SOCRATIC METHOD OF TUTORING: AN INNOVATION FOR BETTER STUDENTS' NUMERACY SKILLS

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Socratic Method of Tutoring: An Innovation
for Better Students' Numeracy Skills

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Abstract

This action research sought to determine the students' numeracy skills before and after using the Socratic Method of Tutoring (SMT). This exploration also measured the effect of SMT on the students' mathematical operations of numbers. Additionally, the study investigated the challenges encountered by the peer tutors in handling their peers' numeracy skills and their coping mechanisms in addressing the problems they experienced. The study used sequential explanatory research. The research participants consisted of thirty (30) students from the ABM strand and eighteen (18) peer tutors from the STEM strand of Zamboanga del Sur National High School – Senior High during the school year 2022-2023. The students obtained below-normal scores before the utilization of SMT, but the performance of the students in numeracy tests significantly improved after the intervention. The drastic shift in students' numeracy skills proved the effectiveness of the Socratic Method of Tutoring to the students. The Peer tutors experienced four (4) major problems or challenges: (1) the peer's lack of mathematical fundamentals, (2) the distracted peer's focus, (3) insufficient knowledge as tutors, and (4) management of time constraints as tutors. Further, the peer tutors articulated their four (4) coping mechanisms: (1) reviewing and reteaching the competencies to their Peers, (2) being patient towards their Peers, (3) self-preparation of the topic as tutors, and (4) proper time management as tutors. The findings of this research support the conduct of a learning program to capacitate the students in their numeracy skills and enhance the pedagogical skills of the Peer Tutors of the school.

Keywords: Socratic Method of Tutoring, Numeracy Skills, Peer Tutors

Acknowledgment

Zamboanga Peninsula

Context and Rationale

The careful assessment of K–12 students plays a crucial role in ensuring compliance with the standards and requirements set by the Department of Education (DepEd) for K–12 graduates. Education Secretary Leonor Briones, in conjunction with DepEd Order No. 18 series 2017, emphasized the importance of fostering reading skills in every child through the implementation of the Early Language, Literacy, and Numeracy Program (Department of Education 2017, 1). While numerous studies have been conducted on literacy programs, only a limited number have focused on numeracy. Numeracy encompasses the knowledge, skills, attitudes, and behaviors that students need to effectively apply mathematics in various contexts. It involves understanding the role of mathematics in the world and possessing the mindset and ability to utilize mathematical knowledge and skills proficiently (Numeracy for All Learners, 2022).

The Socratic Method of Tutoring (SMT) was anchored on the philosophies of teaching with the Greek philosopher Socrates. By probing the opinions of the pupils with questions, any contradictions will be made clear. Additionally, by employing this method of inquiry, it pushed people to challenge what they said and to look beyond the obvious (Scholle, 2020, 1). The Socratic tutoring method can come across as adversarial. Students' views frequently contested by tutors to make them defend their decisions and demonstrate how a rule that produces a just outcome in one instance could have an unfavorable effect on another. When employing this method, tutors can be unpredictable by calling on students randomly or by giving them advance notice that they would be on call. Tutors often differ in demeanor and whether they will allow a student to opt out of providing an answer (Coughlin and Shadel, 2022, 1).

The inquiry method is another name for the Socratic method of tutoring. The method based on a student's current level of comprehension of a subject. Questions move from what the student already knows to new information and concepts the tutor leads the student into with their directed inquiry (Connor, 2003,1). A key component of the Socratic Method of teaching is the dialogue between the teacher and the students, who are then asked questions and given the opportunity to respond. This approach based on the principle that questions should be asked repeatedly until a student discovers the proper response to their academic query. It aims to support students in developing critical thinking abilities and meaningful engagement with their educational material (Saint Leo University, 2022, 1).

Over time, a significant majority of students (63%) had trouble answering problems that called for knowledge of fractions, indices, logarithms, or units of measurement (Tariq et al. 2010, 47). It is alarming to know that some ZSNHS-SHS graduates have low levels of numeracy skills, considering the years they spent attending school.

Innovation, Intervention, and Strategy

The researcher designed a learning program to capacitate identified students who will act as tutors and determine those with low mastery levels in numeracy that will benefit the program. This learning program employs the Socratic Method of Tutoring to scaffold students' learning in numbers. In the aspiration to keep up the directive of the Department of Education to produce quality senior high school graduates, ZSNHS-SHS sought to implement tutorials among those students with the most minor numeracy skills at the school level. This strategy will reasonably convey the problems/challenges

encountered by the tutors towards students' mathematical operation of numbers after implementing the innovation that affects the students' numeracy skills.

As an intervention, this learning program aims to: (1) sharpen the skills of participants in numeracy; (2) give technical assistance to students' difficulties in basic mathematical operations through tutors, and (3) convey the problems/challenges experienced by the tutors towards students' mathematical operations of numbers.

The usual tutoring method is a tutor-centered approach wherein most efforts of teaching-learning are within the tutors. At the same time, Socratic Method is a student-centered style of tutoring that utilizes the inquiry-based and discovery method of teaching-learning. Student tutors allowed their peers to express their prior knowledge of specific competencies and divulged their difficulties in solving mathematical operations of numbers. Repeated questions and exercises were given to their peers until they discovered the process of solving the mathematical operations of numbers.

Student tutors were purposely chosen from the STEM strand and assumed to have prior knowledge of the competencies. They have undergone training on how to employ the Socratic method of tutoring by the teacher knowledgeable with the approach. The tutorial program of their peers has started after the training of student tutors. The tutorial program lasted for four (4) weeks, every Friday, wherein students had ample time to attend the tutorial program. The tutorial program served as remediation for students who have difficulties executing mathematical operations of numbers.

The numeracy skills of individuals cover broad topics and competencies in Mathematics. In this innovation, the tutorial program focused on the following: the basic mathematical operations of fractions, indices, logarithms, exponents, and units of measurement. These competencies were the most common topics that would come out during entrance tests and other professional examinations.

