CHAPTER I
INTRODUCTION

1.1 Problem Background

Efforts to improve the learning success is a constant challenge faced by everyone involved in the teaching profession and education. Although we recognize that what has been achieved is not yet fully give satisfaction so requires thinking and hard work to solve their problems.

Problem solving is a part of the math curriculum is very important because in the learning process and its completion, students gain experience possible to use knowledge and skills already possessed to be applied to solving problems that are not routine. Through these activities, aspects of mathematical skills such as application of the rules at issue is not routine, pattern discovery, generalizing, mathematical communication and others can be developed better. Mental activity that can be reached in solving the problem, among others, is to remember, recognize, explain, distinguish, applying, analyzing, and evaluating.

According Solso (in Mawaddah, 2015: 166), the problem-solving was a thought that is targeted directly to find a solution or a solution to a specific problem. While Sumarno (in Marliani, 2015: 136) defines as a problem solving activity completing word problems, solve problems that are not routine, apply mathematics in everyday life or other circumstances, and prove or create or test the conjecture. Based on the understanding that the proposed Sumarmo, in mathematical problem solving seem their activities to develop mathematical power (mathematical power) against students.

According Branca (in Sumartini, 2016: 12) the ability of problem solving is essential possessed by any student because of (a) solving the problem is a general purpose of teaching mathematics, (b) solutions that include methods, procedures and strategies are core processes and main in the curriculum mathematics, and (c) solving the basic skills in mathematics.

Mathematical problem solving ability explained by Yurmayani (2016: 13) is an ability which students attempt to find a way out which is made in achieving

the goal, also requires readiness, creativity, knowledge and skills and their application in daily life. The ability in mathematical problem solving is one capability students need to have, for solving the problem of great benefit to the student to see the relevance of math with other subjects, as well as in real life. Students are said to be able to solve mathematical problems if they can understand, choosing the right strategy, and then implement them in problem solving. Mathematical problem solving ability was good also affected the mathematics learning outcomes to be better and also the general purpose of teaching mathematics, because the mathematical problem-solving skills can help in solving the problems well in other subjects and in everyday life. Lack of students' mathematical problem solving ability also causes the mathematics teaching and learning process does not achieve the expected learning outcomes.

Because problem solving is very difficult mathematical activities both teach and learn, then a large amount of research, especially that done in primary schools has focused on solving mathematical problems. The focus of his research include the problem characteristics, the characteristics of students succeed or fail students in problem-solving, learning problem-solving strategies that may help students toward successful groups of students in problem-solving. From various studies, among others obtained the following conclusions. (1) Strategy specific problem solving can be taught. (2) There is no single strategy that can be used appropriately to any problems encountered. (3) A variety of problem-solving strategies can be taught to students with the intention to provide an experience that they can use when faced with a wide variety of problems. They should be encouraged to try to solve different problems by using the same strategy followed by discussion of why a strategy is only suitable for a particular problem. (4) Students should be exposed to a variety of problems that can not be resolved quickly so that these need to try a variety of alternative solutions. (5) The ability of the child in solving problems is closely related to the level of their development. Thus the problems given to children, the degree of difficulty should be adjusted to their development.

Problem solving can improve critical thinking skills, logical and systematic. Problem-solving ability is less need to be studied further to determine how the

mathematical problem solving abilities of each student. One benchmark to assess the success of teaching is to use the results achieved learners in learning. Of course, learning outcomes assessment is done by the teacher.

According Sumiati (2016: 1) the role of the teacher is to provide the knowledge needed by students' to express their opinions, ask questions, explain, and give examples that will be studied. Furthermore, teachers provide linear programming for students' to actively participate in real apply what they have learned from the teacher to ask, argue, do chores, practicing, or try.

To obtain optimal results needed ability of teachers and students. But the activity between teachers and students' is not yet visible in the learning process, especially in class XI SMA Negeri 2 Kisaran. The following are some of the documentation of student test results.

Question 1.

