

**THE IMPROVEMENT OF STUDENTS ACTIVITIES AND CRITICAL
THINKING IN MATHEMATIC LEARNING THROUGH GROUP
INVESTIGATION LEARNING MODEL WITH INQUIRING
MINDS WANT TO KNOW LEARNING STRATEGY
(CAR IN GRADE VIII D SMP AL-ISLAM 1 SURAKARTA YEAR 2013/2014)**

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ABSTRACT

THE IMPROVEMENT OF STUDENTS ACTIVITIES AND CRITICAL THINKING ABILITY IN MATHEMATIC LEARNING THROUGH GROUP INVESTIGATION LEARNING MODEL WITH INQUIRING MINDS WANT TO KNOW LEARNING STRATEGY (CAR In Grade VIII D SMP Al-Islam 1 Surakarta Year 2013/2014)

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This research is conducted to improvement the activities and abilities of critical thinking by students using *group investigation* model with the *inquiring minds want to know* strategy. This research is a classroom action research (CAR). The receiver subject of action are the students of class VIII D SMP Al-Islam 1 Surakarta counted 36 students and the giver subject of action are mathematics teacher collaborated with the researcher. The method of collecting data was conducted by observation, documentation, and notes field sheet. The technical of analyzing data consists of: data reduction, data presentation, and conclusion drawing. The research result shows the improvement activities and students abilities of critical thinking through *Group investigation* model with *inquiring minds want to know* strategy. It can be seen by the percentage increasing of activity indicators, (1) doing exercise questions in front of class before the treatment 38,88% became 61,11%, (2) answering questions given by the teacher before the treatment 30,55% raised become 80,56%. While on indicators of critical thinking ability, that was (1) asking a various questions according to the learning concept before the treatment 8,33% became 63,88%, (2) proposing idea, opinion, and comments before the treatment 13,88% became 69,44%, (3) solving mathematics problem before the treatment 25% become 80,56%. From this research, can be concluded that application the *Group investigation* model with *inquiring minds want to know* strategy can improvement the activities and abilities of critical thinking by students in mathematics learning.

Keywords: activities, critical thinking ability, *group investigation*, *inquiring minds want to know*.

INTRODUCTION

The important matter in studying mathematics is to train ourselves to think and to act critical and creative. The competence of critical thinking of learners is very important matter in the global competition century, because problems complexity level in all this modern life aspects are more and more high. Ability of critical thinking, creative and productive is high level competence and can be viewed as a continuance from base

competence in studying mathematics (Sudiarta, 2009). Activity in studying is one of big influence in its way of studying and teaching process. Process of studying and teaching will work well if the learners are active. Therefore, it is necessary to awake the students activities in order the lesson given by the teacher can be accepted and understood easily.

According to the observation result conducted in SMP Al-Islam 1 Surakarta class VIII D counted 36 students that consist of 18 male students and 18 female students, showed that activity and critical thinking ability was still low. It can be seen from indicators of critical thinking ability as followed: 1) ability of proposing various question according to studying concept 8,33%; 2) ability of proposing idea, notion, and reaction 13,88%; 3) ability to solve the mathematics problem 25%. Activity Indicator are as followed: 1) ability to do the question in front class 38,88%; 2) ability to answer questions given by the teacher 30,55%. Root of problems in this research is studying process that is not proper and students low understanding in studying, caused the difficulty in solving the problem, therefore, it made the learning result was not maximum.

The Usage of correct studying model and strategy can trigger the students' happy feeling toward the lesson, grow and increase the motivation in doing assignments, give the easy for the students to comprehend the lesson, hence it gives the student the possibility to achieve the better study result (Aunurrahman, 2009: 143). *Group Investigation* is one of various studying model that can be applied in mathematics studying. This model presents various problem situations that is authentic and meaningful to students, that can be a function as jumping stone to investigation. Actually, this model was planned to guide the students to define their problems, explore various colors about problem, compile the relevant data, develop and test hypothesiical (Aunurrahman, 2009:151). Therefore, studying model *group investigation* involves students to be active and creative in studying activity. Students will work in group to compile informations, to analyze data, to do experiment, to find solution of problem and make a conclusion. The activities was planned to develop students' activity inside the classroom and to assist students to develop their skill of critical thinking, skill to solve the problem and their intellectual skill.

