CHAPTER I

INTRODUCTION

1.1 Background

Education has a very important role to ensure the survival of the nation because it can improve and develop the quality of human resources as the future generation. Education is also the root of the nation's development, the successful of development in the field of education will affect development in other areas. In UU RI No. 20 Pasal 1 Tahun 2003 on Sistem Pendidikan Nasional has been established that:

> Pendidikan adalah usaha sadar dan terencana untuk mewujudkan suasana belajar dan proses pembelajaran agar siswa secara aktif mengembangkan potensi dirinya untuk memiliki kekuatan spiritual keagamaan, pengendalian diri, kepribadian, kecerdasan, akhlak mulia, serta keterampilan yang diperlukan dirinya, masyarakat, bangsa dan negara.

Education should be able to develop the potential of students so that the concerted may face and solve problems in their experienced life. Then education should be able to see what challenges students will be faced in the future. Therefore, nowadays development in the field of education more active conducted. School is the institution that organizes the process of teaching and learning, place transfer knowledge and skills to students. So the school is expected to produce quality human in education that can solve every problem in daily life.

The purpose of learning mathematics in school is listed in Standarisi (Badan Standar Nasional Pendidikan (BNSP), 2006) that the students have the following capacities:

1. Memahami konsep matematika, menjelaskan katerkaitan antar konsep dan mengaplikasikan konsep atau algoritma, secara luwes, akurat, efisien, dan tepat, dalam pemecahan masalah, (2) Menggunakan penalaran pada pola dan sifat, melakukan manipulasi matematika dalam membuat generalisasi, menyusunbukti, ataumenjelaskangagasandanpernyataanmatematika, (3) Memecahkan masalah yang meliputi kemampuan memahami masalah, merancang model matematika, menyelesaikan model dan menafsirkan solusi yang diperoleh, (4) Mengkomunikasikan gagasan dengan symbol, table, diagram, atau media lain untuk memperjelas keadaan atau masalah,

(5) Memiliki sikap menghargai kegunaan matematika dalam kehidupan, yaitu memiliki rasa ingin tahu, perhatian dan minat dalam mempelajari matematika, serta sikap ulet dan percaya diri dalam pemecaha nmasalah.

Mathematics is a science that has an important role in the development of science and technology. Mathematics serves to help examine the natural surroundings so that one can develop technology for human well-being. To study the natural surroundings requires critical thinking abilities, systematic, logical, creative, and innovative. These abilities can be developed through math learning. The National Council of Teachers of Mathematics (2004) established five standards of mathematical ability that students must process, namely problem solving, communication, connection, reasoning, and representation. Various reasons for the need of the school teach mathematics to students in essence can be summarized as problem of everyday life. In other words, mathematics is one way to train students to think in ways that are logical and systematical way to solve mathematics problem.

Mathematical problem solving ability is a person's ability or potential by applying the mathematical knowledge he has acquired in the process of discovering the combination of a number of rules applied in finding a way out of trouble. In addition, problem solving abilities are an integral part of mathematics learning, so it should not released from mathematics learning (NCTM, 2000).

Furthermore, NCTM states that problem solving should underlie all aspects of mathematics teaching in order to give students experience of the power of mathematics in the world around them. The council sees problem solving as a vehicle for students to construct, evaluate and refine their own theories about mathematics and the theories of others. Relating to the above explanation, problem solving is an important component of mathematics education.

From the statement above, one aspect that is emphasized in the curriculum is to improve problem solving students' ability. Problem solving is part of mathematics curriculum which very important because in learning process and completion, students obtain possible experience using the knowledge and also expected that after studying, the students will obtain experience using the knowledge and skills already possessed to be applied to solving problem when

they go into the community. Inside solve a problem, the student should first have some abilities such as the ability to understand the concept, understand the problem, able to associate the concept with one another, able to apply the concept to new situations, and able to evaluate the tasks performed.

Mathematics experts stated that problem is the question that must be answered or responded. However, not all questions belong to problem. Krulik dan Rudlink (1995), define the problem as follows:"A problem is a situation, quantitative or otherwise, that confront an individual, that requires resolution, and for which the individual see no apparent or obvious mean or path to obtaining a solution". The same thing also expressed by Ruseffendi (2006), the problem is an issue for someone who did not know and the person willing and capable to complete, regardless of whether someone can do it correctly or not. Hudoyo (2005) also argued that a question is a problem when it is challenging question to be answered that the answer cannot be done routinely and the challenge was accepted.

