READINESS OF GRADE 10 STUDENTS OF SINUNUC NATIONAL HIGH SCHOOL ON THE PREREQUISITE COMPETENCIES IN GENERAL MATHEMATICS

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Readiness of Grade 10 Students of Sinunuc National High School on the Prerequisite Competencies in General Mathematics

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Abstract

This study aimed to assess Grade 10 students' readiness in general mathematics and identify the least mastered prerequisite competency in general mathematics. It utilized a descriptive-quantitative approach with randomly selected Grade 10 students as respondents. The study focused on 20% of SNHS Grade 10 students from the 2020-2021 school year, concentrating on specific prerequisite competencies in general mathematics. Data was statistically analyzed using Arithmetic Mean and ANOVA, employing adapted instruments like a 50-item Readiness Test and identified competencies. The findings revealed that Grade 10 students demonstrated moderate readiness in 14 out of 25 specified prerequisite competencies in general mathematics, with 11 competencies remaining unmastered. The overall Mean Percentage Score (MPS) was 36%, indicating a moderate level of preparedness for senior high school general mathematics. Notably, differentiating between equations and inequalities in Rational Functions and Inverse, Exponential, and Logarithmic Functions was a challenging area. In Business Mathematics, solving word problems related to simple interest posed the most difficulty, while in Logic, using inductive and deductive reasoning in arguments was the least mastered competency. Moreover, the study found readiness variations among Grade 10 students at Sinunuc National High School based on family income and parental education but no significant differences regarding gender and ethnicity. These results highlight specific areas where Grade 10 students might need additional support in general mathematics and suggest potential factors affecting their readiness.

Keywords: *General Mathematics; Grade 10 students; Readiness*

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The grade 10 students of Sinunuc National High School, who serve as the respondents of this study, spend their time and efforts in answering the test questionnaire.

Introduction

Most students in Junior High School report that learning mathematics as a discipline gives them a negative response. Mathematics is one of the most challenging core topics in which students are most likely to fail since most students struggle to meet the course's prerequisites and perform poorly in academic and abstract thinking skills (Bulanday 2019, 23).

The majority of people think of mathematics as a set of methods that only scientists, engineers, and specialists can utilize. In fact, the vast majority of our population can be categorized as math avoiders, who regard the assertion that mathematics can be creative, beautiful, and significant as not just an "impossible dream" but also something they don't want to discuss.

Academic, Technical Vocational Livelihood, Arts and Design, and Sports are the four (4) tracks in the Philippine Senior High School. STEM, ABM, HUMSS, and GAS are academic tracks. The curriculum consists of 31 subjects, 15 essential courses that every student should take regardless of the strands/tracks they choose. One of the core subjects that is required to take in Mathematics subjects in Grade 11 is General Mathematics, which is offered during the first semester.

The following subjects are listed as being included under general mathematics in the Department of Education guide: Functions; Rational Functions; Exponential, Inverse, and Logarithmic Functions; Basic Business Mathematics; and Logic (Herrera and Dio 2016, 6). These topics are highly sophisticated since the curriculum designers expected that grade 10 students at Junior High School had a minimum mastery of competencies and skills in Junior High Mathematics subjects.

Senior High School students may have difficulties in General Mathematics if they lack the prerequisite knowledge and skills for a particular course. Thus, Mathematics teachers usually let the students recall previous lessons before introducing new topics to discuss and encourage them to answer activities about a lesson discussed in the lower years for the teacher to know how ready the students with the new topic.

Students who lack a solid grasp of fundamental mathematical skills will encounter challenges when trying to absorb new math concepts. If these challenges are not addressed promptly, students may become disinterested in the subject (Ganal and Guiab 2014, 25), which may be one of the causes of students getting failing marks or low mastery in mathematics. Based on the literature reviewed, the researcher was prompted to conduct the study to determine the readiness of Grade 10 students of Sinunuc National High School in General Mathematics. The findings of this study may serve as a crucial basis for developing targeted interventions and strategies to address the challenges faced by Grade 10 students in General Mathematics at Sinunuc National High School. By understanding the readiness of students in this subject, educators can tailor teaching methods and support mechanisms to bridge the gaps in fundamental mathematical skills.

Additionally, the study results can inform curriculum developers and policymakers in the Department of Education about the need for a comprehensive review of the prerequisites and expectations for students entering General Mathematics in Grade 11. This insight may lead to adjustments in the curriculum to ensure that it aligns with the actual preparedness of students, thereby reducing the likelihood of encountering difficulties in mastering advanced mathematical concepts.