Teacher requires learning strategy that can in solid it with *group investigation* model that study with this model to obtain a good result. One of the studying strategy that can in solid it with *group investigation* model is *inquiring minds want to know* strategy. *Inquiring*

minds want to know strategy is a learning strategy that be had a look scientific enough in to do investigation in draft obtain a meeting. All the steps that be get through can to guide student to thought objective and scientific in to break it problem. This strategy can build the students' curiosity about a topic. At study of collaborative group investigation model with inquiring minds want to know strategy can assist student to active, creative, critical and likes in mathematics study.

The steps of the *Group Investigation* model with *Inquiring Minds Want to know* strategy that is: 1) Teacher forms student into group that to be member of 2 until 6 students . Student study information sources and to choose topic that will to be discussed in the group. 2) Student in the group each to plan it task study about the topic that have been chosen previous. Implementation *inquiring minds want to know* strategy, (a) teacher make question that can build the students' curiosity about a topic to know more continue. (b) Teacher recommend it student to answer according to with their suspect and to discuss it in group. (c) Each group to discuss the materials that already exist according to *cooperative* that attitude of meeting. 3) In the group each student find information, to analyzed data, and make conclusion; the students to exchange thinking, to discuss it, to clarification, and to synthetic ideas. 4) Each group who it report of end. Member of groups to plan it what is will to be reported and how make the presentation, also to coordinate it presentation plan. 5) One of member from each group presentation it results of the group's discussion and other group to answer. 6) Teacher gives it return bait and evaluation on material that had to be presented by student.

Based on the description above, *Group Investigation learning* model with *Inquiring Minds Want to know* strategy to be expected can to level it activity and thinking ability critical in studying process mathematics. One of usage influence model and strategy the mentioned studying is to leveling activity and thinking ability critical student. So that can to level it activity and thinking ability critical , teacher must can to apply it model and strategy the mentioned studying truely according to model steps and strategy mentioned. Therefore researcher performs research with title the improvement activities and abilities of critical thinking by students in mathematic learning through group investigation learning model with inquiring minds want to know learning strategy.

The expected of the goals of this research is to improve activity and thinking ability critical through *Group Investigation* model with *Inquiring Minds Want to know* strategy in grade VIII D of SMP Al-Islam 1 Surakarta year 2013/2014.

RESEARCH METHOD

The research was conducted in SMP Al-Islam 1 Surakarta of grade VIII D year 2013/2014, with the totaling of 36 students. This study was conducted from May 2014. Research preparation, execution and analysis of data with math's teachers. The subject are students as the subject of a class action and the receiver of math's teacher of SMP Al-Islam 1 Surakarta as giver of.

This research type is Classroom Action Research (CAR). CAR is a form of research having the character of reflektif with to do surest actions to to repair and to level it the studying practice directly in class according to more qualityy until student can to obtain result the study that better. CAR focussed it to his studying process repairing not direct to his studying impact repairing. If the program has not been able to reach the existing problems, it is necessary to next cycle (second cycle) to try the other action. The research data was collected from various source include: a) Information or a resource, that is teacher and student; b) The course of events and learning activities ; c) Document or archives, include curriculum, lesson plans, and assessment of sheets (Sutama, 2010:166).

This research is a collaborative classroom action research that is practical, situational, conditional and contexttual based on problems that arise in the learning activities. . Math's teacher involved in this study since: 1) initial dialogue, 2) action planning, 3) implementation of the action, 4) observation, 5) reflection, 6) evaluation and 7) inference. Action research is descriptive qualitative. The primary data source is the researcher who did the action, while the secondary data documentations. Data retrieval can be done by observation, field notes, documentation and test method.

The method of collecting data was conducted by observation, documentation, and notes field sheet. The research instrument was developed by researches with the teachers of mathematics with maintaining the validity of the data. The purpose of this study was to determine the increase in activity and critical thinking ability by applying the *Group Investigation* model with *Inquiring Minds Want to know* strategy. The research instrument

used in this study is the observation guide, test of questions, and documentation. Documentation of the list of student's name, student's value list, lesson plans and photo of each action, while field notes the form of a addition notes about the events that occurred on each action.

Data validity of checking technique with continuous observation and triangulation. Triangulation is data validity audit technique that by exploiting other observation for checking or as comparator to the data (Sutama, 2011:101). Analysis of the data in this study include of data collection, data presentation, and data verification. Based on the summary of which was made later researchers carrying out data reduction activities include the following elements of: 1) Selecting the data on the basis of relevance; 2) To arranges the data in units of the type/ simplification; 3) Focusing simplification and transfer of raw-data into to field records.