An electronic factory produce two type of televison, thodse are TV A and TV B. To make TV A required 6 hours on the machine I and 4 hours on the machine II, while TV B requires 2 hours on the machine I and 8 hours on the machine II. Every day the machine work not more than 18 hours. If every day the factory produce x item of TV A and y item of TV B, then determine the mathematical model of the problem and show the area of set completion of the problem!

Answer 1.

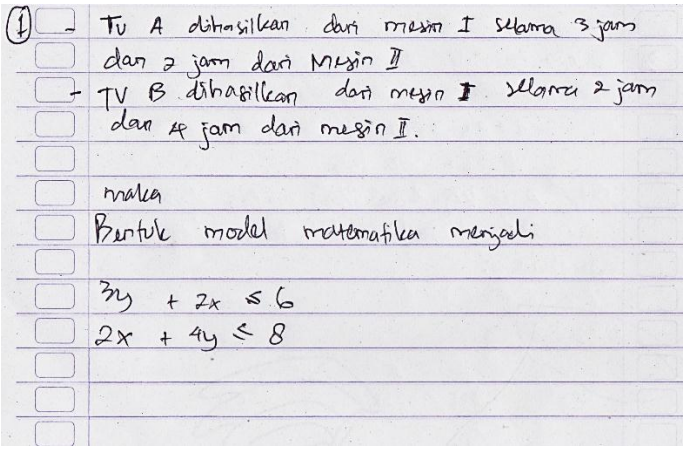

Figure 1.1 Observation result of student's answer number 1

From the answer above, we can see that the students have not been able to solve the problems into answer corretly. Students did not understand the problems mentioned above, she/he didn't write what the question is. Student also had not been able to write a formula that can solve these problems so as a result students could not do the calculations right and got the right answer.

Question 2.

A boutique has two types of cloth those are satin and prada. It has stok of 4 meters satin and 6 meters prada. From these topic will be made two party dress. The party dress I needs 2 meters of satin and 2 meters of prada. Meanwhile the party dress II needs 1 meter of satin and 2 meters of prada. The selling price of party dress I is Rp. 500,000.00 and party dress II is Rp. 400,000.00. Then determine the objective function of the problems. What does the term of objective function contained of the problems? How many party dress to be made in order to obtain the maximum price selling?

Answer 2.

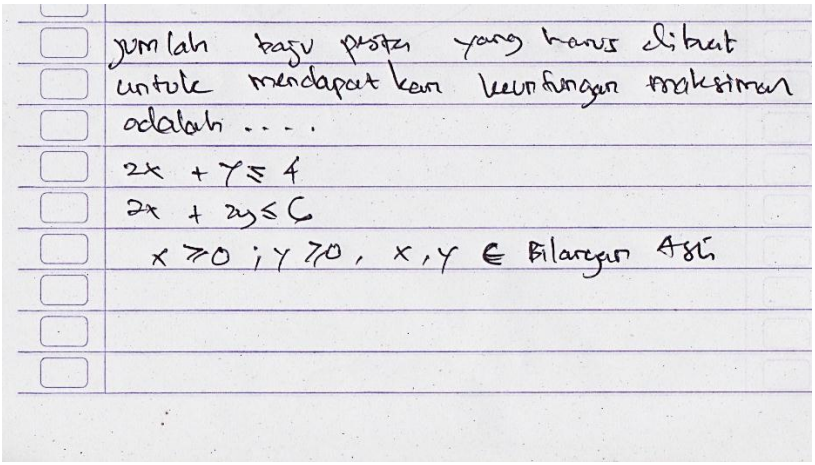

Figure 1.2 Observation result of student's answer number 2

From the answer above, we can see that the students can answer but not complet. She / He doesn't know, what must they do to answer the qustion. Because they don't know the concept about the topic

Question 3.