In light of the study's outcomes, it is recommended that the Department of Education consider implementing targeted professional development programs for mathematics teachers. These programs can focus on cutting-edge teaching strategies, differentiated instruction, and methods to deal with various learning requirements. Such initiatives can empower teachers to create a more inclusive and supportive

learning environment, ensuring that students with varying levels of mathematical readiness receive the necessary guidance and encouragement.

Furthermore, the study may encourage school administrators to explore the integration of supplementary resources, such as tutoring or peer-assisted learning programs, to provide additional support for students identified as having gaps in fundamental mathematical skills. This proactive approach can contribute to preventing disinterest in the subject and minimizing the risk of students receiving failing marks or achieving low mastery in mathematics.

Literature Review

The K-12 program, where "K" represents kindergarten and "12" signifies the subsequent 12 years of fundamental education, consists of six years in elementary school, four years in junior high school, and two years in senior high school. This extended 12-year curriculum seeks to alleviate congestion in the educational system, allowing students sufficient time to hone their skills and attain essential competencies, with the ultimate objective of global competitiveness. Under this new system, students will be equipped for various pathways, including the workforce, entrepreneurship, developing middle-level skills, and pursuing post-secondary education, even if they do not intend to finish their studies beyond graduation.

Through expediting the mutual recognition of Filipino graduates and professionals abroad, the K–12 program promotes global proficiency. The new curriculum offers three options for students to select from: Academic, Technical-Vocational-Livelihood, and Sports and Arts. Additionally, it will give students the chance to take part in immersions, get relevant industry exposure, and develop experience in the sector of their choice. The K -12 curriculum includes more practical applications than the previous curriculum yet offers a more comprehensive and linear curriculum (Enderun 2020, 1).

In addition, all strands must take General Mathematics as one of their core subjects. Its goal is to impart to students the skills necessary to solve problems involving logarithmic, exponential, and rational functions as well as business challenges and the application of logic to actual situations. Consequently, all its learning abilities aim to assist learners in gaining the knowledge and skills necessary for university life and the workplace. The curriculum is designed to be all-encompassing, tailored to cater to the requirements of learners and communities, and is structured around defined standards and competencies in accordance with the Department of Education's objectives. Furthermore, it aims to cultivate and utilize the abilities and proficiencies of young Filipinos, ultimately contributing to their personal growth, community development, and national progress. Therefore, it is imperative for students to acquire these competencies before their graduation, as stipulated by the Department of Education in 2013.

The emphasis of high school CT instruction is determined by the learners' math skills. Teachers devote a significant amount of time to reviewing prerequisite topics to assist students in acquiring the necessary mathematical abilities in the least mastered competencies to guarantee that students are prepared for the new materials (Herrera and Dio 2016, 1).

According to Mamolo (2019, 1938), in his study (Analysis of Senior High School Students' Competency in General Mathematics) done in one division of the Department of Education Region 8, Philippines, senior high school student's general mathematics competency was "fair." Only the STEM strand of the academic track qualifies as "satisfactory."

Furthermore, this study is similar to Herrera and Dio's (2016, 1) investigation of the general mathematics requirement knowledge of grade 10 students at Sorsogon National High School about the extent of preparedness. It was discovered that Grade 10 pupils are moderately prepared in Senior High General Mathematics. This signifies that Grade 10 students have attained the bare minimum of knowledge and skills in the required general mathematics competencies. This indicates that the pupils were not proficient in the necessary abilities. As a result, it was determined that the students were unprepared for the concepts in general mathematics.

Evidence shows that students in Grades 10 and 11 struggled as they progressed from junior high to senior high school. The data confirmed by Herrera and Dio (2016, 1) that entering Grade 11 Students in the Division of Sorsogon are only somewhat prepared, with a 40 percent MPS after finishing a 50-item examination on the requisite competencies for taking up General Mathematics. Learners in Grade 10 could not acquire the abilities and skills required to comprehend the ideas taught in General Mathematics. To apply the spiral development strategy of the curriculum, a vertically consistent collection of learning competencies and criteria is required. Vertical coherence pertains to a collection of competencies that are imparted to students within a single lesson, course, or grade level, with the intention of equipping them for the subsequent level of study featuring more advanced competencies. Curriculum mapping, which actively strives to enhance logically structured content, guarantees that the educational content is intentionally organized and logically structured across different grade levels. This approach enables students to systematically build upon their prior knowledge and skills, thereby preparing them for more difficult and advanced academic work (Schweitzer 2020, 1; Van den Akker et al. 2004, 1).

