CHAPTER I

INTRODUCTION

1.1. Background

Education is one form of human culture manifestation that dynamic and full of development. Therefore, a change or a development of education is indeed should be in line with the change of life culture. Education that can support future development is education that able to develop potential of learners, so the concerned is able to face and to solve the life problems that he/she is faced. Education should touch the inner potential and the competence potential of learners (Trianto, 2011:1).

Mathematics is a subject that very important in every level of education, from primary to high education. This is because mathematics can train students to think logically, to be responsible and to have a good personality and skill in solving problems in real life.

As one of basic sciences, mathematics has an essential value that can be applied in various fields of life. Mathematics learning is qualified or not, it cannot be separated from role of teachers and students. Teachers are required to create an active learning situation, innovative, creative, effective and fun in the learning process that the result will be reflected in student achievement that high.

Trigonometry is type of mathematics that deals with the relationship between the sides and angles of triangles (Oxford English Dictionary, 2000:1444). Trigonometry has a very close relationship in our lives, both directly and indirectly. Astrology and building construction is greatly helped by presence of trigonometry. With changing of times, trigonometry keeps to be developed, combined with other disciplines in order to be useful together. Originally, trigonometry comes as solution of solving of simple planes, with the growing of time, trigonometry is often used in world of applied sciences, the development of other sciences, and the development of mathematics itself. Here are some examples of trigonometry applications in daily life, such as: to calculate angle of

attack which is the most optimal from a launcher weapon, to be able to throw the projectile as far as possible; determine how the highest gradient of a hill on a public road in the mountains, so that all vehicles can pass it safely; and the simplest example of the daily events, when we walk in the stairs, we do not want to make the gradient of the stair to be too big or the angle is too small because its range is low (Bawazir, 2012).

However, what happened today is contrary to the expectations; it was indicated by low of students' mathematics achievement. Generally, the learning of mathematics in Indonesia, including learning trigonometry in high school is still far from satisfactory and sometimes can be said still disappointing. (Setiawan, 2004:1).

Based on survey data of Trends in International Mathematics and Sciences Study (TIMSS) 2003 under the International Association for the Evaluation of Educational Achievement (IEA) that: "Indonesia in the position 34 for field of mathematics and in position 36 for field of science of 45 countries surveyed" (Karwono, 2009).

The success of mathematics learning can be measured by the success of students who follow learning activity. That success can be seen from student's activity in participating in classroom activities and learning mathematics achievement. The better activity and mathematics learning achievement, then level of success of learning mathematics process is higher.

Many things affect the low mathematics learning achievement of students. One of them is the use of approaching or the learning model which is irrelevant to topic that taught by teacher. Generally, learning model that implemented is conventional learning model that often called with teacher center. Suherman (2012) expresses the same thing:

> It is said that in the current implementation of learning mathematics in general teacher is still using conventional methods where teacher still dominates the class, the students passive (come, sit, watch, practice, ..., and forget). Teacher tells concepts, so students receive materials. Similarly in practice, from year to year the problem which is given is the almost the same problem and it also does not vary. To follow the lessons in the school, most students do not prepare themselves by reading the

material to be studied, students come without sufficient knowledge as bringing an empty container.

According to Arends (in Trianto, 2011:90): "It is strange that we expect students to learn yet seldom teach then about learning, we expect student to solve problems yet seldom teach then about problem solving".

Teachers are required to make the students learn actively. This is an important factor in the outcome of teaching and learning activities. Learning mathematics still does not reach the substance of problem solving. Students are more likely to memorize concept than to understand the meaning thus students' ability in solving mathematical problems is low. Prayudi (2008) states that:

> One of KTSP advantages is declared that problem solving, reasoning, communication as a goal of learning mathematics in elementary school, junior high school, senior high school, and vocational school beside goals which are related to concept of understanding which has been known by teacher.

Problem solving can be considered as a method of learning in which students are trained to solve problems. The problem may come from the teacher, a phenomenon or real problems that encountered by students. Problem solving refers to child's brain function, develops creative thinking to recognize problem and seek alternative solutions. Mathematics problem solving includes "problem solving" as cognitive behavior and "mathematics" as the object of being studied. Process thinking in mathematical problem solving requires a certain intellectual skills that will organize strategy that pursued in accordance with data and problem that encountered. Therefore, it can be understood that before mastering mathematical problem solving, it is required to mastery lower cognitive aspects firstly, namely memory, understanding and application.