Putri receive the cake orders from neighbors who would make a party. There are two types of cake that must be made by Putri namely Brownies and Blackforest. To make a pan of Brownies, Putri needs 50 grams of chocolate and 200 grams of flour and then to make a pan of Blackforest requires 120 grams of chocolate and 240 grams of flour. Chocolate which's provided is 60 600 grams and flour is 960 grams. The patries are being ordered at least two pans of brownies and at least one pan of Blackforest. If putri sells a pan of Brownies with the price Rp. 20,000.00 and Rp. 40,000.00 for a pan of Blackforest, how much pans that must be made by Putri to get maximum revenue?

Answer 3.

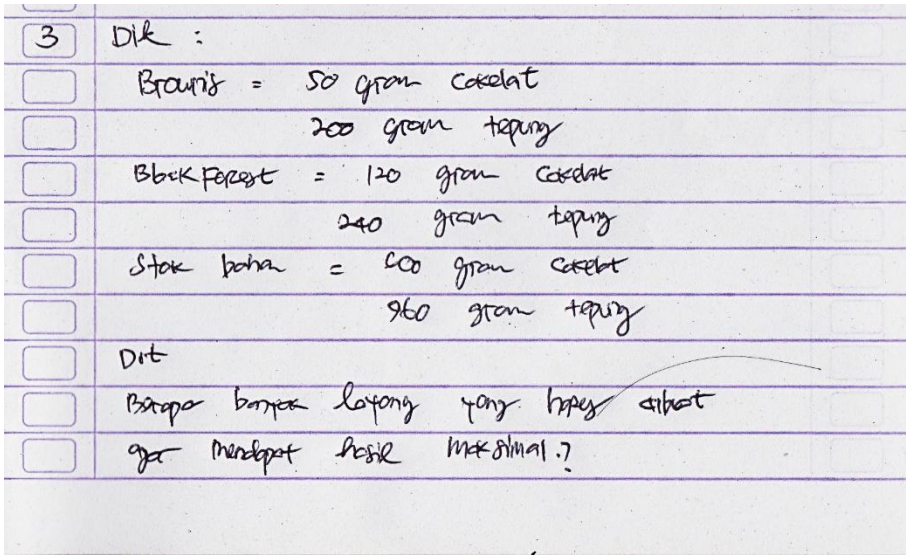

Figure 1.3 Observation result of student's answer number 3

From the answer above, we can see that thestudents have not been able to solve the problem into corret description with correctly. She / He only just write who known from the question.

From the answers above, we can see that the students have not been able to solve the problems into answer correctly because students still looks passive students' in the learning process. When there are problems that are less understood, most students choose to remain silent and not ask questions. So this suggests that

as only a teacher-centered learning (teacher centered) alone, when it should be centered on the student (student centered).

This has implications for the study of students, as evidenced by 40 students only 12 people who passed the daily test in accordance minimum completeness criteria (KKM) mathematics courses is 70, the remaining remedial. This is reinforced by the fact that Tilaar (in Asmani, 2016: 16) one of the things that a weakness in the study is the students are never taught or taught to be creative and innovative and oriented to curiosity (curiosity or harsh).

The implementation of 2013 curriculum requires a paradigm shift of learning, where students are trained to learn to observe, ask questions, collect data, analyze (associate) data, and communicate the results of studying the so-called scientific approach (Sani, 2014: vii). One model of learning that can be applied to the scientific approach is a model of problem-based learning. Mudlofir (2016: 72) asserts that the problem-based learning model (PBL) is one of the innovative learning model that can provide active learning conditions for students'. According Shoimin (2014: 130) model of problem-based learning (PBL) or in terms of its foreign Problem Based Learning (PBL) is a learning model that is characterized by the existence of real problems as a context for the students to learn critical and problem solving skills as well as gaining knowledge.

Used since the 1960s, many teachers express concerns about the effectiveness of problem-based learning (PBL) in certain classroom settings. Whether the teacher introduce the student-centred pedagogy as a one-time activity or mainstay exercise, grouping students together to solve open-ended problems can present pros and cons. According to Guido (2016) below are five advantages of problem-based learning:

1. Development of Long-Term Knowledge Retention

Students who participate in problem-based learning activities can improve their abilities to retain and recall information, according to a literature review of studies about the pedagogy.