This intervention's main goal was to support the curriculum's learning objectives, notably in creating qualified and prepared K–12 Basic Education Program graduates. Senior High Schools are prepared for life after graduation, according to the Department of Education. The K-12 program framed to produce long-lasting learners who are competitive worldwide and equipped to pursue their chosen journey (Ciriaco, 2018). The researcher desired to implement a school-wide program that will capacitate, develop, and enhance the learners' numeracy skills.

Action Research Questions

Determining the impacts of the Socratic Method of Tutoring in numeracy skills on students at Zamboanga del Sur National High School - Senior High School (ZSNHS-SHS) during the school year 2022–2023 was the primary goal of this action research. This study aimed to use the Socratic Method of Tutoring to improve the student's numeracy abilities.

Specifically, this action research sought to answer the following queries:
1. What is the level of students' numeracy skills before and after applying the Socratic Method of Tutoring (SMT)?
2. How do students' numeracy skills levels compare when applied with SMT and not applied with SMT?
3. What are the problems/challenges student tutors encounter in handling peers' mathematical operations of numbers?

4. How do student tutors cope with the challenges encountered towards peers' mathematical operations of numbers?
5. Based on the findings, what learning program can be designed to capacitate students' numeracy skills?

Action Research Methods

Research Design

This study utilized a mixed methods sequential explanatory design incorporating sequentially quantitative and qualitative data collection and analysis in a progressive approach (Creswell & Piano Clark 2017, 77). This design is appropriate for this study which started with a quantitative description and comparison of students' numeracy skills before and after applying the Socratic Method of Tutoring (SMT). This exploration was followed by a subsequent qualitative phase on the problems and coping strategies to the challenges encountered by the student tutors in handling peers' mathematical operations of numbers.

Participants and Other Sources of Data and Information

The trained STEM strand students who served as tutors and the chosen students or tutees through the universal sampling of Accountancy, Business, and Management Strand (ABM) of ZSNHS-SHS were the participants in this action research. These pupils, or tutees, responded to the verified pre-test and post-test created by the researcher.

Students who had an equivalent achievement level of utmost average down to absolutely no mastery during the pre-test were delegated into the learning program. In addition, non-probability sampling was used in choosing samples for the qualitative investigation in this action research. Data saturation was also utilized to determine the number of tutors who will supply information about the problems/challenges encountered in handling students' difficulties with the mathematical operation of numbers.

Research Instruments

The first research instrument used in the study is the researcher-made Test on Students' Numeracy Skills. This instrument underwent content validation by the expert validators and an internal consistency reliability test using Cronbach's alpha. The 40-item numeracy skills test captured ten (10) competencies/objectives as reflected in the Table of Specification.

The second instrument used in the conduct of research is the interview guide which explores the problems and coping strategies for the challenges encountered by the student tutors in handling peers' mathematical operations of numbers. This interview guide was validated by content experts to ensure the validity of the data collection.

Data Gathering Procedure

In order to uphold the integrity of the research procedure, the researcher received permission from the Office of the Principal to carry out the study at the school level. Before deciding to participate as research subjects, the chosen students were asked for their informed consent.

As part of the initial stages of the data collection procedure, participants were informed of the privacy of any information obtained. The data collected is only utilized

for the study. The study's relevance and significance, the explanation of risks and benefits, the required degree of commitment, and confidentiality protection were all brought up in the researcher's reminders to the research participants.

In this action research, both quantitative and qualitative data were progressively examined using the Sequential Explanation Design. Participants in the study responded to a validated researcher-made post-test to reassess the degree of the students' numeracy skills after using the Socratic Method of Tutoring and finishing the learning program. Results from the pre-test and post-tests were compared to see if the innovation had made any difference.

The interview method through a questionnaire was used to solicit qualitative data on the problems/challenges identified by the tutors regarding students' difficulties with the mathematical operation of numbers and their coping mechanisms to address those challenges.

Data Analysis

Descriptive and inferential statistics were employed to analyze this study's quantitative data. Specifically, mean, standard deviation and Mean Percentage Score (MPS) were utilized to summarize the level of students' numeracy skills before and after using SMT. From DepEd Memorandum No. 160, s. 2012, the degree of learners' numeracy abilities, the scaling of their score, and its descriptive equivalent are displayed here and have been modified to fit.

Table 1. Mastery/Achievement Level

Pre-test / Post-test Score	Descriptive Equivalent
96 – 100%	Mastered
86 – 95%	Closely Approximating Mastery
66 – 85%	Moving Towards Mastery
35 – 65%	Average
15 – 34%	Low
5 – 14%	Very Low
0 – 4%	Absolutely No Mastery

Inferential statistics such as the paired-sample t-test was employed to determine the significant difference in the students' numeracy skills before and after using SMT. Moreover, thematic analysis was also utilized in inducing the themes of the qualitative data on students' difficulties with the mathematical operation of numbers and their coping mechanisms to address those challenges.

Results and Discussion

Level of Students' Numeracy Skills. Students took two (2) sets of numeracy tests. The first was before the application of the Socratic Method of Tutoring (SMT), and the next test was after the application of SMT.

Table 2. Level of Students' Numeracy Skills Before SMT

Test	Mean Score	SD	MPS	Descriptive Equivalent
Numeracy Test	17.37	4.13	43.42%	Average

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Total Items: 40
Scale: 96 – 100% = Mastered; 86 – 95% = Closely Approximating Mastery; 66 – 85% = Moving
Towards Mastery; 35 – 65% = Average; 15 – 34% = Low; 5 – 14% = Very Low; 0 – 4% = Absolutely
No Mastery

Table 2 shows that the level of students' numeracy skills before Socratic Method of Tutoring disclosed as Average *(Mean = 17.37; SD = 4.13; MPS = 43.42%).* The mean indicated that the students would typically get below 50% of the total items in every numeracy test conducted. The standard deviation proved that most students who took the test did not score more than 54%. Considering the years spent at school, the students obtained below-standard scores on the numeracy test. Moreover, the students demonstrated sub-par performance in mathematical operations of numbers. The school had some students with a low level of numeracy skills.