Based on some definitions above, means that problem solving in mathematics is the activity to find the solution of mathematical problems by involving all the stock of knowledge (the concepts have studied). Learning problem solving in mathematics, students will find the ways of thinking, persistency, curiosity, and confidence in unusual situation, as they will face outside the mathematics classroom.

Cooney (1985) also stated that teaching problem solving to students, allowing the students to be more analytical in making decisions in their lives. In other words, when the students are trained to solve the problem, then students will be able to make decisions because the students have become skilled at gathering relevant information, analyzing information, and realize how necessary to re-examine the results that have been obtained. In daily life and the world of work, being a good problem solver can bring great benefits.

Based on the description, in this research problem solving ability will be measured through students' ability to complete a problem by using problem-solving steps by Polya (1973) namely: (1) Understanding the problem, i.e. able to make what (data) is known, what is unknown (asked), what information is adequate, what conditions must be met, and restates the original problem in a more operation form solve, (2) Devising a plan, i.e. by trying to find or recall problems that have been resolved that have similarities to the problem to be solved, to search for patterned or rules, and to prepare a settlement procedure (make conjecture), (3) Carrying out the plan, i.e. to execute the procedure that have been made to obtain the settlement and see clearly that each procedure or step is correct, and (4) Looking back, i.e. checking how the result are obtained, checking the rebuttal, searching for results in another way, see if the results can be viewed at a glance, see if all the data is used to solve the problem and check whether the result or how it can be used other questions.

Based on the observation that has been made to the students of class XMIA 1 in SMA Negeri 1Perbaungan, showed that students in mathematical problem solving ability are still low and the majority of teachers teach by lecture method and writing notes on the board. Diagnostic tests conducted by the researcher by giving the problem to see students' mathematical problem solving ability. In this research, the researcher chose one topic about of System Linear Two Variable (SPLDV). This difficulty can be found from the mistakes made by students as follows:

Problem

Di dalam dompet Laras terdapat 25 lembar uang lima ribu rupiah dan 10 ribu rupiah. Jumlah uang itu adalah Rp.200.000,00. Berapa jumlah uang pecahan itu masing-masing?

a. Write down what is known and unknown of the above problem!

b. How do you solve the above problem?

c. Making solution based on the plan that you have made!

d. Can you derive the result with another plan? Explain it with your own words!

From the answers are given by the students obtained:

1. Students could not understand the problem clearly.

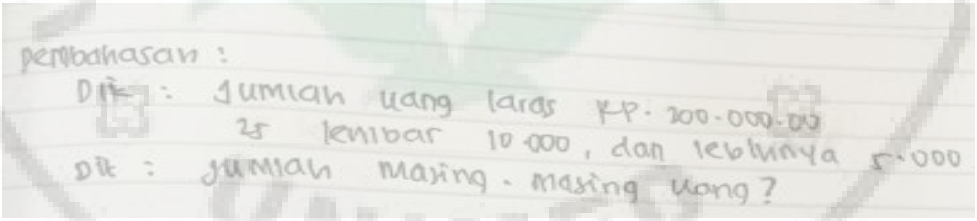

Figure 1.1 Students' Answer in Understanding the Problem

From Figure 1.1 show that students did not understand the problems mentioned above. Students were almost able to identity what asked clearly but they were not able identify what is known.

2. Student could not devise the problem a plan in problem solving

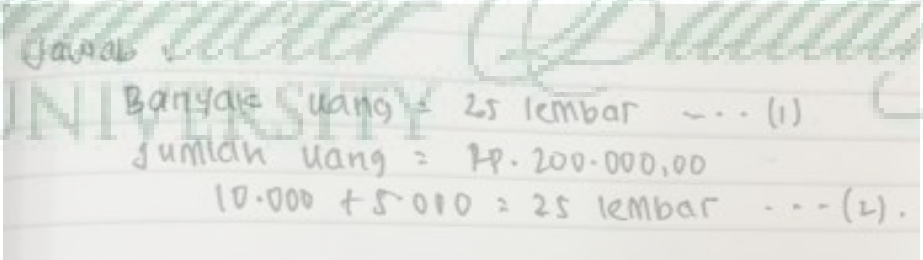

Figure 1.2 Students' Answer in Planning to Problem Solving

From Figure 1.2 show that students did not know which to solve the problem. It happened because they did not understand the problem clearly.