RESULT AND DISCUSSION

Preliminary in the observations made on Monday, April 5, 2014 in SMP Al-Islam 1 Surakarta of grade VIII D. This observation aimed to find out the problems faced by teachers and students in the learning process. The result of the initial observation and dialogue that has been done, an agreement that are: 1) Identify the problems that arise as a barrier to activity and critical thinking ability the student in mathematics learning; 2) Efforts to be made in improving the activity and critical thinking ability; 3) Alternative learning practiced in improve of activity and critical thinking ability in SMP Al-Islam 1 Surakarta of grade VIII D in the mathematics learning through *Group Investigation* model with *Inquiring Minds Want to know* strategy.

The researchers conducted the study during the first two cycle s of the cycle and the second cycle of each cycle there are two meetings. Each meeting of 2X40 minutes.

Implementation of actions performed during the first cycle of 2 meetings on Saturday, May 24, and Monday, May 26, 2014. At the first meeting the learning process of the first cycle, the teacher still has not been able the *Group Investigation* model with *Inquiring Minds Want to know* strategy as well as the student has not understand the model and the learning strategy. Students still rowdy in class during the learning process because it is not familiar with model and learning strategy that is being applied. At the moment

there is still a discussion group of students who are not responsible in the group, just speak for themselves and not working on the problems that have been given. Students are also still anyone asks the answer to another group. At the time of presentation only a few students in a group who dared to put forward the idea in front of the class to present the results of the group discussions.

At the second meeting of the first cycle of the teachers are able to apply the model and learning strategy, as well as students were beginning to understand the approach and applied learning models. But at the time of giving teachers the basic concept is still a lot of explaining because students still do not quite understand the learning materials and teacher at the time was still a lot of discussions help students to solve problems so that students can make sense is not so.

In the first cycle there are several indicators that have been achieved and which has not been achieved. Indicators that have been achieved in the first cycle according to the investigators' analysis of mathematics teachers stated that indicators of ability propose idea, opinion, and comments, solving mathematics problem, answering questions given by the teacher. The ability of proposing idea, opinion, and comments on the first cycle increased 50%, from 13,88% to 63,88 %. This indicator measured from student activity in proposing idea, opinion and comments in discussion or answers the individual questions. The ability of solving mathematics problem increased 36,1% from 25% to 61,1%. This indicator measured from student activity in proposing idea, opinion and comments in discussion or answers the individual questions. The ability answering questions given by the teacher increase about 30,55% from 30,5% to 61,1%. This indicator measured from student activity in answering the individual questions given by the teacher.

Indicator which has not success at the first cycle is ability to asking a various questions according to the learning concept. The ability asking a various questions according to the learning concept at first cycle only increase of 19,45% that is from 8,33% becomes 27,78%. This see from many students that answering the result of the other group when presented in front of class. The ability doing exercise questions in front of class at first cycle only increased 2,79% that is from 38,88% becomes 41,67%. This see from many students which can do the answer of the problem in front of class without referred by teacher that has not improvement from the student gets action before.

The first cycle of the action plan needs to be revised, and the revised plan of action would be used for a second cycle. Some need to be revised: 1) in indicator asking a various questions according to the learning concept, teacher must angle to the student that is active in discussion or answers to percentage result of other group discussion to give and also expostulates opinion. 2) In indicator doing exercise questions in front of class, teacher doesn't dominate the study in the class. Teacher gives opportunity to student for active in class according to the *Group Investigation* model with *Inquiring Minds Want to Know* strategy.

Implementations of the actions carried out during the second cycle class 2 meetings are on Saturday, May 31, 2014 and Monday, June 2, 2014. At the second cycle of learning, *Group Investigation* model with *Inquiring Minds Want to know* strategy goes well according to plan although there are still some drawbacks. All indicators of activity and critical thinking ability have also been achieved. Because indicators of activity and critical thinking ability through *Group Investigation* model with *Inquiring Minds Want to know* strategy has been going well as expected, researchers and teachers of mathematics to the conclusion that a class action through *Group Investigation* model with *Inquiring Minds Want to know* strategy ended in the second cycle.

Based on the research that has been conducted by researches through class action cycle I to cycle II by using *Group Investigation* model with *Inquiring Minds Want to know* strategy, researches and classroom teachers concluded that the ability of activity and critical thinking is improvement.

