	X TITL B	X TITL C
Average	16,81	23,63	36,71
Highest	30	80	75
Lowest	0	10	10
Not finished yet	33	31	30
Complete	0	2	5

Based on the above sources, it appears that the results of the Middle Semester Deuteronomy Grade X TITL SMK Negeri 1 Pleret scores no student achieved above the Minimum Completeness Criteria (MCC). According to Fudyartanta Designed to measure the ability to understand numerical relationships and solve problems related to numerical concepts (numbers). Numerical ability tests measure computing ability (calculations) rather than numerical reasoning. Based on information from Suisanto M.Pd, for example, students of class X TITL (Electric Power Installation Technique) of SMK Negeri 1 Pleret chose to take notes from buying books or for ± 15,000.00. Besides economics, the lack of numerical ability regarding arithmetic operations. Parents of students assume that if they meet the school (spp and pocket money), they have fulfilled their parents' responsibilities towards their children. Parents rarely tell their children to study, except when there is a school exam. In addition to parents' role in facilitating their children, there is also attention to their children.

Several factors influence student learning success. According to Slameto, the factor was divided into two, namely internal factors and external factors. Internal factors are factors that originate from within individuals. At the same time, external factors are factors that are outside the individual self. One internal factor that has an impact on mathematics learning outcomes is students' perceptions of mathematics. According to Slameto (2010: 102), the notion of perception is a process that involves the entry of messages or information into the human brain. Human perception is continuously in touch with their environment. This relationship is done through the senses, namely the sense of sight, listener, touch, taste, and smell.

Based on interviews with students at SMK Negeri 1 Pleret, according to students of class X TITL, learning mathematics is complicated and confusing. In this study, the following problems were formulated: (1) Is there a positive and significant relationship between numerical ability, students' perceptions of mathematics, and socioeconomic parents with mathematics learning outcomes of class X TITL SMK Negeri 1 Pleret Bantul Regency even semester 2017 school year / 2018?

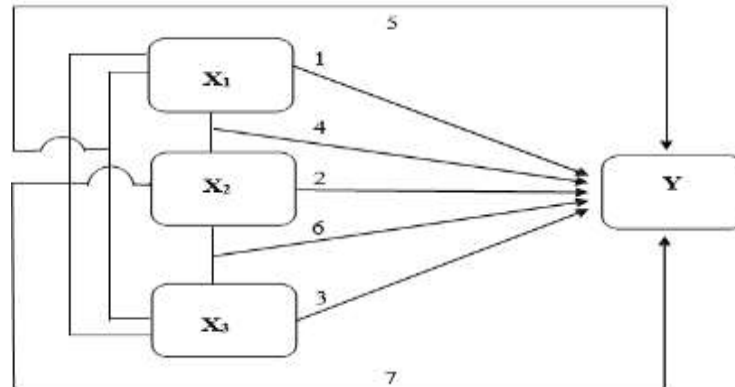
From the main problems that have been formulated above, the purpose of this study is to find out whether or not there is a positive and significant relationship between numerical abilities, students' perceptions of mathematics, and socioeconomic parents with mathematics learning outcomes of students of class X TITL of SMK Negeri 1 Pleret Regency Bantul even semester 2017/2018 school year.

## METHODS

This research was conducted in class X TITL SMK Negeri 1 Pleret Bantul Regency Academic Year 2017/2018 on 3-17 May 2018 with the test class is class X TITL A and the sample class

is X TITL B where the number of TITL A students is 33 students TITL B were 33 students and TITL C were 33 students. In this study, four variables are consisting of three independent variables, namely numerical ability ( $X_1$ ), students' perceptions of mathematics ( $X_2$ ), socioeconomic parents ( $X_3$ ), and one dependent variable, namely mathematics learning outcomes ( $Y$ ). The method used in this study is a quantitative method with the technique used is the Random Sampling of classes. According to Arikunto, Suharsimi (2010: 174), the sample represents the population under study.

