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STKIP PGRI JOMBANG

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Saya yang bertanda tangan di bawah ini

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Menerangkan bahwa artikel ilmiah dengan judul

Analysis on The Ability of Elementary School Student Who Had High Mathematics Ability In Making The Equation of Fractions

Karya :

- (1) Syarifatul Maf'ulah;
- (2) Dwi Juniati;
- (3) Tatag Yuli Eko Siswono

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Results	Query	Domains (original links)
Unique	Pd 3 1 STKIP PGRI Jombang, syarifatul	-
Unique	This kind of research was qualitative by a student subject	-
Unique	Data collection was conducted by giving a test to the subject, continued by interviews	-
Unique	The result test indicated that subject able to make the eleven equations correctly	-
Unique	The following steps were (1) subject changed the initial equation element position	-
Unique	On the other hand, student mathematics ability has the role in solving mathematical problem	-
Unique	It means that reversibility affects the student ability to solve the problem	-
Unique	Whereas problem solving is the learning mathematics focused	-
Unique	Reversibility is the person thinking ability to build up the reversible sides	-
Unique	The beginning side is the first equation test given	-
Unique	Then, subject asked to make many equations as equivalent as the beginning one	-
Unique	So the equation student made means the researched goal	-
Unique	The defined equation related to fractions and arithmetic operations	-
Unique	If student do not understand the basic, student will difficulty in studying further	-

Unique	It means reversibility begins on elementary school student	-
Unique	Based on the descriptions, researcher interested analyzing the elementary student ability in making fractions	-
Unique	Therefore, this is a descriptive qualitative research	-
Unique	Furthermore, the result data analyzed based on the framework established in theoretical study	-
Unique	While supporting instrument are as follows:	-
Unique	Test used to obtain the data about subject's ability delineation in making equation	-
Unique	Interview guideline in this study is semi-structured or opened	-
Unique	Implementation Stage The research implementation stage selectes the subject	-
Unique	Analysis Stage The research analysis stage analyzes the data and report writing	-
Unique	Analysis conducted after finishing the interview	-
Unique	Then data analysis conducted by following step: (1) data reduction	-
Unique	Test result A test was given by the researcher such as the following: Fig	-
Unique	While subject way in making the beginning equivalent equation was obtained from interview	-
Unique	Subject made P2 by moving a side	-
Unique	Thus, obtained $\square + 14 = 45$ as P2	-
Unique	P3 The beginning equation was $45 - \square = 1$	-
Unique	P6 The beginning equation was $45 - \square = 1$	-
Unique	Then it changed both of elements known by P2 into anan another equivalent fraction	-
Unique	P7 The beginning equation was $45 - \square = 1$	-
Unique	P9 The beginning equation was $45 - \square = 1$	-
Unique	Subject made P10 by moving the a side	-
Unique	At this category divided by two, they were as follows	-
Unique	Subject made a new equation by moving the a element	-
Unique	Then, changed the known sides on P2 to an another equivalent equation	-

Unique	These category divided by two parts, they are as follows	-
Unique	The subject way in making the beginning equivalent equation as follows	-
Unique	Subject only moved the beginning equation of element side	-
Unique	Subject changed the known position on beginning equation to an another equivalent fractions	-
Unique	Subject moved the sides of beginning equation, then added the sides by fractions	-
3 results	The Psychology of Mathematical Abilities in Schoolchildren	amazon.com hindawi.com educationengland.org.uk
Unique	Chicago: The University of Chicago Press National Council of Teachers of Mathematics (NCTM)	-
25 results	Principles and standards for school mathematics	nctm.org en.wikipedia.org amazon.com educationworld.com amazon.com math.arizona.edu en.wikipedia.org ascd.org jstor.org emints.org
Unique	Psikologi Pendidikan: Teori dan Praktik	-
Unique	Kiat Pendidikan Matematika di Indonesia: Konstataasi Keadaan Masa	-
Unique	ANALYSIS ON THE ABILITY OF ELEMENTARY SCHOOL STUDENT WHO HAD HIGH MATHEMATICS ABILITY IN MAKING	-
Unique	this study was to analyze the ability of fifth grade elementary school student who had	-
Unique	The next stage was data analysis, include reduce the data, presentate the data, conclusion	-
Unique	Subject was given a test containing an equation $45 - \square = 1$	-
Unique	Then, subject was asked to make an another equation as equivalent as initial one	-
Unique	(2) subject refered on $45 - 14 = \square$, then changed both	-
Unique	(3) subject changed the operan known at initial equation to the another equivalent fraction	-
Unique	(4) subject refered on $\square + 14 = 45$, then changed	-
Unique	(5) subject changed the element position from initial equation, then added both elements with	-
Unique	Keywords: analysis, ability to make equation, fraction The research is inspired by Piaget's theory	-
Unique	Reversibility means the person mental ability to change the mind purpose to the original	-
Unique	While (Krutetskii, 1976: 287) explains that reversibility is the person thinking to build up	-
Unique	Furthermore, Krutetskii identifies one of the categorized mathematics ability related to success in solving	-