Improved of ability of activity and critical thinking before the second cycle of action to be presented in the table following:

Table 1

Improvement of student's activities in mathematics learning

Indicator	Before Action	Total of students (Percentage)	
		Cycle I	Cycle II
Doing exercise questions in front of class	38,88 % (14 students)	41,67 % (15 students)	61,11 % (22 students)
Answering questions given by the teacher	30,55% (11 students)	61,1 % (22 students)	80,56 % (29 students)

Graph 1

Improvement of student's activities in mathematics learning

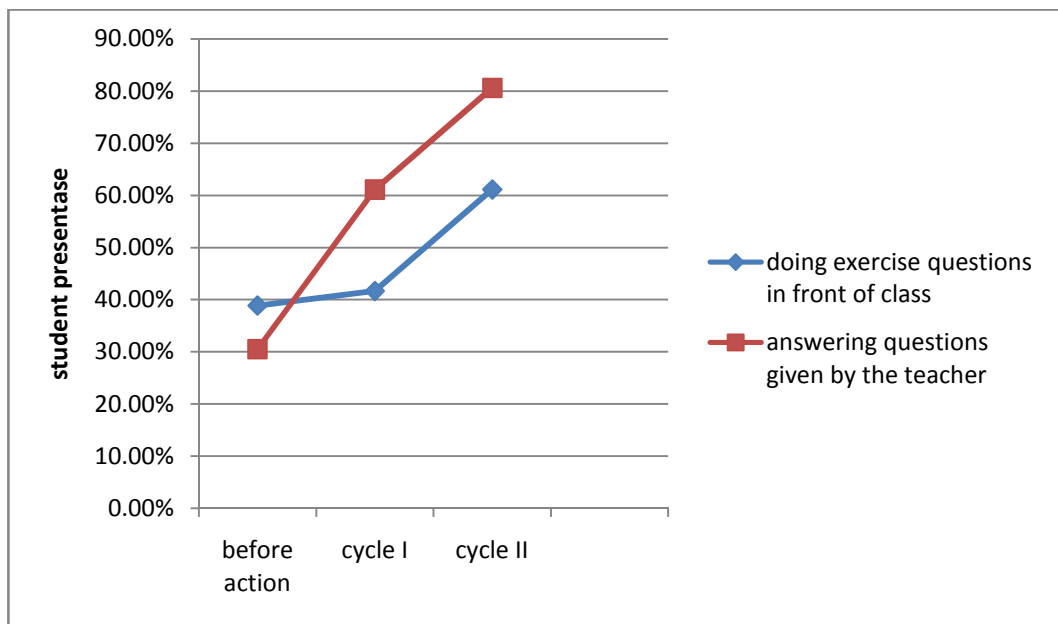
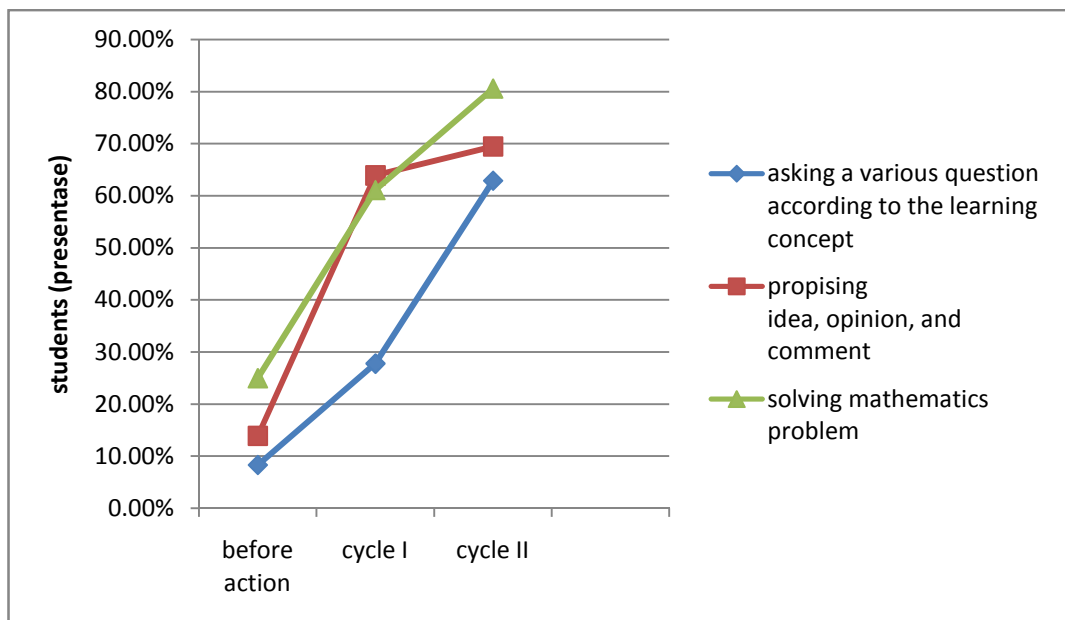