Based on the interview (January 22, 2013) of researcher with mathematics teacher of grade X of SMA Negeri 1 Perbaungan, Mr. Ishak Saragih, said that:

> Students are less able to solve problems in trigonometry material; it is occurred because students think that trigonometry topic is a difficult material to understand, so that concentration level of students during

learning process is not maximal. This might be due to methods which are used do not appropriate or methods do not make students be motivated to learn, so problem solving ability of students in trigonometry topic is low.

From result of survey that conducted by researcher (February 4, 2013) by giving the problem solving diagnostic test to students of grade XU-1 of SMA Negeri 1 Perbaungan, in topic of Angle Size and Angle Triangle as a prerequisites matter of trigonometry topic. From 26 students who took the test, the average of class score that obtained is 54.23 (score scale 0 – 100). Based on the test result is also obtained that total of student who complete in understanding the problem step is 10 students (38.46%), in making a plan step is 13 students (50%), in doing the plan step is 4 students (15.39%) and in checking solution step is 0 student (0%). The complete result can be seen in the following table:

Table 1.1. Total of Students who Complete in Problem Solving Steps

No.	Problem Solving Step	Diagnostic Test	
		Total of Student	Percentage
1.	Understanding problem	10	38.46%
2.	Making a plan	13	50%
3.	Doing the plan	4	15.39%
4.	Checking solution	0	0%

Diagnostic test result also shown that there was not student who completed to solve problem.

From some of descriptions above, it can be seen that many of students who are not able to solve problem because learning process is less meaningful to students that cause to low ability of students in solving problems. The reality is students just memorize the concepts and less able to use these concepts if it is encountered in real life problems that associated with concept that owned. Furthermore, students even are not able to determine problem and formulate it (Trianto, 2011: 89). Mathematics teachers have a duty to help students to improve students' problem-solving abilities. Teachers should strive harder to enable

students to solve problems because one focus of learning mathematics is problem solving, so that basic competencies that should be owned by every student is a minimum standard of knowledge, skills, attitudes and values which is reflected in learning of mathematics with habits of thought and action to solve problem.

Powerful learning model that believed can enhance students' problem solving abilities are learning models that require students to seek their own solution problem independently that will give a concrete experience, the experience can be used also to solve the similar problem because experience will give meaning itself for the learners. Learning model that has the characteristics above is problem based learning (PBL). PBL model is a learning model that based on a number of issues that require authentic investigation that is an investigation that require a real solution from the real issues (Trianto, 2011: 90).

Based on the explanations above, researcher is interested to conduct a research which entitled: **The Effort to Increase the Problem Solving Ability of Student by Implementing Problem Based Learning (PBL) in the Topic of Trigonometry in Grade X of SMA Negeri 1 Perbaungan in the Year of 2012/2013**

1.2. Problem Identification

Based on background, some issues that can be identified as follows:

1. Learning approaches which is used by teachers is irrelevant.
2. Learning activities are still centered on teacher.
3. Student ability in solving mathematics problem is low.
4. Implementation of PBL is an effort to increase mathematics problem solving ability of students.

1.3. Problem Limitation

Based on identification of problems that has been described above, scope of this study is limited to implementation of PBL in topic of trigonometry in grade X of SMA Negeri 1 Perbaungan in the year of 2012/2013, as an effort to improve

mathematics problem solving ability of student and to know difficulties which is faced by students in doing trigonometry problem.

1.4. Problem Formula

Based on problem limitation above, then problems formula of this research are

1. How increasing of students' problem solving ability by implementing PBL in trigonometry topic?
2. Is PBL effective in learning of trigonometry topic?
3. How do students response to implementation of PBL in learning of trigonometry topic?