Among the ten (10) competencies considered in the numeracy test which was reflected in the Table of Specifications (TOS) (*See Appendix B*) and Test Item Mastery Level (TIML_Pretest) (*See Appendix C*), only Competency no. 7. Solve problems involving sequences *(TIML = 73%; Nearing Mastery)* posted excellent level of numeracy skills. These results indicated the need to capacitate and enhance the student's skills in the operations of numbers. Numeracy appears to be a current area of relative difficulty, and learning increasingly complicated mathematical concepts seems to progress slowly. However, some teaching strategies that try to utilize comparative advantages in communicating number concepts seem to be useful in practice. To assess instructional strategies and identify the problems pupils confront, more research is needed (Buckley, Sue. 2007, 11–14).

Table 3 confirms the effectiveness of the Socratic Method of Tutoring as the interpretation change to Moving Towards Mastery *(Mean = 32.87; SD = 4.93; MPS = 82.17%).* On average, the students got 82% of the correct answers to the total items in the numeracy test. The standard deviation substantiated that more students could score up to 95% of the total items. The student's performance in numeracy tests significantly improved after SMT. The results inferred that the students could carry out good results with the guidance of their peers and their teachers. A notable increase in MPS is conspicuous after SMT.

Table 3. Level of Students' Numeracy Skills After SMT

Test	Mean Score	SD	MPS	Descriptive Equivalent
Numeracy Test	32.87	4.93	82.17%	Moving Towards Mastery

Total Items: 40
Scale: 96 – 100% = Mastered; 86 – 95% = Closely Approximating Mastery; 66 – 85% = Moving
Towards Mastery; 35 – 65% = Average; 15 – 34% = Low; 5 – 14% = Very Low; 0 – 4% = Absolutely
No Mastery

Out of ten (10) competencies included in the post numeracy test, which was reflected in the Table of Specifications (TOS) (*See Appendix B*) and Test Item Mastery Level (TIML_Post Test) (*See Appendix D*), only Competency no. 6. Solve problems involving factors of polynomials *(TIML = 50%; Not Mastered)* reported low levels of numeracy skills. This result convincingly shows the benefits of the Socratic Method of Tutoring (SMT) to the students. Positive evaluations praised the tutorials' inclusive

communication style and clarity. Although research cannot verify that attending tutorials was the single factor in improving performance, it does indicate the benefit of early interventions to promote numeracy skills (Choudhary and Malthus 2017, 1-22).

Test of difference of students' numeracy skills before and after the Socratic Method of Tutoring (SMT). In this action research, the researcher used a paired-sample t-test to ascertain whether there was a significant difference between the students' numeracy abilities before and after SMT. The mean results of the pupils' numeracy examinations are shown in Table 4. (T-value = -19.09; p-value =.001). It showed that there is a substantial difference in the students' numeracy abilities before and after SMT. The fact that the students' performances significantly improved suggested that the tutorial session was effective in boosting their numeracy.

Table 4. Test of difference before and after SMT

Variables	t-value	df	p-value	Interpretation
Before and After SMT	-19.09	29	.001	With Significant Difference

The outcome revealed that using SMT significantly improved pupils' numeracy abilities. Prior to SMT, the students' numeracy abilities were not very strong. However, with the aid of peer tutors after SMT, the students increased their knowledge and ability levels. Until students use the various parts of numeracy in real-world situations, they will not form the mental habits of a numerate citizen. Like literacy, numeracy is a skill that every person should be able to use (Steen 1999, 8-13).

One of the key benefits of the Socratic Method of Tutoring (SMT) is that it promotes active learning and engagement among students. By encouraging students to ask questions and participate in the learning process, they become more invested in their education and take ownership of their learning. This method leads to more excellent retention of information, as students are more likely to remember and apply concepts they have actively engaged. SMT also encourages student interaction and discussion, which is a bonus. Students learn cooperation and communication skills, which are crucial for success in both academic and professional settings when they are encouraged to collaborate to solve challenges.

SMT also encourages students to have a growth mindset, which encourages them to see barriers as opportunities for learning and development rather than things to fear. In general, the Socratic Method of Tutoring is a cutting-edge method of instruction that can greatly enhance students' numeracy abilities. By encouraging critical thinking, active learning, teamwork, and a growth mindset, this method aids students in acquiring the skills necessary to thrive in school and in their future employment. As a result, educators ought to think about incorporating it into their teaching methods.

Problems/Challenges Encountered by Student Tutors in Handling Peers' Mathematical Operations of Numbers. Selected STEM students were chosen to serve as peer tutors, assisting their peers in developing their numerical abilities and knowledge. Investigating the issues or difficulties the peer tutors faced while using the Socratic Method of tutoring is one of the goals of this study. To increase results, peer tutoring should address the students' difficulties and disappointments. According to

Chow and Loke (2007, 237–244), peer tutors have better knowledge than teachers do of the learning difficulties that other peer learners encounter.

Using textual analysis of the qualitative responses, the peer tutors experienced four (4) major problems or challenges: (1) *Peer's lack of mathematical fundamentals*, (2) *Distracted Peer's focus*, (3) *Insufficient knowledge as a tutor*, and (4) *Management of time constraints as a tutor*.

Theme 1: Peer's lack of mathematical fundamentals. Several peer tutors expressed that their peers lack mathematical fundamentals such as mathematical operations of fractions, decimals, indices, and others. Moreover, this should be the foundation for better numeracy skills of the students. The research participants (RP) disclosed the following:

> "*The problem that I have encountered with my tutees is they have to recall the basics such as: adding, subtracting, multiplying, and combining fractions. They also need to practice subtracting digits with decimals, as I observed with co-tutors. They had a hard time solving the operation. Nonetheless, they were able to cope with everything.*" -RP 3

> "*Honestly speaking, my tutees were hard to handle. They do not know how to multiply using the traditional way. They must depend on a scientific calculator.*" -RP 8

> "*One problem I encountered was their inability to recall the basics of Math, so I had to start from the very beginning before we had a smooth flow of the lessons.*" -RP 11

> "*Some of them do not know how to solve fractions. They also do not know how to evaluate simple problem/s. They do not know how to find the LCD.*" -RP 16

Theme 2: Distracted Peer's focus. Catching the attention of their peers is a great challenge confronting peer tutors. Some of the students were not motivated by every topic discussed by tutors. Addressing peer's focus plays an integral part in understanding the topic better as they communicated:

> "*At first, my assigned tutees lacked the presence of mind, which made it difficult to teach them even the most basic of math. It took them a while to fully comprehend the questions I prepared for them. It led to a point where I was also confused with my teachings.*" -RP 2

> "*Some of the tutees get distracted by their phone, and they go to their social media while I teach them.*" -RP 9

> "*I was having difficulty in teaching them since they tend to forget the lessons. One of the tutees does not pay attention. He gets distracted by his phone and social media.*" -RP 17

> "*One of my tutees is being distracted by his phone, which leads him not to understand the topic.*" -RP 26

Theme 3: Insufficient knowledge as a tutor. Peer tutors are not professional teachers, so they have limited content knowledge to teach and little experience in pedagogical skills to adjust to their peers' difficulties. Nonetheless, they have tried their best to help improve the numeracy skills of their peers. Peer tutors emphasized that they have difficulties in some topics or competencies tackled as they revealed:

" *In my case, the difficulty in transferring knowledge was a problem or challenge. Because I know I am not good at Math and Problem-solving."* -RP 7

"I have encountered the feeling of wanting to explain something concisely, but somehow, I cannot. Most of the items would take me a long time explaining it to them. However, I could still make them understand my point and the topic. It is a bit of a challenge when you should fully understand the whole lesson before teaching it to them." -RP 12

"Having trouble in solving those math problems and how I should answer it and explain it to them, and I felt nervous at the same time because I am not familiar with them." -RP 13

"After a month of tutoring my fellow schoolmates, I encounter some problems teaching them, like understanding the problem and solving the problem. As a student from the different building, they were shy to ask questions and sometimes hardly interact." -RP 14

Theme 4: Management of time constraints as a tutor. The process of having tutorials add a burden in the life of the peer tutors. As teachers mandated by the Department of Education to inculcate core values to the students, peer tutors responded by being Makatao in their peers by helping them. Moreover, peer tutors gave extra time to help students who have low numeracy skills. In this study, the peer tutors observed that time constraints should be dealt. The research participants (RP) expressed the following:

"*The problems/challenges I faced were time management and balancing my priorities. Instead of having fun and playing with my classmates, I spent it teaching students. I did not know. I even got intimidated by my fellow tutors because of how smart they are."* -RP 4

"I was challenged by the time given during tutorial as it seems it was not enough to perform the discussion." -RP 6

"I have encountered the feeling of wanting to explain something concisely, but somehow, I cannot. Most of the items would take a long time explaining it to them. But despite that, I was still able to make them understand the point and the topic." -RP 12

"To be honest, it takes much of time in teaching them for most of them forget the Basic Math." -RP 18

One of the most challenging tasks of teaching the students through SMT is their motivation to attend the learning program. Motivation serves as fuel to continue learning

without expecting something in return. The use of diagnostic testing, according to studies, is only the first step in identifying the nature and severity of any skill impairments and treating them. Any identified issues must specify precisely for the best intervention plans to be developed and put into practice (Tariq 2004, 25-29). This exploration identified peer's lack of mathematical fundamentals, distracted peer's focus, insufficient knowledge as a tutor, and management of time constraints as the great challenges of the peer tutors. There are instances when students anticipated that a tutor would act as a knowledgeable group facilitator who would support them in their learning while fostering a good environment. They want the tutor to teach the content without thinking it is their responsibility to do the task (Holmes and Kaufman 1996, 371-377). Along with this proposition, this study claims the need to address the issues and concerns. Kindler et al. (2009) advocated with emphasis that the group, not just the tutor, is responsible for solving identified problems.

     Coping Mechanisms for the Challenges Encountered by Tutors towards their Peer's Mathematical Operations of Numbers. Based on the coping mechanisms for the challenges encountered by peer tutors, the research participants articulated four (4) major categories: (1) *Reviewing and reteaching the competencies to their Peers*, (2) *Being patient towards their peers*, (3) *Self-preparation of the topic as tutors*, and (4) *Proper time management as tutors*.

     Theme 1: Reviewing and reteaching the competencies to their Peers. Recalling what has been discussed previously during the early years of study would probably give a smooth flow of the tutorial sessions. Some students could not remember because they did not understand the topic in the first place. Teaching the topics in another way could bridge the learning gap for the students. The research participants (RP) disclosed:

    "*I could cope by knowing their limitations and competencies in solving a particular operation. The tutees are indeed a fast learner as they are determined, focused, and has the eagerness to learn, therefore, the tutees were able to recall and solve problems effectively.*" -RP 3

    "*I have shown them how to multiply and taught them the way to multiply.*" -RP 8

    "*I was able to cope with the challenges by teaching them the basic maths again so they can recall it.*" -RP 9

    "*I taught them the things they forgot so we would not have a hard time progressing to the following lessons we needed to tackle.*" -RP 11
    "*Before jumping to the next problem, I make sure they understand by letting them solve a different math equation. I also explain to them some mathematical terms.*" -RP 15

    Theme 2: Being patient towards their peers. Patience is a virtue. Peer tutors, like the teachers, also encountered different behaviors of their peers. It requires much energy to be patient, thinking you are the one giving the favor. However, some peer tutors pinpointed being patient as their coping mechanism when they shared:

" *I managed to go through the obstacles through consistency. The consistent pursuit of teaching them lessons benefited them. I worked hard to teach them in different ways, such as oral, written, and games. In the end, they learned useful math from me.*" -RP 2

"*I patiently wait for them if they use their phone, and I continue to teach them lessons.*" -RP 9

"*I was being patient while teaching them because, without patience, our relationship can be ruined. As much as possible, we do our best to teach them in a fun way so that our goal in teaching will be successful. At the end of our tutorial session, we can see that my tutees are having improvements on themselves.*" -RP 17

"*We used conversational and fun way of teaching them so that they will no't get bored during our tutorial.*" -RP 18

Theme 3: Self-preparation of the topic as tutors. Stock knowledge is beneficial as it will be a reliable wealth in the future. Peer tutors looked for ways to make the tutorial sessions better when they found out to have limited knowledge about the topic. Internet may be a good option for everyone. In this research, the participants emphasized the following:

" *I deal with this challenge by asking how to do it so that you can learn to do it and have the knowledge to do it because confidence combined with preparation equals success.*" -RP 7

"*Before I taught them everything I knew about certain topics, I studied. I was learning, reviewing previous lessons, searching up on youtube, managing my time and priorities well, and lastly taking down notes so I could later show it to them during our meeting.*" -RP 12

"*By getting to know each other, sharing ideas, and helping each other with those math problems.*" -RP 13

"*I cope with the challenges by teaming up together with my tutees. We study and learn together because some questions and mathematical problems are hard to understand. That is why we always ask sir Bongga to guide us.*" -RP 14

"*I studied by myself before starting to tutor them.*" -RP 15

Theme 4: Proper time management as tutors. Some peer tutors conveyed that the time allotment for the tutorial program is short, considering that they met once a week for one (1) month. Nevertheless, they properly managed their time to complete the tutorial program. The research participants (RP) expressed the following:

" *I cope with the challenge by managing my time wisely and doing my best. I did not care if I was not good at Math, but I am trying, and I know teaching those students will not only benefit them, but it will also benefit me as a person to be selfless and caring to others.*" -RP 4

"Considering many things to do, I set my schedule and priorities. Given that we only meet once a week for one month, I always check the level of the competencies we are about to teach. So far, the discussion went some progress." -RP 6

"Before I taught them everything I knew about certain topics, I studied. I was learning, reviewing previous lessons, searching up on YouTube, managing my time and priorities well." -RP 12

"I teach them the easiest way or fastest way in solving math problems to cover all the lessons we need to tackle. We usually do not proceed to the next topic if they do not yet understand the present topic." -RP 18

The peer tutors articulated the continuous implementation of the learning program to mitigate the problems/challenges they had encountered. Campbell et al. (2010) emphasize that the usage of mathematical terminology, strategic conversation, and praise between partners increased significantly during verbal encounters, while procedural speaking decreased. This study appeared to be largely successful in raising the self-esteem of both tutors and tutees, improving the frequency and quality of interactive math discussions among students, as well as the tutors' general social and communication skills.

Designing a learning program to capacitate the Students' Numeracy Skills. Based on the study's findings, the researcher created a learning program to boost students' numeracy abilities and enhance peer tutors' classroom management abilities. Senior High School students at Zamboanga del Sur National High School are being tutored using the Socratic Method to improve their numeracy skills. This intervention program supports the directive of the Department of Education to produce prepared and high-quality graduates of the K-12 Basic Education Program. In addition, this capacity-building program will also address the problems/challenges experienced by the peer tutors in handling the student's difficulties in the mathematical operations of numbers. *(See Appendix A)*

Conclusion and Recommendations

This study, which aims to determine the effects of Socratic Method of Tutoring (SMT) on students' numeracy skills, concluded that the use of SMT significantly improved students' numeracy skills as revealed by the pretest and posttest comparison of results. The remarkable increase in students' performance after the tutorial session warrants the claim that SMT is efficient in improving numeracy skills. Thus, SMT provides opportunities for learners to strengthen critical thinking, questioning, and dialogue to stimulate learning. Moreover, the thematic analysis induced four (4) major problems or challenges encountered by the peer tutors in handling their peers such as (1) the peer's lack of mathematical fundamentals, (2) the distracted peer's focus, (3) insufficient knowledge as tutors, and (4) management of time constraints as tutors. Further, the peer tutors articulated their four (4) coping mechanisms in handling the challenges encountered in the implementation of SMT: (1) reviewing and reteaching the competencies to their Peers, (2) being patient towards their Peers, (3) self-preparation of the topic as tutors, and (4) proper time management as tutors.

The findings of this research also recommend further exploration of the phenomenon, such as examining case studies or anecdotal evidence of the Socratic Method being used in teaching contexts. While these may not deliver immediate quantitative evidence of effectiveness, they can offer valuable insights and practical examples. Further research on the effectiveness of the Socratic Method of Tutoring is also recommended since the context in which the tutoring is taking place, and the specific goals through which SMT is implemented may vary depending on the subject, grade level, and individual learners.

Action Plan
Republic of the Philippines
Department of Education
Region IX, Zamboanga Peninsula
Division of Pagadian City
Zamboanga del Sur National High School – Senior High
Pagadian City

Capacity-Building Intervention for the Students and their Peer Tutors
School Year 2022 – 2023

Subject Focus	Program Description	Objectives	Strategies/ Activities	Time Frame	Persons Involved	Sources of Fund	Expected Outcome
MATHEMATICS	School Training to Capacitate the selected Peer Tutors.	Equip and train the selected Peer tutors about the Socratic Method of Tutoring (SMT).	Seminar-Workshop in Capacitating the selected Peer Tutors regarding the Socratic Method of Tutoring (SMT).	Nov. 18, 2022	Proponent / Select Experts/ Teachers/ Peer Tutors	None	*Equipped and trained Peer tutors on the Socratic Method of Tutoring. *Streamlined the tutorial process.
MATHEMATICS	Tutorial Sessions employing the Socratic Method of Tutoring.	Enhance the students' numeracy skills through the Socratic Method of Tutoring.	Tutorial sessions for the identified students having low numeracy skills based on the diagnostic test with their assigned peer tutors.	Nov. 25 – Dec. 16, 2022	Proponent / Teachers/ Peer tutors/ Students	None	Enhanced students' numeracy skills.

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Financial Report

The table below shows the cost estimates expended before, during, and after conducting this action research.