The mathematical abilities that learners acquire from kindergarten to the eighth grade are the foundation for all higher-level mathematics courses. Students should grasp earlier mathematical concepts, applications, and skills before taking algebra and other higher-level courses (Wriston 2015, 1)

In a similar study, 143 high school students registered in a basic Algebra 1 subject were given a fraction assessment (Lin et al. 2013, 41). Almost half of the students could not find the sum of 5/12 and 3/8. Students frequently made the mistake of adding numerators and denominators. Even though they understood they had to find common denominators, the learners could not remember how to do it (Lin et al. 2013, 48).

Research Questions

The purpose of this study is to determine the readiness of Grade 10 students of Sinunuc National High School in General Mathematics. The following questions are addressed in this research.

1. What is the readiness of Grade 10 Students of Sinunuc National High School in General Mathematics of Senior High School relative to the identified Prerequisite competencies?
2. What are the least mastered competencies or skills among identified prerequisite competencies per content topic?
3. Is there a significant difference in the readiness of grade 10 students when grouped according to their profile?

Scope and Limitation

The study determined the readiness of Grade 10 Students of Sinunuc National High School in General Mathematics of Senior High School. To facilitate the systematic organization and supervision of this study and to generate accurate data, the following

delimitations were established: 1.) Grade 10 Students of Sinunuc National High School High School Year 2020-2021; and 2.) Identified Prerequisite Competencies in General Mathematics.

The scope and delimitation of this study established the parameters and context within which the research is conducted. This study is specifically designed to assess the readiness of Grade 10 students at Sinunuc National High School, focusing on their proficiency in General Mathematics during the academic year 2020-2021. The study aims to ascertain the level of readiness, identify areas of weakness within prerequisite competencies, and investigate variations in readiness based on selected student profiles. The study is confined to Grade 10 students at this institution during the specified academic year, and it centers on the General Mathematics curriculum and its corresponding prerequisite competencies as defined by Sinunuc National High School. Moreover, the study considers demographic factors such as family income, parental educational attainment, gender, and ethnicity when assessing readiness. However, it acknowledges that there may be other relevant variables that are not within the scope of this research. Importantly, the findings and recommendations of this study are not universally applicable and should be interpreted in the context of Sinunuc National High School, recognizing the unique characteristics and circumstances of this educational setting. Generalization to other institutions, academic years, or curricular frameworks should be approached with caution, considering the distinctions in demographics, curricula, and environmental factors.

Method

Research Design

The descriptive-quantitative research method was used in this study. It determines the readiness of Sinunuc National High School Grade 10 students in Senior High School General Mathematics. The Prerequisite Competencies and Readiness of Grade 10 Students in the General Mathematics Examination was adapted from Herrera and Dio (2016, 1-8) research, and the test results will be shown. recorded and analyzed.

The National Education Testing and Research Center (NETRC) descriptive equivalent Achievement Level was adopted to measure the Readiness of Sinunuc National High School Grade 10 students in Senior High General Mathematics and to explain the MPS of each required competency:

MPS (%)	DESCRIPTORS	REMARKS
96 – 100	Mastered	Ready
86 – 95	Closely Approximating Mastery	Ready
66 – 85	Moving Towards Mastery	Moderately Ready
35 – 65	Average Near Mastery	Moderately Ready
15 – 34	Low Mastery	Not Ready
5 – 14	Very Low Mastery	Not Ready
0 – 4	Absolutely No Mastery	Not Ready

Research Participants

The table below shows the frequency and percentage of the demographic profile of the selected grade 10 students of Sinunuc National High School in terms of gender, ethnicity, family monthly income, and educational attainment of parents. The respondents of the study were selected by random by means of a lottery.

Table 1: Frequency Distribution and Percentage of the Profile of the Respondents

Gender	Frequency	Percentage
Male	27	43.55%
Female	35	56.45%
Ethnicity	**Frequency**	**Percentage**
Bisaya	8	12.90%
Chabacano	11	17.74%
Samal	13	20.97%
Tausug	29	46.77%
Family monthly income	**Frequency**	**Percentage**
Above Php 15,000.00	6	9.68%
Php 10,001.00 – Php 15,000.00	14	22.58%
Php 5,001.00 – Php 10,000.00	12	19.35%
Php 1,001.00 – Php 5,000.00	10	16.13%
Below Php 1,000.00	19	30.65%
Educational attainment of parents	**Frequency**	**Percentage**
Master's Degree Holder	8	12.90%
With units in Master's Degree	9	14.52%
Bachelor's Degree Holder	11	17.74%
High School Graduate	17	27.42%
High School Level	4	6.45%
Elementary Graduate	5	8.06%
Elementary Level	7	11.29%

Research Instrument

The Prerequisite Competencies and Readiness of Grade 10 Students in the General Mathematics Examination, which was developed from Herrera and Dio (2016) research, was utilized in this study. This Readiness of Grade 10 Students in General Mathematics Examination was used to test the mathematics competency of Grade 10 students. It covered the identified prerequisite learning abilities of General Mathematics.