1.5. Research Objective
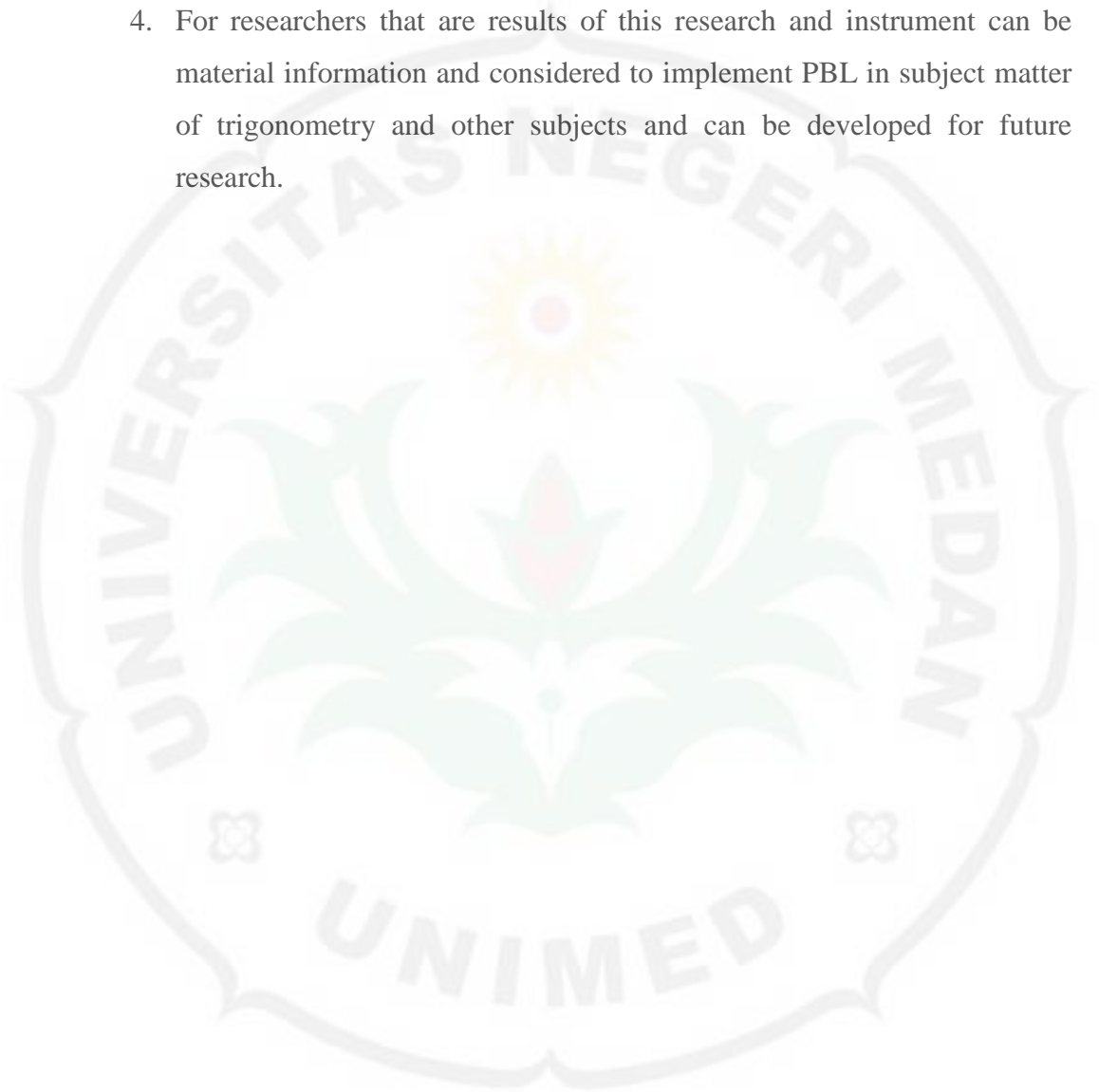
The objective of this research such as

1. To find out the increasing of students' problem solving ability with implementation of trigonometry topic.
2. To know effectiveness of PBL in trigonometry topic learning.
3. To know the response of student to implementation of PBL in learning of trigonometry topic.

1.6. Research Benefit

After this research is done, it is expected to be beneficial to all people, including:

1. For teacher/teacher candidate that is as information about student achievement in solving problems by implementing PBL in trigonometry topic.
2. For principal that can be considered matter for teacher to implement PBL in teaching and learning activities in school.
3. For students that are by implementing PBL can help students to increase problem solving ability.

4. For researchers that are results of this research and instrument can be material information and considered to implement PBL in subject matter of trigonometry and other subjects and can be developed for future research.