Unique	This is constructed by NCTM (2000: 52) that expands problem solving is the integral	-
Unique	It is relevant with Soedjadi (1992: 33) states mathematics should be directed to develop	-
Unique	It means that reversibility has two reversible ways, they are beginning side to the	-
Unique	However, research focussed is how the student thinking ability from the beginning side to	-
Unique	Fractons is on of the pre-requisites for understanding the subsequent and the intertwined materials	-
Unique	Research subject is the fifth grade of elementary school student by considering the fractions	-
Unique	In addition, Piaget states the ability of buiding the two-way relation develop in concrete	-
Unique	result of research is used as basic by the teacher to teach fractions and arithmetic	-
Unique	In expectation is the ability the other student can be same or equal with	-
Unique	RESEARCH METHOD Research Design This study purposed analyzing the elementary school student ability in	-
Unique	Researcher gave a test to the subject, then researcher conducted interview to the sujet	-
Unique	Research Subject Research subject was the fifth grade of elemetary school student who is	-
Unique	High mathematic information was obtained by mathematic test and consultation with the teacher Research	-
Unique	A test contains an equation then subject was asked to make as many as	-
Unique	Subject was interviewed based on the work result Research Procedure Research procedure consists of	-
Unique	Preparation Stage The research preparation stage examines theory in making equation's ability refers to	-
Unique	Furthermore, researcher give a test to the subject, then followed by interviewed based on	-
Unique	Data Analysis Technique Result data was analyzed with references to (i) the equation subject	-
Unique	FINDING AND DISCUSSION Before research was conducted, researcher choose the subject previously, it is	-
Unique	Furthermore, researcher conduted the research and analyzed the result data Data Analysis Finding and	-
Unique	as possible P9 P10 P11 Based on the test result, known the subject has made	-
Unique	1 4 =□ as P1 P2 The beginning equation was 4 5 -□ =	-
Unique	sign "=", so 4 5 = 1 4 +□ = □ + 1 4	-
Unique	Subject made P3 in reference to P1, it was 4 5 - 1	-

Unique	Then subject changed both of known elements on $4\ 5 - 1\ 4 = \square$	-
Unique	$8\ 10 - 2\ 8 = \square$ as P3 P4 The beginning equation was 4	-
Unique	Subject made P4 by changing the side known on beginning equation to an another	-
Unique	It changed 4 5 as 8 10 obtained $8\ 10 - \square = 1$	-
Unique	Subject made P5 in reference on P1, it was $4\ 5 - 1$	-
Unique	Then subject changed one of the element known by $4\ 5 - 1$	-
Unique	It changed 1 4 into 2 8 obtained $4\ 5 - 2\ 8 = \square$	-
Unique	Subject made P6 in reference on P2, it was $\square + 1\ 4$	-
Unique	It changed 4 5 into 8 10 and changed 1 4 into 3 12	-
Unique	Subject made P7 by moving the a and 4 5 side, obtained 0	-
Unique	Then added the sides of $0 = 1\ 4 + \square - 4\ 5$ with	-
Unique	but subject wrote $1\ 4 + \square - 4\ 5 + 1\ 4, =$	-
Unique	Subject made by moving the 1 4 side, obtained $4\ 5 - \square -$	-
Unique	Then added the sides of $4\ 5 - \square - 1\ 4 = 0$ with	-
Unique	$4 = 4\ 5 - \square$ by reasoning there was an equal sign "=", so	-
Unique	, obtained $1\ 4 + 4\ 5 = 4\ 5 - \square + 4\ 5$ as	-
Unique	Subject made P10 by moving the a side, obtained $4\ 5 = \square +$	-
Unique	obtained $4\ 5 + \square = \square + \square + 1\ 4$ as P10 P11 The beginning equation	-
Unique	$1\ 4 + \square = 4\ 5$ form as P11 Based on the table 2 above.	-
Unique	Subject made a new equation by the changing the side on beginning equation without	-
Unique	Moving the 1 4 and elements side The test beginning equation given was 4	-
Unique	Subject made a new equation by moving the 1 4 of right side and	-
Unique	The subject equation made included P1 category was $4\ 5 - 1\ 4 = \square$	-
Unique	Moving the aelement side A test beginning equation given was $4\ 5 - \square$	-