Table 2
Improvement of critical thinking ability students

Indicator	Before action	Total of students (Percentage)	
		Cycle I	Cycle II
Asking a various questions according to the learning concept	8,33 % (3 siswa)	27,78 % (10 siswa)	63,88 % (23 siswa)
Proposing idea, opinion, and comments	13,88% (5 siswa)	63,88 % (23 siswa)	69,44 % (25 siswa)
Solving mathematics problem	25% (9 siswa)	61,1 % (22 siswa)	80,56 % (29 siswa)

Graph 2
Improvement of critical thinking ability students



Based on table 1, graph 1, table 2, and graph 2 can be concluded that the *Group Investigation* model with *Inquiring Minds Want to Know* strategy can be improving the activity and critical thinking ability the students of VIII D SMP Al-Islam 1 Surakarta. It can be seen from the improving indicators of activity and critical thinking ability by researchers used. The improvement of the indicators can be increasing the student's learning activity and student achievement is increasing too.

1. Activity indicators

- a. The students ability doing exercise questions in front of class

The students ability doing exercise questions in front of class in mathematics learning by using *Group Investigation* model with *Inquiring Minds Want Know* strategy seen from the many students which dare to do problem in front of class. Amount of students that capable to do the problem of practice in front of the class in mathematics learning increase after teacher apply the *Group Investigation* model with *Inquiring Minds Want Know* strategy. *Group Investigation* model with *Inquiring Minds Want Know* strategy invites student for active in study.

- b. The students ability answering questions given by the teacher

The students ability answering questions given by the teacher in mathematics learning by using *Group Investigation* model with *Inquiring Minds Want Know* strategy seen at the many correct students answers the problem of individual and also group. Most all students can do problem given by teacher truly. The students ability answers question given teacher can increase after using *Group Investigation* model with *Inquiring Minds Want Know* strategy because *Group Investigation* model with *Inquiring Minds Want Know* strategy invites student to find information supporting to finalize problems and analyses way is finalizing problem given.

2. Indicators of critical thinking ability

- a. The students ability asking a various questions according to the learning concept

The students ability to asking a various questions according to the learning concept in mathematics learning by using *Group Investigation* model with *Inquiring Minds Want Know* strategy seen when student answer to result of other group discussion presented in front of class. Amount of students can submit the various questions as according to study the concept in mathematics learning increases after teacher to

apply *Group Investigation* model with *Inquiring Minds Want Know* strategy. *Group Investigation* model with *Inquiring Minds Want Know* strategy invites student to think critically in discussion activity.

b. The students ability proposing idea, opinion, and comments

The students ability proposing idea, opinion, and comments in mathematics learning by using *Group Investigation* model with *Inquiring Minds Want Know* strategy seen when student to submit idea, opinion and comments in newsgroup and in front of class. In addition, when answer the problem of individual claiming student to submit the idea, opinion, and comments. Amount of students can submit the idea, opinion, and comments in mathematics learning increases after teacher to apply *Group Investigation* model with *Inquiring Minds Want Know* strategy. *Group Investigation* model with *Inquiring Minds Want Know* strategy invites student to submit the idea, opinion, and comments in activity of discussion or individual. Students motivate to get best value.

c. The students ability solving mathematics problem

The students ability solving mathematics problem in mathematics learning by using *Group Investigation* model with *Inquiring Minds Want Know* strategy seen at the many correct students answers the problem of individual and also group. Most all students can do problem given by teacher truly. Ability solving mathematics problem students of grade VIII D SMP Al-Islam 1 Surakarta can increase after using *Group Investigation* model with *Inquiring Minds Want Know* strategy because *Group Investigation* model with *Inquiring Minds Want Know* strategy invites student to find information supporting to finalize problems and analyses way is finalizing problem given.