Data collection techniques using a questionnaire method to obtain data on learning interest and parental attention and test methods to obtain data on mathematics learning outcomes. The research instrument tests conducted were validity tests, different power tests, and reliability tests. Analysis prerequisite tests include the normality test, linearity test, and independence test. Data analysis uses product moment analysis and multiple linear regression analysis.



**Figure I.** Model of the Relationship of Independent Variables and Bound Variables

Information:

$X_1$ : Numerical Ability

$X_2$ : Students' Perceptions of Mathematics

$X_3$ : Parent's Social Economy

$Y$ : Learning outcomes

(Sugiyono, 2012: 14)

## RESULTS AND DISCUSSION

Numerical ability scores were obtained from tests given to students totaling 25 items. The highest score of 94 and the lowest score of 50 obtained an average value of 64.16667 and a standard deviation of 11.53346. From this criterion, a numerical ability score grouping is obtained as follows:

**Table 2.** Distribution of Number of Students by Numerical Ability Score Category

Category	Score	F	%
High	$X > 75,70013$	5	15,15
Is	$52,63321 \leq X \leq 75,70013$	26	78,79
Low	$X < 52,63321$	2	6,06
Amount		33	100

From the results of the categorization in the table above, it can be seen that the majority of class X TITL B SMK Negeri 1 Pleret Bantul Regency Academic Year 2017/2018 has a numerical ability frequency level which is located at intervals of  $52.63321 \leq X \leq 75.70013$  with the medium category namely as many as 26 students or 78.79%.

Scores of students' perceptions of mathematics were obtained from a questionnaire given to students totaling 27 items, with the highest 97 and the lowest score of 67, an average value of 77.44885, and a standard deviation 8.889473 were obtained. From these criteria obtained a grouping of students' perceptions of mathematics as follows:

**Table 3.** Distribution of Number of Students by Category of Students' Perception Scores Against Mathematics

Category	Score	F	%
High	$X > 86,374323$	6	18,182
Is	$68,5953 \leq X \leq 86,3743$	18	54,545
Low	$X < 68,5953$	9	27,273
Amount		33	100

From the results of the categorization in the table above, it can be seen that the majority of class X TITL B SMK Negeri 1 Pleret Bantul Regency Academic Year 2017/2018 has a frequency level of students' perceptions of mathematics located at intervals of  $68.5953 \leq X \leq 86.3743$  with categories while as many as 18 students or 54.545%.

The parents' socioeconomic score was obtained from a questionnaire given to students totaling 20 items, with the highest score of 119 and 79, an average score of 49.92424, and a standard deviation of 10.56588. From these criteria, the parents' socioeconomic grouping is obtained as follows:

**Table 4.** Distribution of Students by Socioeconomic Parents Category

Category	Score	F	%
High	$X > 60,02515$	5	15,152
Is	$39,823 \leq X \leq 60,02515$	27	81,818
Low	$X < 39,823$	1	3,030
Amount		33	100

From the results of the categorization in the table above, it can be seen that the majority of class X TITL B SMK Negeri 1 Pleret Bantul Regency Academic Year 2017/2018 has a socioeconomic frequency level of parents located at intervals of  $39.823 \leq X \leq 60.02515$  with a moderate category namely as many as 27 students or 81.818%.

The value of mathematics learning outcomes obtained from the learning outcomes test, which amounted to 18 questions with the highest value of 94 and the lowest value of 44, obtained an average value of 62.18182 and a standard deviation 12.83033. From these criteria, the grouping of mathematics learning outcomes is obtained as follows:

**Table 5.** Distribution of Number of Students by Students' Mathematical Learning Outcomes Categories

Category	Score	F	%
High	$X \geq 75$	7	21,212
Low	$X < 75$	26	78,788
Amount		33	100

From the results of the categorization in the table above, it can be seen that the majority of class X TITL B SMK Negeri 1 Pleret Bantul Regency Academic Year 2017/2018 is included in the low category because the highest frequency lies in the interval  $X < 75$ , which is 26 students or 78.788%.