The literature review states "elaboration of knowledge at the time of learning" — by sharing facts and ideas through discussion and answering questions —

"enhances subsequent retrieval." This form of elaborating reinforces understanding of subject matter, making it easier to remember. Small-group discussion can be especially beneficial — ideally, each student will get chances to participate. But regardless of group size, problem-based learning promotes long-term knowledge retention by encouraging students to discuss — and answer questions about — new concepts as they're learning them.

2. Use of Diverse Instruction Types

The teacher can use problem-based learning activities to the meet the diverse learning needs and styles of your students, effectively engaging a diverse classroom in the process.

In general, grouping students together for problem-based learning will allow them to:

a. Address real-life issues that require real-life solutions, appealing to students who struggle to grasp abstract concepts
b. Participate in small-group and large-group learning, helping students who don't excel during solo work grasp new topic
c. Talk about their ideas and challenge each other in a constructive manner, giving participatory learners an avenue to excel
d. Tackle a problem using a range of content you provide — such as videos, audio recordings, news articles and other applicable topic — allowing the lesson to appeal to distinct learning styles

Since running a problem-based learning scenario will give you a way to use these differentiated instruction approaches, it can be especially worthwhile if your students don't have similar learning preferences.

3. Continuous Engagement

Providing a problem-based learning challenge can engage students by acting as a break from normal lessons and common exercises. It's not hard to see the potential for engagement, as kids collaborate to solve real-world problems that directly affect or heavily interest them.

Although conducted with post-secondary students, a study published by the Association for the Study of Medical Education reported increased student

attendance to — and better attitudes towards — courses that feature problem-based learning. These activities may lose some inherent engagement if you repeat them too often, but can certainly inject excitement into class.

4. Development of Transferable Skills

Problem-based learning can help students develop skills they can transfer to real-world scenarios, according to a 2015 book that outlines theories and characteristics of the pedagogy.

The tangible contexts and consequences presented in a problem-based learning activity "allow learning to become more profound and durable." As you present lessons through these real-life scenarios, students should be able to apply learnings if they eventually face similar issues.

For example, if they work together to address a dispute within the school, they may develop lifelong skills related to negotiation and communicating their thoughts with others. As long as the problem's context applies to out-of-class scenarios, students should be able to build skills they can use again.

5. Improvement of Teamwork and Interpersonal Skills

Successful completion of a problem-based learning challenge hinges on interaction and communication, meaning students should also build transferable skills based on teamwork and collaboration. Instead of memorizing facts, they get chances to present their ideas to a group, defending and revising them when needed. This should help them understand a group dynamic. Depending on a given student, this can involve developing listening skills and a sense of responsibility when completing one's tasks. Such skills and knowledge should serve your students well when they enter higher education levels and, eventually, the working world.

In addition, there is also a Realistic Mathematics Education (RME) model that can be applied to the process of teaching and learning. According to Hans Freudenthal (in wijaya, 2012, 2012: 20) realistic mathematics learning approach is"mathematics is humanity activity". Statement "mathematics is human activity" shows that Freudenthal not put mathematics is a ready product, but rather as a form of activity or process. According to Freudenthal mathematics should not be given to students as a ready product that is ready to use, but rather as a form of activity in

constructing mathematical concept. Freudental familiar with the term “guided reinvention” as the students are actively committed to rediscover a mathematical concept with teacher guidance. Futhermore, do not put mathematics as a closed system but rather as an activity called mathematize.