All activity indicators and critical thinking ability students stall have been reached, at activity indicators 22 students (61,11%) can doing exercise questions in front of class, 29 students(80,56) can answering questions given by the teacher. At critical thinking ability indicators 23 students (63,88%) can asking a various questions according to the learning concept, 25 students (69,44%) can proposing idea, opinion, and comments, and 29 students (80,56%) can solving mathematics problem. This is show *Group Investigation*

model with *Inquiring Minds Want Know* strategy can increase activity and ability the critical thinking by students.

The conclusions were supported by previous research, Hawa Liberna (2012) in research concluding that applying of method Improve to increase critical thinking ability to result of better mathematics learning with conventional method. Setyorini (2011) in research conclude that *problem based learning* model can increase critical thinking ability students. Asuai Nelson Chukwuyenum (2013) in research conclude the difference significant assessing mathematics performance test between the group of experiment. Skill of critical thinking is also effective supporting facilities to increase the understanding of student to mathematics concepts. Dita darliyati (2011) in research conclude that applying of study strategy of cooperative group investigation can increase liveliness of student learning. Novi Sri Rahayu (2013) in the research conclude that students with high mathematics learning activity has achievement of mathematics learning that is better than student with low and medium mathematics learning activity. Ebiendele Ebosele Peter (2012) conclude that ability of critical thinking by students can increase with (i) applies study strategy entangling student actively in process of study than relying on discourse and memorizes note, (ii) focused in instruction at learning process is not solely at content, and (iii) applies the assessment technique by giving the students with intellectual challenge than recalls.

Applying of *Group Investigation* model with *Inquiring Minds Want Know* strategy has given opportunity of student to critical thinking and active in mathematics learning. Inquiry (finds) in study is part of core of study activity applies approach contextual. Knowledge and skill obtained by student is expected not merely result in considering a set facts, but also result from finding itself, covers observation, enquires, submits estimation, data collecting, and recapitulating (Sagala, 2011:89).

Based on the above explanation that supports researchers to do research and concludes that usage of *Group Investigation* model with *Inquiring Minds Want to Know* strategy can increase activity and critical thinking ability in students of grade VIII D SMP Al-Islam 1 Surakarta years 2013/2014.

CONCLUSION

This study is an action research on the application of the *Group Investigation* model with *Inquiring Minds Want to Know* strategy to improve activities and critical thinking abilities the students of grade VIII D SMP Al-Islam 1 Surakarta year 2013/2014.

The results were conducted by researchers who collaborate with teachers of mathematics can be summarized as follows: 1) *Group Investigation* model with *Inquiring Minds Want to Know* strategy to improve activities and critical thinking ability of students, namely the steps of: (1) Teacher forms student into group that to be member 2 until 6 students . Student study information sources and to choose topic that will to be discussed in the group. (2) Student in the group each to plan it task study about the topic that have been chosen previous. Implementation *inquiring minds want to know* strategy, (a) Teacher make question that can build the students' curiosity about a topic to know more continue. (b) Teacher recommend it student to answer according to with their suspect and to discuss it in group. (c) Each group discusses materials that already exist according to *cooperative* that attitude of meeting. (3) In the group each student find information, to analyzed data, and make conclusion; the students to exchange thinking, to discuss it, to clarify, and to synthetic ideas. (4) Each group who it report of end. Member of group are to plan it in what will to be reported and how make the presentation, also to coordinate it presentation plan. (5) One of member from each group presentation it results of the group's discussion and other group to answer. (6) Teacher gives it return bait and evaluation on material that had to be presented by student. 2) An increase activities through *Group Investigation* model with *Inquiring Minds Want to Know* strategy can be show from the following indicators: (a) doing exercise questions in front of class before action is 38,88 % (14 students), after the first cycle contained 41,67% (15 students) and the second cycle of 61,11% (22 students), (b) answering questions given by the teachers before action is 30,55% (11 students), after the first cycle contained 61,1% (22 students) and the second cycle of 80,56% (29 students). 3) An increase critical thinking abilities through *Group Investigation* model dengan *Inquiring Minds Want to Know* strategy can be show from the following indicators: (a) asking various questions according to the learning concept before action is 8,53 % (3 students), after the first cycle contained 27,78% (10 students) and the second cycle of 63,88% (23 students), (b) proposing idea, opinion, and comments before

action is 13,88% (5 students), after the first cycle contained 63,88% (23 students) and the second cycle of 69,44% (25 students), (c) solving mathematics problem before action is 25% (9 students), after the first cycle contained 61,1% (22 students) and the second cycle of 80,56% (29 students).

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