The analysis prerequisite tests are carried out to provide an overview of how the data's planned technical analysis can meet prerequisite assumptions. This study's prerequisite test analysis is the normality test, linearity test, and independence test.

A normality test is used to test the distribution of data obtained on each variable with normal distribution or not. The normality test in this study uses the chi-square formula. The decision-making criteria are the distribution of data obtained on each variable with normal distribution if  $\chi^2_{\text{count}} \leq \chi^2_{\text{table}}$  with a significant 5% level and freedom  $k-1$ . Where  $k$  is the number of interval classes. The normality test results are presented in the following table:

**Table 6.** Summary of Test Results of Study Variable Normality

No.	Variable	$\chi^2_{\text{count}}$	$\chi^2_{\text{table}}$	df	Info.
1	Numerical Ability ( $X_1$ )	6,4684	7,815	3	Normal
2	Students' Perceptions of Mathematics ( $X_2$ )	5,7872	7,815	3	Normal
3	Parent's Social Economy Ekonomi ( $X_3$ )	4,8384	7,815	3	Normal
4	Mathematics Learning Outcomes (Y)	6,1695	7,815	3	Normal

After the normality test is done, an independent test. The independent test is used to determine the presence or absence of a relationship between the independent variables, namely the numerical ability variable ( $X_1$ ), the students' perception of mathematics ( $X_2$ ), and the parents' socioeconomic variable ( $X_3$ ) using the chi-square formula. The decision making criteria are variable  $X_1$ , variable  $X_2$ , and variable  $X_3$  are independent if, at 5% and degrees of freedom  $df = (B - 1)(K - 1)$ . Where B is the number of rows, and K is the number of columns. The independent test results are presented in the following table:

**Table 7.** Summary of Independent Test Results

No.	Variable	$\chi^2_{\text{count}}$	$\chi^2_{\text{table}}$	Conclusion
1	( $X_1$ ) to ( $X_2$ )	19,7352	37,6525	Independent
2	( $X_1$ ) to ( $X_2$ )	36,1469	37,6525	Independent
3	( $X_2$ ) to ( $X_3$ )	34,2385	37,6525	Independent

The linearity test is used to determine whether the independent variable and the dependent variable have a linear relationship or not by using the linear regression formula (Test F). The criteria for decision making are the relationship between variables  $X$  and  $Y$  linear if  $F_{\text{count}} < F_{\text{table}}$  at a significant level of 5% and db numerator =  $k - 2$  and db denominator =  $n - k$ . In this study for  $X_1$  with  $Y$  db numerator = 7, the db denominator = 24, for  $X_2$  with  $Y$  the numerator = 16, the denominator = 15, for  $X_3$  with  $Y$  the numerator = 19, the denominator = 12. A summary of the linearity test results for the independent variable, and the dependent variable can be seen in the following:

**Table 8.** Summary of Linearity Test Results

No.	Variable	$F_{\text{count}}$	$F_{\text{table}}$	Info.
1	$X_1$ to Y	-0,999	2,42	Linear
2	$X_2$ to Y	-6,253	4,6	Linear
3	$X_3$ to Y	-1,002	2,56	Linear

The purpose of the discussion of the results of this study was to determine the relationship of Numerical Ability ( $X_1$ ), Students' Perceptions of Mathematics ( $X_2$ ), and Socioeconomic Parents ( $X_3$ ) with Mathematics Learning Outcomes (Y) Grade X students of SMK Negeri 1 Pleret Bantul Regency Teachings 2017/2018. In this section, further discussion of the results of the research was analyzed in correlation.

In the first hypothesis test, a simple correlation coefficient ( $r$ ) of 0.3524 was obtained. So that the coefficient of determination ( $r^2$ ) is obtained for 0.1242, which can be explained that 12.42% of learning outcomes are influenced by numerical ability. In contrast, the rest is influenced by other factors. There is a variation in mathematics learning outcomes (Y), explained by numerical ability ( $X_1$ ) through a linear line  $\hat{Y} = 38,4304 + 0,932X_1$ , with a regression direction coefficient of 0.932. This means that each increase of one unit  $X_1$  results in a 0.932 increase in Y. The first hypothesis test result is accepted that there is a positive and significant relationship between numerical ability and mathematics learning outcomes. In other words, the higher the numerical ability of students, the better the student's learning outcomes.