General Descriptions	Quantity	Unit	Unit Price	Total Estimated Costs
Short Bond paper sub. 20	3	reams	275.00	825.00
Ink for printer	4	bottles	271.25	1,085.00
Internet Costs			1,000.00	1,000.00
Printing and Binding	5	copies	60.00	300.00
Ballpen	2	pcs	20.00	40.00
Snacks (50 participants)	50	pax	35.00	1,750.00
Total				5,000.00

Republic of the Philippines
Department of Education
Region IX, Zamboanga Peninsula
Division of Pagadian City
Zamboanga del Sur National High School – Senior High
Pagadian City

Capacity-Building Intervention for the Students and their Peer Tutors
School Year 2022 – 2023

Subject Focus	Program Description	Objectives	Strategies/ Activities	Time Frame	Persons Involved	Sources of Fund	Expected Outcome
MATHEMATICS	School Training to Capacitate the selected Peer Tutors.	Equip and train the selected Peer tutors about the Socratic Method of Tutoring (SMT).	Seminar-Workshop in Capacitating the selected Peer Tutors regarding the Socratic Method of Tutoring (SMT).	Nov. 18, 2022	Proponent / Select Experts/ Teachers/ Peer Tutors	None	*Equipped and trained Peer tutors on the Socratic Method of Tutoring. *Streamlined the tutorial process.
MATHEMATICS	Tutorial Sessions employing the Socratic Method of Tutoring.	Enhance the students' numeracy skills through the Socratic Method of Tutoring.	Tutorial sessions for the identified students having low numeracy skills based on the diagnostic test with their assigned peer tutors.	Nov. 25 – Dec. 16, 2022	Proponent / Teachers/ Peer tutors/ Students	None	Enhanced students' numeracy skills.

Appendix B

TABLE OF SPECIFICATION

Concept/Competency/ Objectives	No. of Hours	%	No. of items	Easy 50% Remembering	Understanding	Average 40% Applying	Analyzing	Difficult 10% Evaluating	Creating	TOTAL
Subject: MATHEMATICS							QUARTER: SECOND			
1. Solve multi-step problems involving multiplication and addition or subtraction of decimals, mixed decimals and whole numbers.	1	2.50%	1.00	0.50		0.40		0.10		1
					1					
2. Solves routine and non-routine problems involving addition, subtraction, multiplication, and division of fractions using appropriate problem solving strategies and tools.	5	12.50%	5.00	2.50		2.00		0.50		5
				6	37	2, 15		11		
3. Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	8	20.00%	8.00	4.00		3.20		0.80		8
					3, 17, 18	7, 12, 16	19		40	
4. Solves routine and non-routine problems involving factors, multiples, and divisibility rules.	3	7.50%	3.00	1.50		1.20		0.30		3
				8, 14	9					
5. Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	9	22.50%	9.00	4.50		3.60		0.90		9
				27, 30	4, 25, 26	28, 32	29, 31			
6. Solves problems involving factors of polynomials.	1	2.50%	1.00	0.50		0.40		0.10		1
					21					
7. Solve problems involving sequences.	2	5.00%	2.00	1.00		0.80		0.20		2
				20	13					
8. Performs two or more different operations on whole numbers with or without exponents and grouping symbols.	3	7.50%	3.00	1.50		1.20		0.30		3
						5, 33	36			
9. Calculate the measures of central tendency of ungrouped and grouped data.	2	5.00%	2.00	1.00		0.80		0.20		2
					24	10				
10. Solve problems involving algebraic expressions.	6	15.00%	6.00	3.00		2.40		0.60		6
				34	22	23	35	38, 39		
TOTAL	40	100%	40	20.00		16.00		4.00		40

Zamboanga Peninsula

Appendix C

Republic of the Philippines
Department of Education
DIVISION OF PAGADIAN CITY
ZAMBOANGA DEL SUR NATIONAL HIGH SCHOOL
SENIOR HIGH SCHOOL
Roxas St., Sta. Maria, Pagadian City

DIRECTION: Do not enter any data on the blue cell.

GRADE/SECTION:	*GRADE XI - ABM*		QUARTER:	*SECOND*

TEST ITEMS MASTERY LEVEL (PRETEST)

Teacher:	**REY O. BONGGA**	Total # of examinees:	**30**	Total # of Items:	**40**

Test Item No.	Learning Competencies	Total # of Examinees with correct responses		Interpretations *Mastered *Nearing Mastery *Not Mastered
		Total	%	
1	Solve multi-step problems involving multiplication and addition or subtraction of decimals, mixed decimals and whole numbers.	20	67%	NEARING MASTERY
2	Solves routine and non-routine problems involving addition, subtraction, multiplication, and division of fractions using appropriate problem solving strategies and tools.	6	20%	NOT MASTERED
3	Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	15	50%	NOT MASTERED
4	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	8	27%	NOT MASTERED
5	Performs two or more different operations on whole numbers with or without exponents and grouping symbols.	7	23%	NOT MASTERED
6	Solves routine and non-routine problems involving addition, subtraction, multiplication, and division of fractions using appropriate problem solving strategies and tools.	15	50%	NOT MASTERED
7	Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	10	33%	NOT MASTERED
8	Solves routine and non-routine problems involving factors, multiples, and divisibility rules.	16	53%	NEARING MASTERY
9	Solves routine and non-routine problems involving factors, multiples, and divisibility rules.	13	43%	NOT MASTERED
10	Calculate the measures of central tendency of ungrouped and grouped data.	14	47%	NOT MASTERED
11	Solves routine and non-routine problems involving addition, subtraction, multiplication, and division of fractions using appropriate problem solving strategies and tools.	9	30%	NOT MASTERED
12	Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	14	47%	NOT MASTERED
13	Solve problems involving sequences.	19	63%	NEARING MASTERY
14	Solves routine and non-routine problems involving factors, multiples, and divisibility rules.	18	60%	NEARING MASTERY
15	Solves routine and non-routine problems involving addition, subtraction, multiplication, and division of fractions using appropriate problem solving strategies and tools.	11	37%	NOT MASTERED