A realistic problem is not necessarily a real-world problem and usually found in daily life of students. A problem called "realistic" if the problem can be imagined or real in the student's mind (Wijaya, 2012: 20-21). Realistic problem presented by teacher at the beginning of the learning process so that the idea or mathematical knowledge can appear from the realistic problems. During the process of solving realistic problems, students will learn problem solving and reasoning, in the discussion the students will learn to communicate. The results obtained during the learning process will be easy to remember because mathematical ideas students find themselves with the help of the teacher. In the end, the students will have respect for mathematics because with realistic problem related to real life day-to-day learning process of mathematics not directly to the abstract from so that students are motivated to learn mathematics and develop their ideas and solve problems in mathematics. Using realistic mathematics education starts from a realistic problem is expected that students will be able to construct their own understanding and will make learning more meaningful so that students' understanding of the material more depth that would be beneficial to enhance the ability in problem solving.

According Palinusa (2013) presents the findings of a quasi-experimental with pre-test-post-test design and control group that aims to assess students’ critical mathematical thinking skills and character through realistic mathematics education (RME) culture-based. Subjects of this study were 106 junior high school students from two low and medium schools level in Ambon. The instruments of the study are: students’ early math skills test, critical thinking skills mathematical test and perception scale of students’character. Data was analyzed by using ttest and Anova. The study found that: 1) Achievements and enhancement of students’ critical mathematical thinking skills who were treated with by realistic mathematics education is better then students’ skills were treated by conventional mathematics

education. The differences are considered to: a) overall students, b) the level of early math skills, and c) schools' level; 2) Quality of students' character who were treated by realistic mathematics education is better then students' character who were treated by conventional mathematics education The differences are considered to: a) overall students, b) the level of early math skills, and c) schools' level.

According Anwar (2012) his paper focuses on an implementation a sequence of instructional activities about addition of fractions that has been developed and implemented in grade four of primary school in Surabaya, Indonesia. It is conjectured that the students could add fractions with different denominator. The progress of students' reasoning in explaining their answer showed that Realistic Mathematics Education (RME) can contribute to developing learning to a more progressive learning. In our research, RME has supported the classroom activities and we have seen how students learned better in such an environment. The use of measurement contexts have supported students thinking and reasoning in solving addition of fractions. With a good context, students can construct their understanding about mathematical ideas that is meaningful so that it makes sense for them.

Because Problem Based Learning and Realistic Mathematics Education have some similarity especially that both of learning model start from the contextual problem that related to the human daily life, so the researcher want to know whether between of both models is better in helping the students to understanding the mathematics especially in solving the problems that always exist in mathematics.

Based on the description above, the researcher has interested in conducting research entitled "The Comparison of Students' Mathematical Problem Solving Ability by using Problems Based Learning and Realistic Mathematics Education on The Topic of Linear Programing in Grade XI SMAN 2 Kisaran Academic Year 2016 / 2017"

1.2 Problem Identification

The problem in this research can be identified as follows:

1. Students' still looked passive in the learning process, most students choose to remain silent and not ask questions.
2. Learning impressed not only centered on the teacher (teacher centered), not centered on the learner (student centered).
3. The results of students' low of 40 students only 12 people who passed the daily test in accordance minimum completeness criteria (KKM) mathematics courses is 70, the remaining remedial.
4. Curiosity low student.

1.3 Problem Restrictions

Researcher restrict research on students' mathematical problem solving matter of linear programing, with the application of realistic mathematics education and problem based learning students of class XI SMA N 2 Kisaran academic year 2016 / 2017.

1.4 Problem Formulation

Based on problem limitation above, then the problem can be formulated as follows:

"is students' mathematical problem solving ability in the classroom taught using Realistic Mathematics Education is better than students' mathematical problem solving ability in the clasroom that taught using Problem Based Learning?"

1.5 Research Objectives

The purpose in this research is to know whether students' mathematical problem solving ability taught using Realistic Mathematics Education is better than Problem Based Learning for Grade XI in SMA Negeri 2 Kisaran.

1.6 Benefits of Research

The benefits of this research are:

1. For schools, it can be a reference for potential students' can develop that spurred other teachers in order to conduct research and development of teaching and learning in the classroom.
2. For the teacher, may be topic to develop students' skills in the topic linear programming.
3. For other researchers, can be a learning and reference for developing further research.