In the second hypothesis test, the correlation coefficient ( $r$ ) 0.40756 is obtained at a significant 5% level. So that the obtained determinant coefficient ( $r^2$ ) of 0.1661 can explain 16.61% of learning outcomes influenced by students' perceptions of mathematics. In contrast, the rest is influenced by other factors. There are variations in mathematics learning outcomes ( $Y$ ) explained by students' perceptions of mathematics subjects ( $X_2$ ) through linear lines  $\hat{Y} = 18,4086 + 0,5882 X_2$ , with a coefficient of regression direction of 0.5882. This means that every increase of one unit  $X_2$  results in 0.5882 increase in  $Y$ . The second hypothesis test result is accepted that there is a positive relationship between students' perceptions of mathematics with mathematics learning outcomes.

In the third hypothesis test, the correlation coefficient ( $r$ ) of 0.46064 is obtained so that ( $r^2$ ) of 0.2121 can explain 21.21% of learning outcomes influenced by students' socioeconomic parents. In contrast, the rest is influenced by other factors. There is a variation in mathematics learning outcomes ( $Y$ ) explained by parents' socioeconomic ( $X_3$ ) through a linear line  $\hat{Y} = 34,5005 + 0,5851 X_3$  with a coefficient of regression direction of 0.5851. This means that every increase of one unit  $X_3$  results in a 0.5851 increase in  $Y$ . The third hypothesis test results are accepted that there is a positive relationship between parents' social economy and mathematics learning outcomes. The multiple correlation analysis obtained the value of the multiple correlation coefficient ( $R$ ) of 0.4741. This study also obtained a coefficient of determination ( $R^2$ ) of 0.225, meaning that 22.5% of learning outcomes are influenced by numerical abilities and students' perceptions of mathematics while the rest ar.

In contrast, it is influenced by other factors. There are variations in mathematics learning outcomes ( $Y$ ), which can be explained by numerical ability ( $X_1$ ) and students' perceptions of mathematics ( $X_2$ ) through linear lines  $\hat{Y} = 6,5989 + 0,298 X_1 + 0,4924 X_2$ . This means an increase in one unit ( $X_1$ ) resulted in a 0.298 increase in  $Y$ , and an increase in one unit ( $X_2$ ) resulted in 0.4924 increase in  $Y$ . The relative contribution of  $X_1$  by 40.44% and  $X_2$  by 59.559% and the effective contribution of  $X_1$  by 9.91% and  $X_2$  by 13.389%.

The fourth hypothesis test result is that there is a positive and significant relationship between numerical ability and students' perceptions of mathematics subjects with mathematics learning outcomes. The multiple correlation analysis obtained the value of the multiple correlation coefficient ( $R$ ) of 0.8154. This study also obtained a coefficient of determination ( $R^2$ ) of 0.6645, meaning 66.57% of learning outcomes influenced the numerical and socioeconomic abilities of parents of students. In contrast, the rest is influenced by other factors. There are variations in mathematics learning outcomes ( $Y$ ), which can be explained by numerical ability ( $X_1$ ) and learning discipline ( $X_3$ ) through linear lines  $\hat{Y} = -32,9638 + 0,2537 X_1 + 1,6118 X_3$ . This means an increase in one unit ( $X_1$ ) resulted in a 0.2537 increase in  $Y$ , and an increase in one unit ( $X_3$ ) resulted in a 1,6118 increase in  $Y$ . The relative contributions  $X_1$  amounted to 12,087%, and  $X_3$  amounted to 87,912%, and effective contributions of  $X_1$  amounted to 8,036%, and  $X_3$  was 58.450%.