16	Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	5	17%	NOT MASTERED
17	Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	4	13%	NOT MASTERED
18	Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	19	63%	NEARING MASTERY
19	Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	8	27%	NOT MASTERED
20	Solve problems involving sequences.	25	83%	MASTERED
21	Solves problems involving factors of polynomials.	14	47%	NOT MASTERED
22	Solve problems involving algebraic expressions.	17	57%	NEARING MASTERY
23	Solve problems involving algebraic expressions.	10	33%	NOT MASTERED
24	Calculate the measures of central tendency of ungrouped and grouped data.	10	33%	NOT MASTERED
25	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	12	40%	NOT MASTERED
26	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	15	50%	NOT MASTERED
27	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	14	47%	NOT MASTERED
28	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	14	47%	NOT MASTERED
29	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	15	50%	NOT MASTERED
30	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	6	20%	NOT MASTERED
31	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	7	23%	NOT MASTERED
32	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	9	30%	NOT MASTERED
33	Performs two or more different operations on whole numbers with or without exponents and grouping symbols.	13	43%	NOT MASTERED
34	Solve problems involving algebraic expressions.	14	47%	NOT MASTERED
35	Solve problems involving algebraic expressions.	10	33%	NOT MASTERED
36	Performs two or more different operations on whole numbers with or without exponents and grouping symbols.	22	73%	NEARING MASTERY
37	Solves routine and non-routine problems involving addition, subtraction, multiplication, and division of fractions using appropriate problem solving strategies and tools.	8	27%	NOT MASTERED
38	Solve problems involving algebraic expressions.	18	60%	NEARING MASTERY
39	Solve problems involving algebraic expressions.	23	77%	MASTERED
40	Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	14	47%	NOT MASTERED
	TOTAL	521	43%	NOT MASTERED

Zamboanga Peninsula

Appendix D

DIRECTION: Do not enter any data on the blue cell.

GRADE/SECTION:	*GRADE XI - ABM*	QUARTER:	*SECOND*

TEST ITEMS MASTERY LEVEL (POST-TEST)

Teacher:	**REY O. BONGGA**	Total # of examinees:	**30**	Total # of Items:	**40**

Test Item No.	Learning Competencies	Total # of Examinees with correct responses Total	%	Interpretations *Mastered *Nearing Mastery *Not Mastered
1	Solve multi-step problems involving multiplication and addition or subtraction of decimals, mixed decimals and whole numbers.	26	87%	MASTERED
2	Solves routine and non-routine problems involving addition, subtraction, multiplication, and division of fractions using appropriate problem solving strategies and tools.	26	87%	MASTERED
3	Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	17	57%	NEARING MASTERY
4	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	27	90%	MASTERED
5	Performs two or more different operations on whole numbers with or without exponents and grouping symbols.	26	87%	MASTERED
6	Solves routine and non-routine problems involving addition, subtraction, multiplication, and division of fractions using appropriate problem solving strategies and tools.	26	87%	MASTERED
7	Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	27	90%	MASTERED
8	Solves routine and non-routine problems involving factors, multiples, and divisibility rules.	26	87%	MASTERED
9	Solves routine and non-routine problems involving factors, multiples, and divisibility rules.	26	87%	MASTERED
10	Calculate the measures of central tendency of ungrouped and grouped data.	26	87%	MASTERED
11	Solves routine and non-routine problems involving addition, subtraction, multiplication, and division of fractions using appropriate problem solving strategies and tools.	25	83%	MASTERED
12	Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	18	60%	NEARING MASTERY
13	Solve problems involving sequences.	27	90%	MASTERED
14	Solves routine and non-routine problems involving factors, multiples, and divisibility rules.	28	93%	MASTERED
15	Solves routine and non-routine problems involving addition, subtraction, multiplication, and division of fractions using appropriate problem solving strategies and tools.	26	87%	MASTERED

16	Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	16	53%	NEARING MASTERY
17	Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	16	53%	NEARING MASTERY
18	Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	25	83%	MASTERED
19	Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	21	70%	NEARING MASTERY
20	Solve problems involving sequences.	26	87%	MASTERED
21	Solves problems involving factors of polynomials.	15	50%	NOT MASTERED
22	Solve problems involving algebraic expressions.	27	90%	MASTERED
23	Solve problems involving algebraic expressions.	26	87%	MASTERED
24	Calculate the measures of central tendency of ungrouped and grouped data.	27	90%	MASTERED
25	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	18	60%	NEARING MASTERY
26	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	23	77%	MASTERED
27	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	24	80%	MASTERED
28	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	27	90%	MASTERED
29	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	28	93%	MASTERED
30	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	26	87%	MASTERED
31	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	27	90%	MASTERED
32	Approximates the measures of quantities particularly length, weight/mass, volume, time, angle, and temperature and rate.	26	87%	MASTERED
33	Performs two or more different operations on whole numbers with or without exponents and grouping symbols.	27	90%	MASTERED
34	Solve problems involving algebraic expressions.	26	87%	MASTERED
35	Solve problems involving algebraic expressions.	28	93%	MASTERED
36	Performs two or more different operations on whole numbers with or without exponents and grouping symbols.	28	93%	MASTERED
37	Solves routine and non-routine problems involving addition, subtraction, multiplication, and division of fractions using appropriate problem solving strategies and tools.	22	73%	NEARING MASTERY
38	Solve problems involving algebraic expressions.	24	80%	MASTERED
39	Solve problems involving algebraic expressions.	28	93%	MASTERED
40	Solves routine and non-routine problems involving ratio and proportion, finding the percentage, rate and base using appropriate strategies and tools.	28	93%	MASTERED
	TOTAL	986	82%	MASTERED

Zamboanga Peninsula

Appendix E

Name: _____   **Section:** _____   **Score:** _____

Direction: Choose the letter of the correct answer. Write your answers in capital letters on the space provided.

_____1. What is the product of 33.4 and 0.127 subtracted by the product of 0.14 and 0.19?
    a. 4.5128   b. 4.2418   c. 3.5128   d. 3.2158

_____2. Which of the following fractions is greater than $\frac{3}{7}$ and less than $\frac{4}{9}$?
    a. $\frac{3}{10}$ b. $\frac{7}{16}$ c. $\frac{6}{13}$ d. $\frac{2}{3}$

_____3. Forty-eight is 40% of what number?
    a. 60   b. 120   c. 160   d. 180

_____4. A ream of onion skin paper is 4 cm thick. If there are 320 sheets to each ream, how thick is <u>one</u> sheet of paper?
    a. 0.00125 cm   b. 0.00215 cm   c. 0.0125 cm   d. 0.0215 cm

_____5. What is the value of $(-14)^4$?
    a. -38416   b. -38146   c. 38146   d. 38416

_____6. Which of the following has the highest value?
    a. $\frac{3}{7}$ b. $\frac{3}{8}$ c. $\frac{3}{10}$ d. $\frac{3}{11}$