Unique	The subject equation made included P2 category was $1\ 4 + \square = 4$	-
Unique	But P11, subject also used the commutative to arithmetic, it was $1\ 4 + \square$	-
Unique	Subject made a new equation in reference on P1, it was $4\ 5 -$	-
Unique	Then, subject changed the known sides of $4\ 5 - 1\ 4 = \square$ to	-
Unique	The subject equation made included P3 category was $8\ 10 - 2\ 8$	-
Unique	Subject made a new equation by changing the known side on beginning equation to	-
Unique	The subject equation made included P4 category was $8\ 10 - \square = 1$	-
Unique	Subject made a new equation in reference on P2, it was $\square +$	-
Unique	The subject equation made included P6 category $\square + 3\ 12 = 8\ 10$	-
Unique	Subject made a new equation by moving the side of beginning equation, then added	-
Unique	included category of equation was P8 $4\ 5 - \square - 1\ 4 + \square = \square$ and	-
Unique	category of equation was P7 $1\ 4 + \square - 4\ 5 + 1\ 4$	-
Unique	Subject made a new equation by moving one of these then added the sides	-
Unique	The included category of equation was $1\ 4 + 4\ 5 = 4$	-
Unique	CONCLUSION Based on the result analysis obtained the conclusion about subject ability in making	-
Unique	It was a subject making the eleven equivalent equations $4\ 5 - \square =$	-
Unique	Subject referenced at $4\ 5 - 1\ 4 = \square$, then changed the known	-
Unique	Subject referenced at $\square + 1\ 4 = 4\ 5$, then changed the known	-
Unique	Subject moved one of the beginning equation sides then added those equation sides by	-

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ANALYSIS ON THE ABILITY OF ELEMENTARY SCHOOL STUDENT WHO HAD HIGH MATHEMATICS ABILITY IN MAKING THE EQUATION OF FRACTIONS Syarifatul Maf'ulah, M.Pd 1, Prof. Dr. Dwi Juniati 2, Dr. Tatag Yuli Eko Siswono, M.Pd 3
1 STKIP PGRI Jombang, syarifatul.m@gmail.com 2 UNIVERSITAS NEGERI SURABAYA dwi_juniati@yahoo.com 3 UNIVERSITAS NEGERI SURABAYA, tatagyees@yahoo.com

ABSTRACT The purpose of this study was to analyze the ability of fifth grade elementary school student who had high mathematic ability in making the equation of fractions. This kind of research was qualitative by a student subject. Data collection was conducted by giving a test to the subject, continued by interviews. The next stage was data analysis, include reduce the data, presentate the data, conclusion and verificate the data. Subject was given a test containing an equation $45 - \square = 14$ as initial equation. Then, subject was asked to make an another equation as equivalent as initial one as much as possible. The result test indicated that subject able to make the eleven equations correctly. The following steps were (1) subject changed the initial equation element position; (2) subject refered on $45 - 14 = \square$, then changed both elements known to the another equivalent fraction; (3) subject changed the operan known at initial equation to the another equivalent fraction without changed the position of elements at initial equation; (4) subject refered on $\square + 14 = 45$, then changed both elements known to the another equivalent fraction; (5) subject changed the element position from initial equation, then added both elements with an element or an \square . Keywords: analysis, ability to make equation, fraction

The research is inspired by Piaget's theory of reversibility. Reversibility means the person mental ability to change the mind purpose to the original point (Piaget via Slavin, 2008: 48). While (Krutetskii, 1976: 287) explains that reversibility is the person thinking to build up the reversible sides. Furthermore, Krutetskii identifies one of the categorized mathematics ability related to success in solving the problem, it is reversibility. On the other hand, student mathematics ability has the role in solving mathematical problem. It means that reversibility affects the student ability to solve the problem. Whereas problem solving is the learning mathematics focused. This is constructed by NCTM (2000: 52) that expands problem solving is the integral part of learning mathematics. It is relevant with Soedjadi (1992: 33) states mathematics should be directed to develop the student future live transferable ability. Reversibility is the person thinking ability to build up the reversible sides. It means that reversibility has two reversible ways, they are beginning side to the final one as the reached goal, and the final side returns to the beginning one. However, research focussed is how the student thinking ability from the beginning side to the final. The beginning side is the first equation test given. Then, subject asked to make many equations as equivalent as the beginning one. So the equation student made means the reached goal. The defined equation related to fractions and arithmetic operations. Fractons is on of the pre-requisites for understanding the subsequent and the intertwined materials of fractions concept. If student do not understand the basic, student will difficulty in studying further.