For the Validity and Reliability of the Research Instrument, the instrument was adapted from Herrera and Dio (2016, 1-8) research. Through email communication, the researcher requested permission to use the said instrument.

Data Gathering Procedure

The Researcher prepared a permission letter addressed to the Schools Division Superintendent through Planning and Research Office to administer the data gathering. The approved letter by the Schools Division Superintendent and a cover letter were prepared and forwarded to the Quadrant Head (Q1.1), and a copy was furnished to the Principal of Sinunuc National High School for data gathering.

Due to the pandemic and to comply with the AITF's health protocol and guidelines, the researcher administered the Readiness Test in two ways: first, it was given to grade 10 students who personally took their Self-Learning Module or CapSLETs, and second, the researcher went house to house to administer the Readiness Test. The participants asked for consent and willingness to be part of the study, after getting consent from the participants, the researcher proceeded with the orientation and data collection.

Data Analysis

The data were analyzed and interpreted utilizing the following statistical tools: Arithmetic Mean was used to compute the Mean Percentage Score (MPS) and measure the readiness of Sinunuc National High School Grade 10 students in General Mathematics of Senior High and also used to determine the least mastered competencies. Analysis of Variance (ANOVA) was used to determine the difference in the readiness of grade 10 students of Sinunuc National High School in General Mathematics when grouped according to their profile.

Results and Discussion

Readiness of Grade 10 Students in General Mathematics. Table 2 presents the readiness of the students in general mathematics per competency.

Table 2: Readiness of Grade 10 Students per Competency

Prerequisite Competencies	MPS %	Verbal Description
1. Performs Fundamental Operations on Integers	54%	Moderately Ready
2. Perform Operations on Rational Numbers	34%	Not Ready
3. Evaluates Algebraic Expressions for given values of the variables	42%	Moderately Ready
4. Adds and subtracts polynomials	35%	Moderately Ready
5. Multiplies and Divides Polynomials	40%	Moderately Ready
6. Translates English sentence to Mathematical sentence and vice versa	48%	Moderately Ready
7. Verifies if the given relation is a function	23%	Not Ready
8. Illustrates linear functions, quadratic functions and polynomial functions	50%	Moderately Ready
9. Models real-life situations using linear functions, quadratic functions and polynomial functions	19%	Not Ready
10. Differentiates between equations and inequalities	26%	Not Ready
11. Finds solution of any linear equation or inequality in one variable	27%	Not Ready
12. Factors completely different types of polynomials	42%	Moderately Ready
13. Illustrates rational algebraic expressions	27%	Not Ready
14. Simplifies rational algebraic expressions	31%	Not Ready
15. Performs operations on rational algebraic expressions	39%	Moderately Ready
16. Finds the domain, range and intercept of a function	40%	Moderately Ready
17. Graphs linear functions quadratic functions and polynomial functions	34%	Not Ready
18. Applies the laws of exponents	36%	Moderately Ready
19. Solves word problems involving simple interest	42%	Moderately Ready
20. Describe well-defined sets, subsets, universal sets, and the null sets and cardinality of sets	29%	Not Ready
21. Illustrates the union and intersection of sets and the difference of two sets	39%	Moderately Ready
22. Transforms a statement into an equivalent If-Then statement	32%	Not Ready
23. Determines the inverse, converse, and contrapositive of If-Then statement	40%	Moderately Ready
24. Use inductive and deductive reasoning in an argument	27%	Not Ready
25. Write a proof	46%	Moderately Ready
Over-all MPS	**36%**	**Moderately Ready**

Legend:

96 – 100	Mastered	Ready
86 – 95	Closely Approximating Mastery	Ready
66 – 85	Moving Towards Mastery	Moderately Ready
35 – 65	Average Near Mastery	Moderately Ready
15 – 34	Low Mastery	Not Ready
5 – 14	Very Low Mastery	Not Ready
0 – 4	Absolutely No Mastery	Not Ready