3. Student could not carry out the plan in problem solving strategy.

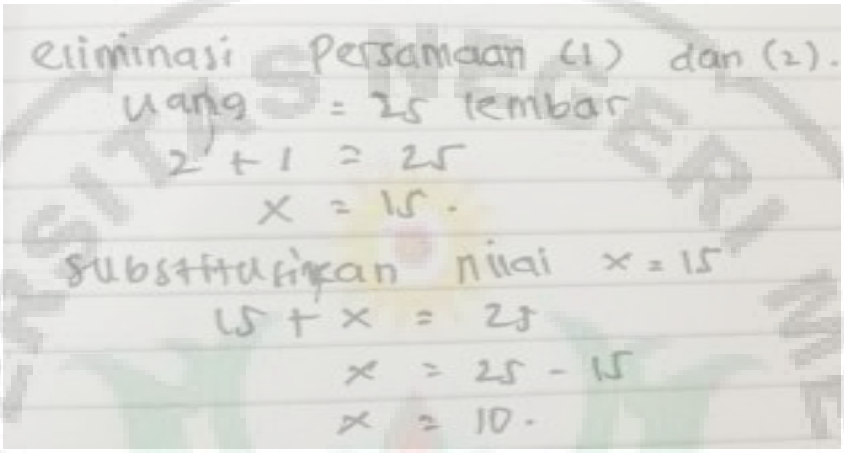

Figure 1.3 Students' Answer Sheet in Carrying Out the Plan

4. Students did not look back the solution carefully and they could not derive the solution differently.

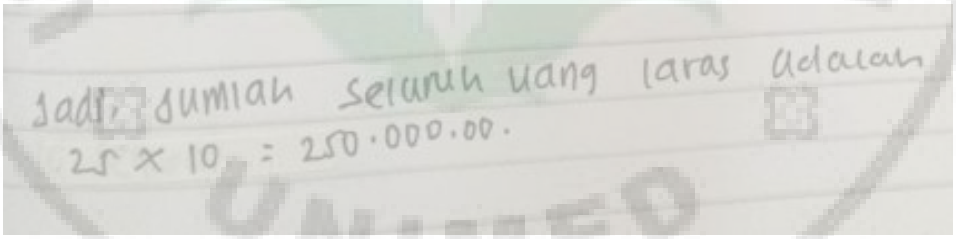

Figure 1.4 Students' Answer Sheet in Looking Back

From Figure 1.3 show that students did not check back or look back their task carefully. They also could not derive the solution differently because most of them have the same solution, mostly have same mistakes to solve the problem. In this step, there are 35 of 38 students did not look back the solution carefully and derive the solution differently.

From the diagnostic test of problem solving ability above, many students still cannot understand the problem, make the question into mathematics model and solving the problem exactly. The result can be explainable as follows:

- The first indicator is understanding the problem, there are 63% of students have been understood the problem well and 37% of students

have not been understood the problem, or the condition that presented by the problem.

- The second indicator is devising a plan, there are 42% of students have been devised a plan and 58% of students have not been devised a plan to solve the problem.
- The third indicator is carrying out plan, there are 26% of students have been carried out the plan and 74% of students have not been carried out the plan could not see clearly that the step in correct.
- The fourth indicator is looking back, there are 8% of students have been locked back carefully and 92% of students have not locked back carefully or derive the result differently.

To overcome the low math scores, educators are trying to hold the reparation and improvement in all aspect related to mathematics education. Many teachers have difficulty in teaching students. This difficulty may occur due to paradigm that the final answer is the only goals of solving the problem that causes students often use the wrong technique in answering the problem. Actually we need to realize that the process of solving the problem is much more important and fundamental. When a final answer is preferred, students may only learn to solve a particular problem, but if the process is emphasized students will learn how to solve the problem more complex.

But in fact, the quality of mathematics education still apprehensive seen problem solving students' ability is low. Learning mathematics is still considered as difficult as learning to use the symbols is understood by memorizing stated mathematical formulas so that students are learning the most disliked and abstract. During the learning of mathematics seen less touching the substance of the problem solving. Students tend to memorize the concepts only and do not want to find their own the idea. Only teachers always have active role in teaching and learning process so the students' ability to solve problem become less.