The fifth hypothesis test results show a positive and significant relationship between the numerical and socioeconomic abilities of parents of students with mathematics learning outcomes. The multiple correlation analysis obtained the value of the multiple correlation coefficient ( $R$ ) of 0.5003. This study also obtained a coefficient of determination ( $R^2$ ) of 0.2503, meaning that 25.03% of learning outcomes are influenced by students' attitudes toward mathematics and socioeconomic subjects of student's parents. In contrast, the rest is influenced by other factors. There are variations in mathematics learning outcomes ( $Y$ ), which can be explained by students' perceptions of mathematics ( $X_2$ ) and socioeconomic parents of students ( $X_3$ ) through linear lines  $\hat{Y} = 16,6513 + 0,4363 X_2 + 0,2387 X_3$ . This means an increase in one unit ( $X_2$ ) resulted in a 0.4363 increase in  $Y$ , and an increase in one unit ( $X_3$ ) resulted in a 0.2387 increase in  $Y$ . While for relative contributions  $X_2$  amounted to 37,319% and  $X_3$  amounted to 62,681% and effective contribution  $X_2$  amounted to 9,3419% and  $X_3$  amounted to 15,691%.

The sixth hypothesis test results show a positive and significant relationship between student's perceptions of mathematics and socioeconomic subjects of students' parents with mathematics learning

outcomes. The multiple correlation analysis obtained the value of the multiple correlation coefficient (R) of 0.5918. This study also obtained a coefficient of determination ( $R^2$ ) of 0.3502, meaning 35.02% of learning outcomes are influenced by numerical ability, students' perceptions of mathematics, and socioeconomic subjects of parents of students while the rest by other factors. Variations in mathematics learning outcomes (Y) can be explained by numerical ability ( $X_1$ ), students' perceptions of mathematics ( $X_2$ ), and socioeconomic parents of students ( $X_3$ ) through linear lines  $\hat{Y} = -8,76869 + 0,25932X_1 + 0,49611X_2 + 0,35293X_3$ . This means an increase in one unit ( $X_1$ ) results in a 0.25932 increase in Y, an increase in one unit ( $X_2$ ) results in a 0.25932 increase in Y. An increase in one unit ( $X_3$ ) results in a 0.35293 increase in Y. The relative contribution of  $X_1$  by 23, 4563%,  $X_2$  of 39.9994%, and  $X_3$  of 36.5443% and effective contribution of  $X_1$  of 8.21515%,  $X_2$  of 14.0091%, and  $X_3$  of 12.799%.

The seventh hypothesis test results show a positive and significant relationship between numerical ability, students' perceptions of mathematics, and students' socioeconomic parents with mathematics learning outcomes. With a value ( $R^2$ ) of 0.3502, it can be concluded that 35.02% of mathematics learning outcomes are influenced jointly by numerical abilities, students' perceptions of mathematics, and socioeconomic parents of students. In comparison, 64.98% of the rest is influenced by other factors not examined in this study.

## CONCLUSION

Based on the results of research and discussion as described in Chapter IV, it can be concluded that there is a positive and significant relationship between numerical ability, students' perceptions of mathematics, and socioeconomic parents with mathematics learning outcomes of students of class X TITL of SMK Negeri 1 Pleret Bantul Regency Academic Year 2017/2018. This is indicated by the F-test that is  $F_{count} > F_{table}$  or  $5.0086 > 3.3158$ . The multiple correlation coefficient (R) between numerical ability, students' perceptions of mathematics, and socioeconomic parents with mathematics learning outcomes of 0.5003 and ( $R^2$ ) of 0.2503 with a double linear regression equation  $\hat{Y} = -8,76869 + 0,25932X_1 + 0,49611X_2 + 0,35293X_3$ . The relative contribution of  $X_1$  is 23.4563%,  $X_2$  is 39.9994% and  $X_3$  is 36.5443% and the effective contribution  $X_1$  is 8.21515%,  $X_2$  is 14.0091% and  $X_3$  is 12.799%.

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