Table 2 shows the readiness of grade 10 students of Sinunuc National High School in General Mathematics. It could be gleaned from the table that the grade 10 students are Average Near Mastery with the following prerequisite competencies with MPS, Performs Fundamental Operations on Integers (54%), Illustrates linear functions, quadratic functions and polynomial functions (50%), Translates English sentence to Mathematical sentence and vice versa (48%), Write a proof (46%), Evaluates Algebraic Expressions for given values of the variables, Factors completely different types of polynomials, and Solves word problems involving simple interest (42%), Multiplies and Divides Polynomials, Finds the domain, range, and intercept of a function (40%), Illustrates the union and intersection of sets and the difference of two sets and Performs operations on rational algebraic expressions (39%), Applies the laws of exponents (36%), Adds and subtracts polynomials (35%).

Meanwhile, the following competencies such as Perform Operations on Rational Numbers, verifies if the given relation is a function, Grade 10 students at Sinunuc National High School are struggling with various essential mathematical concepts and skills, including the ability to apply linear, quadratic, and polynomial functions to real-world scenarios. They also find it challenging to distinguish between equations and inequalities, solve linear equations and inequalities with a single variable, represent rational algebraic expressions, simplify them effectively, and graph linear, quadratic, and polynomial functions. Furthermore, defining universal sets, null sets, defined sets, subsets, and comprehending set cardinality are proving to be a challenge for them. Additionally, students need support in converting statements into equivalent If-Then statements and employing both inductive and deductive reasoning in mathematical arguments. This struggle with these fundamental mathematical concepts highlights the low level of mastery among these grade 10 students.

The total Mean Percentage Score (MPS) of 36% indicates that fourteen (14) out of twenty-five (25) or 56% of required competencies are Average Near Mastery. It means that students have acquired less knowledge and skills in the competencies indicated above, and they were moderately ready in General Mathematics. On the other hand, Low Mastery refers to eleven (11) or 44% of the required competencies, indicating that students did not demonstrate mastery of the competencies and so are not prepared in general mathematics.

The low Mean Percentage Score (MPS) of 36% signifies that students are struggling with a significant portion of the curriculum. As a practical implication, the school should consider implementing targeted interventions, such as additional tutoring, remedial classes, or differentiated instruction, to address these specific competencies. It's crucial to focus on the competencies where students are struggling the most, as identified in the table.

The readiness assessment of grade 10 students at Sinunuc National High School in General Mathematics, as reflected in Table 2, reveals significant challenges. Practical implications include the need for targeted interventions to address specific competencies where students are struggling, potential curriculum revisions, teacher professional development, differentiated instruction, and enhanced parental involvement. From a theoretical perspective, this data underscores the variance in cognitive development and readiness among students, aligning with Vygotsky's Zone of Proximal Development theory. The data also highlights the importance of formative assessment, the transfer of learning to real-world scenarios, and the influence of socioeconomic factors on students' preparedness and performance in mathematics. A holistic approach, incorporating practical strategies and theoretical insights, is essential to improve the students' mathematical readiness and overall educational outcomes.

Least Mastered Competencies. Table 3 displays the least mastered competencies among the identified prerequisite competencies per content topic.

Table 3: Least Mastered Competencies or Skills Among Identified Prerequisite Competencies per Content Topic

Content	Least Mastered Competencies	MPS
Functions	Models real-life situations using linear functions, quadratic functions and polynomial functions	19%
Rational Functions	Differentiates between equations and inequalities	26%
Inverse, Exponential and Logarithmic Function		
Basic Business Mathematics	Solves word problems involving simple interest	42%
Logic	Uses inductive and deductive reasoning in an argument	27%

Table 3 shows that on the topic Functions, Models of real-life situations using linear functions, quadratic functions, and polynomial functions (19%) revealed as the least mastered competency. The least mastered skills in the areas of Rational Functions and Inverse, Exponential, and Logarithmic Functions is differentiating between equations and inequalities (26%). In Business Mathematics, the least mastered competency is Solving word problems involving simple interest (42%), and in Logic, the least mastered competency is Using inductive and deductive reasoning in an argument (27%).