It is caused by a lack of mathematical problem solving students' ability because according to Tim MKBKM (2001) that mathematical problem solving is one of the mathematics activities which is considered important by teachers and

students at all levels from elementary through high school. But it is still the most difficult part for students in learning mathematics and for teachers to teach it.

Another factor that plays a role in determining the success of the approach is the selection of exactly mathematics teaching and learning methods. Using the exactly approach learning methods will overcome students' saturation receive lessons mathematics. In principle, none of teaching methods that can be considered perfect and suitable for all exiting subject in each subject, but professional and creative teachers will choose the exactly teaching methods.

Qohar (2011) found that the formation of small groups facilitate the development of mathematics problem solving ability. Give the small groups, and then the intensity of students in expressing their opinions will be higher. It will provide a great opportunity for students to develop mathematics problem solving.

According to Sharan (2009) explain that cooperative learning is one kind of student centered learning approach offers the opportunity to help all members learn the concepts and strategies through group interaction so that support students to be more active in class and of course increasing the mathematics problem solving ability.

Based on the definition, cooperative model is not same with common study groups. There are some basic unsure in cooperative learning making different with common study groups, they are work together, responsible, compete, communicate and evaluate group process. For instance, type of cooperative learning model is Numbered Head Together (NHT).

Numbered Head Together (NHT) are a group learning model in which each group member is responsible for the group's assignments, so that there is no separation between one student and another in a group to give and receive from one another.

Using the cooperative learning model Numbered Head Together (NHT) has several advantages, as expressed by Krismanto (2003: 6) "bahwa model pembelajaran Numbered Head Together (NHT) memiliki beberapa keunggulan, yaitu: 1) Melatih siswa untuk dapat bekerja sama dan menghargai pendapat orang lain, 2) melatih siswa untuk menjadi tutor sebaya, 3) menumbuhkan rasa kebersamaan, 4) membuat siswa menjadi terbiasa dengan perbedaan".

Based on description above, the researcher is interested in examining this issue in a action of research entitled "**Improving Student's Mathematical Problem Solving Ability by Using Cooperative Learning Model Type Number Head Together At SMA Negeri 1 Perbaungan**".

1.2. Problem identifications

In order the purpose of this study is clear and focus it is necessary to identify the problem. Based on the background, some problem can be identified as follows:

1. Students' mathematical problem solving students' ability is still low.
2. Students' find many difficulties to understand the subject matter and problem given.
3. The cooperative learning model type Number Head Together (NHT) is rare to be applied in the learning process at SMA Negeri 1 Perbaungan.

1.3. Problem Limitations

Because the extent of the problem and the limited ability and time so the problem limitation of the research is:

1. The students' mathematical problem solving ability is still low which is shown by students feel difficult to understand and solve the problem given.
2. The use of cooperative learning model type Number Head Together (NHT) has not been applied well at SMA Negeri 1 Perbaungan.

1.4. Problem Formulations

Based on the background above the writer formulation the problem as follows:

1. How the cooperative model type NHT can improve students' mathematical problem solving ability of SMA Negeri 1 Perbaungan?
2. How the effectiveness of cooperative model type NHT to improve students' mathematical problem solving ability of SMA Negeri 1 Perbaungan?

1.5. Research Objectives

According with the above problem formulation which will be achieved is:

1. To know the process cooperative model type NHT can improve students' mathematical problem solving ability of SMA Negeri 1 Perbaungan.
2. To know the effectiveness of cooperative model type NHT to improve students' mathematical problem solving ability of SMA Negeri 1 Perbaungan.

1.6. Research Benefits

After doing this research study is expected to provide benefits for all people, including:

1. For researchers, to increase knowledge for themselves, especially for the development of students before entering the actual learning process.
2. For the students, through NHT is expected to built positive and pleasure learning attitude in solve mathematical problem.
3. As an input for the teacher to consider a better method of learning in mathematics
4. The result of this study can provide a good contribution to the school in improvement of mathematics teaching at SMA Negeri 1 Perbaungan.

1.7. Operational Definition

This research, entitled is improving Student's Mathematics Problem Solving Ability Using Cooperative Learning Model Type Numbered Head Together at SMA Negeri 1 Perbaungan.Terms that require some explanations are as follows:

1. Mathematical problem solving ability is students' abilities in understanding the problem, planning to solve the problem, implement solving and looking back.
2. Cooperative learning model type NHT is one of cooperative learning that emphasizes special structures designed to influence the pattern of student interaction and has the aim of improving academic mastery.