Research subject is the fifth grade of elementary school student by considering the fractions is the first time material given at elementary school. In addition, Piaget states the ability of buiding the two-way relation develop in concrete operational stage, it is about 7 to 11 years old. It means reversibility begins on elementary school student. But focus of research subject is student who had high mathematics by considering the result of research is used as basic by the teacher to teach fractions and arithmetic operations. In expectation is the ability the other student can be same or equal with ability of student who had high mathematics especially fraction and arithmetics operation materials. Based on the descriptions, researcher interested analyzing the elementary student ability in making fractions. RESEARCH METHOD Research Design This study purposed analyzing the elementary school student ability in making fractions. Therefore, this is a descriptive qualitative research. Researcher gave a test to the subject, then researcher conducted interview to the subject for comprehending about the things of uncovered test yet. Furthermore, the result data analyzed based on the framework established in theoretical study. Research Subject Research subject was the fifth grade of elementary school student who is capable in high mathematic. High mathematic information was obtained by mathematic test and consultation with the teacher Research Instrument The main instrument is the researcher herself. While supporting instrument are as follows: 1. Test used to obtain the data about subject's ability delineation in making equation. A test contains an equation then subject was asked to make as many as another equivalent equation. 2. Interview guideline in this study is semi-structured or opened. Subject was interviewed based on the work result Research Procedure Research procedure consists of three stages described by following: 1. Preparation Stage The research preparation stage examines theory in making equation's ability refers to part of reversibility characteristic. 2. Implementation Stage The research implementation stage selects the subject. Furthermore, researcher give a test to the subject, then followed by interviewed based on the work result. 3. Analysis Stage The research analysis stage analyzes the data and report writing. Data Analysis Technique Result data was analyzed with references to (i) the equation subject made number (ii) subject's way in making each the beginning equivalent equation. Analysis conducted after finishing the interview. Then data analysis conducted by following step: (1) data reduction; (2) data exploring; (3) drawing conclusion. FINDING AND DISCUSSION Before research was conducted, researcher choose the subject previously, it is fifth grade of elementary student of MIN Kauman Jombang. Furthermore, researcher conduted the research and analyzed the result data Data Analysis Finding and Discussion 1. Test result A test was given by the researcher such as the following: Fig. 1. Test Instrument The followings are the result subject in making the equation Table 1 : Subject Equation Made Equation Code Subject Equation Made P1 P2 P3 P4 P5 P6 P7 P8 TEST (30 minutes) Given the following form: Form: " $\square - \square = \square$ " Rewrite the above from to the "another similar form" as much as possible P9 P10 P11 Based on the test result, known the subject has made 10 the beginning equivalent equation. While subject way in making the beginning equivalent equation was obtained from interview. The followings are the subject way in making each equation Table 2: Subject Way in Making Each Equation Equation Code Equation Subject Made Equation Making Way P1 The beginning equation was $45 - \square = 14$ subject made P1 by moving 14 elements to the right side and moving a to left side, obtained $45 - 14 = \square$ as P1 P2 The beginning equation was $45 - \square = 14$. Subject made P2 by moving a side. It should be obtained $45 = 14 + \square$, but subject wrote in $\square + 14 = 45$ form by reasoning there were an equal sign "=", so $45 = 14 + \square = \square + 14 = 45$. Thus, obtained $\square + 14 = 45$ as P2. P3 The beginning equation was $45 - \square = 14$. Subject made P3 in reference to P1, it was $45 - 14 = \square$ because of the beginning equation made. Then subject changed both of known elements on $45 - 14 = \square$ to an another equivalent fraction. It changed 45 into 8 10 and 14 into 2 8 obtained $8 10 - 2 8 = \square$ as P3 P4 The beginning equation was $45 - \square = 14$. Subject made P4 by changing the side knowed on beginning equation to an another equivalent fraction. It changed 45 as 8 10 obtained $8 10 - \square = 14$ as P4 P5 The beginning equation was $45 - \square = 14$. Subject made P5 in reference on P1, it was $45 - 14 = \square$ by reasoning P1 the beginning equation made. Then subject changed one of the element known by $45 - 14 = \square$ into an another equivalent fraction. It changed 14 into 2 8 obtained $45 - 2 8 = \square$ as P5. P6 The beginning equation was $45 - \square = 14$. Subject made P6 in reference