_____7. Solve for n: $\frac{0.24}{0.60} = \frac{n}{5}$
    a. 1.75   b. 2.0   c. 2.25   d. 20

_____8. Find the GCF of 48 and 81.
    a. 9   b. 7   c. 5   d. 3

_____9. The Least Common Multiple of 5, 15 and 20 is _____.
    a. 20   b. 30   c. 45   d. 60

_____10. What is the average of $\frac{1}{6}, \frac{1}{8}$, and $\frac{1}{4}$?
    a. $\frac{13}{12}$ b. $\frac{13}{27}$ c. $\frac{13}{48}$ d. $\frac{13}{72}$

_____11. Divide $(\frac{2}{5} + \frac{3}{15})$ by $\frac{5}{8}$?
    a. $\frac{5}{8}$ b. $\frac{24}{25}$ c. $\frac{25}{24}$ d. $\frac{8}{5}$

_____12. What is $\frac{1}{2}$ of 72?
    a. 42   b. 36   c. 24   d. 12

_____13. What is the missing term in the series 3, 7, 15, 31, 63, ____?
    a. 95   b. 118   c. 127   d. 136

_____14. What is the smallest number which can be exactly divided by 20, 25 and 50?
    a. 150   b. 100   c. 75   d. 40

_____15. Add the following fractions: $\frac{3}{4}, \frac{9}{12}, \frac{18}{36}, \frac{18}{24}$.
    a. 3   b. $\frac{11}{4}$ c. $\frac{5}{8}$ d. $\frac{19}{36}$

_____16. Express $\frac{18}{20}$ as percent.
    a. 0.90%   b. 0.95%   c. 90%   d. 95%

_____17. A store owner makes a 30% profit by selling an item for P1040? How much is the profit?
    a. P100   b. P240   c. P312   d. 800

_____18. What percent of P560 is p47.60?
    a. 0. 08%   b. 0.85%   c. 8.5%   d. 80%

_____19. At what rate should the amount of P90,000 be invested to earn a simple interest rate of P6,<u>300</u> annually?
    a. 9%   b. 8%   c. 7%   d. 6%

_____20. What is the missing term in the series 3, 7, 15, 27, 43, ___, 87?
    a. 36   b. 54   c. 63   d. 73

_____21. Write the expression $4x^5 - 2x^7$ in the factored form.
    a. $2x^5(x^2 + 2)$ b. $2x^5(2 - x^2)$ c. $4x(3x^4 + 2)$ d. $4x^5(1 - 2x^2)$

_____22. If $y = 5x + 3$, what is the value of y when $x = 3$?

    a. 3   b. 5   c. 18   d. 45

_____23. If $6 - x < 20$, then

    a. $x < -26$ b. $x > -26$ c. $x < -14$ d. $x > -14$

_____24. Eight students took a test in Elementary Algebra. Their scores are following; 95, 71, 84, 84, 90, 95, 75.and 95. What is the median?

    a. 84   b. 90   c. 87   d. 95

_____25. If a dosage of medicine is $\frac{3}{2}$ milliliter, how many dosages can be given from a 30ml bottle?

    a. 20   b. 25   c. 30   d. 45

_____26. If a car average $20\frac{1}{2}$ miles per gallon of gasoline on a trip, how many gallons of gasoline will the car use on a 520-mile trip?

    a. $520 \times 20\frac{1}{2}$ b. $520 \div 20\frac{1}{2}$ c. $20\frac{1}{2}+520$ d. $520 - 20\frac{1}{2}$

_____27. What part of an hour has passed from 10:45 pm to 11:25pm?

    a. $\frac{2}{3}$ b. $\frac{2}{5}$ c. $\frac{1}{3}$ d. $\frac{1}{4}$

_____28. If a car travels 88 miles using 5 liters of gasoline, how far can it travel on a full tank that holds 30 liters?

    a. 528 miles   b. 500 miles   c. 440 miles   d. 400 miles

_____29. A rectangular lot measuring 24 meters by 30 meters is for sale at P1, 500 per sq. meter. How much is the rectangular lot?

    a. P1,080,000   b. P1,800,000   c. 8,100,000   d. 18,000,000

_____30. What is the volume of a cube whose surface area is 121 sq. cm?

    a. 1000 cu. cm   b. 1,331 cu. cm   c. 729 cu. cm   d. 1,728 cu. cm

_____31. What is length of the diagonal JL of the rectangle below?

```
K        12        L
                   
                   5
J                  M
```

    a. 16   b. 15   c. 14   d. 13

_____32. What is the factored from of the expression $99p^6 + 33p^3$

    a. $11p^3(9p^2 - 3)$ b. $33p^3(3p^3 + 1)$ c. $3p^4(11 - 3p)$ d. $3p^4(33p^2 - 3)$

_____33. The measures of the angles of a triangle are in the ratio $1:2:3$. Find the measure of the largest angle of the triangle.

    a. 30^0 b. 60^0 c. 90^0 d. 120^0

_____34. The expression "ten years from now" can be represented by

    a. $10x$ b. $10 + x$ c. $10 - x$ d. $\frac{10}{x}$

_____35. If $x + 3y = 8$ and $x = y = 2$, then $3x + 5y = $ ___?

    a. 16   b. 14   c. 12   d. 10

_____36. Which of the following is equivalent to $99^3 + 99$?

    a. $99^2 99$ b. $99^2 (98)$ c. $99(99^2 + 1)$ d. $99^2(99 - 1)$

_____37. What one number can replace both question mark? $\frac{1}{?} = \frac{?}{81}$

    a. 81   b. 9   c. 7   d. 1

_____38. The simplified form of $(x + 5)(x - 3)$ is_____.

    a. $x^2 + 2$ b. $x^2 - 2x + 15$ c. $x^2 + 2x - 15$ d. $x^2 + 2x + 15$

_____39. Which of the following equations is satisfied when $x = 2$?

    a. $4x = x + 6$ b. $4x - 2 = 3x + 3$ c. $5 + 3x = 6x - 10$ d. $5x - 6 = 2x + 8$

_____40. Find in feet the amount of framing needed to frame a picture $7\frac{1}{2}$ inches by 9 inches?

    a. 2.75   b. 3.25   c. 3.9   d. 33