on P2, it was $\square + 14 = 45$. Then it changed both of elements known by P2 into an another equivalent fraction. It changed 45 into 8 10 and changed 14 into 3 12 obtained $\square + 3 12 = 8 10$ as P6. P7 The beginning equation was $45 - \square = 14$. Subject made P7 by moving the a and 4 5 side, obtained $0 = 14 + \square - 45$. Then added the sides of $0 = 14 + \square - 45$ with 14. Obtained $14 = 14 + \square - 45 + 14$, but subject wrote $14 + \square - 45 + 14 = 14$ as P7 P8 The beginning equation was $45 - \square = 14$. Subject made by moving the 14 side, obtained $45 - \square - 14 = 0$. Then added the sides of $45 - \square - 14 = 0$ with a, obtained $45 - \square - 14 + \square = \square$ as P8. P9 The beginning equation was $45 - \square = 14$. Subject made P9 by changing $45 - \square = 14$ form into $14 = 45 - \square$ by reasoning there was an equal sign "=", so $45 - \square = 14$ same as $14 = 45 - \square$. Then added the sides of $14 = 45 - \square$ with 4 5, obtained $14 + 4 5 = 45 - \square + 4 5$ as P9 P10 The beginning equation was $45 - \square = 14$. Subject made P10 by moving the a side, obtained $45 = \square + 14$. Then operated the sides of $45 = \square + 14$ with \square , obtained $45 + \square = \square + 14$ as P10 P11 The beginning equation was $45 - \square = 14$. Subject made P11 by moving the a side. It should be obtained $45 = 14 + \square$, but subject wrote $14 + \square = 45$ form as P11 Based on the table 2 above, obtained the descriptions of subject way in making the equation of fractions 1. Subject made a new equation by the changing the side on beginning equation without changing these element to an another equivalent equation. At this category divided by two, they were as follows a. Moving the 14 and a elements side The test beginning equation given was $45 - \square = 14$. Subject made a new equation by moving the 14 of right side and moving the a of left side. The subject equation made included P1 category was $45 - 14 = \square$. b. Moving the a element side A test beginning equation given was $45 - \square = 14$. Subject made a new equation by moving the a element. The subject equation made included P2 category was $14 + \square = 45$, and P11 category was $\square + 14 = 45$. But P11, subject also used the commutative to arithmetic, it was $14 + \square = \square + 14$. 2. Subject made a new equation in reference on P1, it was $45 - 14 = \square$ by reasoning P1 made from the beginning equation. Then, subject changed the known sides of $45 - 14 = \square$ to an another equivalent equation. The subject equation made included P3 category was $8 10 - 2 8 = \square$ and P5 category was $45 - 2 8 = \square$. 3. Subject made a new equation by changing the known side on beginning equation to an another equivalent equation. The subject equation made included P4 category was $8 10 - \square = 14$. 4. Subject made a new equation in reference on P2, it was $\square + 14 = 45$. Then, changed the known sides on P2 to an another equivalent equation. The subject equation made included P6 category $\square + 3 12 = 8 10$. 5. Subject made a new equation by moving the side of beginning equation, then added the sides with the fractions. These category divided by two parts, they are as follows a. Moving the one of beginning equation element then added those sides by fractions, the included category of equation was $8 10 - \square - 14 + \square = \square$ and P10 $45 + \square = \square + 14$. b. Moving the beginning equation side elements then added those sides by fractions, the included category of equation was $8 10 - 2 8 = \square$ and P5 category was $45 - 2 8 = \square$. 6. Subject made a new equation by moving one of these then added the sides by the fractions. The included category of equation was $14 + 4 5 = 45 - \square + 4 5$. CONCLUSION Based on the result analysis obtained the conclusion about subject ability in making of equation. It was a subject making the eleven equivalent equations $45 - \square = 14$. The subject way in making the beginning equivalent equation as follows 1. Subject only moved the beginning equation of element side. 2. Subject referenced at $45 - 14 = \square$, then changed the known elements at $45 - 14 = \square$ to an another equivalent fractions 3. Subject changed the known position on beginning equation to an another equivalent fractions 4. Subject referenced at $\square + 14 = 45$, then changed the known sides on $\square + 14 = 45$ to an another equivalent fractions 5. Subject moved the sides of beginning equation, then added the sides by fractions 6. Subject moved one of the beginning equation sides then added those equation sides by the fractions REFERENCES Krutetskii, V.A. 1976. [The Psychology of Mathematical Abilities in Schoolchildren](#). Chicago: The University of Chicago Press National Council of Teachers of Mathematics (NCTM). 2000. [Principles and standards for school mathematics](#). Reston, VA: NCTM Slavin, R. E. 2008. Psikologi Pendidikan: Teori dan Praktik. Jakarta: PT Indeks Soedjadi, R. 2000. Kiat Pendidikan Matematika di Indonesia: Konstatasi Keadaan Masa K