The data presented in Table 3 highlights key areas of concern in students' mathematical readiness at Sinunuc National High School. Practical implications include the necessity for targeted remediation efforts in the least mastered competencies, such as the application of linear, quadratic, and polynomial functions in real-life situations, better problem-solving skills in business mathematics, and improved training in inductive and deductive reasoning for logic. Additionally, teachers should undergo professional development to effectively address these areas of weakness, and interdisciplinary approaches could be beneficial. The theoretical implications suggest that these challenges have implications for cognitive load theory, the transfer of learning, critical thinking education, socio-cultural factors, and educational equity. A holistic approach, incorporating both practical and theoretical insights, is crucial for enhancing students' readiness and competency in these critical mathematical areas.

Testing differences in the level of readiness when data are grouped into respondents' profiles.

Table 4: ANOVA Results on the Readiness of Grade 10 Students According to Gender

Source	Sum of Squares	Mean of Square	F	Sig. *p*	Interpretation
Between-Treatment	7.15	7.15	0.234	0.6299	Not Significant
Within-Treatment	1828.40	30.47			

Significant at alpha 0.05

Table 4 demonstrates the Significant difference in readiness among Sinunuc National High School grade 10 students when they are categorized by gender. As indicated in the table, a *p-value of 0.6299* indicates that when grade 10 students at Sinunuc National High School were analyzed by gender with an *alpha of 0.05*, there was no significant difference in readiness. This explains why, regardless of gender, grade 10 students' readiness in general mathematics is unaffected.

The absence of a significant difference in the readiness of grade 10 students at Sinunuc National High School when analyzed by gender, as indicated by the p-value of 0.6299, has both practical and theoretical implications. Practically, this means that educational efforts aimed at improving students' readiness in general mathematics should be gender-neutral. Strategies, interventions, and teaching methodologies should be designed to benefit all students equally, regardless of their gender. This underscores the importance of equitable access to resources and opportunities in education.

From a theoretical perspective, this finding aligns with the literature on gender equity in education. Research has consistently emphasized the importance of creating an inclusive educational environment where all students, irrespective of their gender, have an equal opportunity to excel in their studies. The absence of a significant gender-based difference in readiness supports the theoretical perspective that educational institutions should strive for gender-inclusive practices and avoid reinforcing stereotypes or biases that may limit students' potential based on gender. It's a reminder that educational systems should be committed to fostering a fair and equal learning environment for all students.

Table 5: Significant Difference in the Readiness of Grade 10 Students When Grouped According to Ethnicity

Source	Sum of Squares	Df	Mean of Square	F	Sig. *p*	Interpretation
Between-Treatment	53.7081	3	17.9027	0.574	0.6347	Not Significant
Within-Treatment	1778.9804	57	31.2102			

Significant at alpha 0.05

When Sinunuc National High School grade 10 students are categorized by ethnicity, Table 5 shows the Significant Difference in readiness in General Mathematics. A *p value of 0.6347* shows that there was no significant difference in preparation when grade 10 students at Sinunuc National High School were evaluated by ethnicity with an alpha of 0.05, as shown in the table. This explains why, regardless of ethnicity, grade 10 students' readiness in general mathematics is unaffected.

Table 6: Significant Differences on the Readiness of Grade 10 Students when grouped according to Family Monthly Income

Source	Sum of Squares	Df	Mean of Square	F	Sig. *P*	Interpretation
Between-Treatment	469.1833	4	117.2958	4.81741	0.002	Significant
Within-Treatment	1363.5053	56	24.3483			
Total	1832.6885	60				

Significant at alpha 0.05

Table 6 demonstrates the Significant Difference in General Mathematics readiness when Sinunuc National High School grade 10 students are categorized by

family monthly income. When grade 10 pupils at Sinunuc National High School were evaluated by family monthly income with an *alpha of 0.05*, a *p value of 0.6347* indicates that there was significant difference in readiness, as indicated in the table. It is clear that a family's economic situation has an impact on their children's schooling. If a low-income family's income can be enhanced, they can provide better conditions for their children's education (Lin and Han 2017, 75). In addition, in the study of Machebe, Ezegbe, and Onuoha (2017, 1615), students from financially prosperous homes obtain higher academic accomplishments.

Similarly, some low-income students struggle to grasp or learn as quickly as their peers. Their vocabulary may be less than that of other students from various backgrounds. Also, because their parents may not be able to help them at home or because they have a single parent, their learning and understanding styles differ from those of others. If their parents are poor, they will have to work all day for them, leaving them no time to help their children with homework. Their stress level and the fact that they have a family at home are other factors. These circumstances may have an impact on their grades because no one helps them or cares about their academic development in some cases (Jensen 2013, 27).

Table 7: Significant Differences in the Readiness of Grade 10 Students When Grouped According to the Educational Attainment of Parents

Source	Sum of Squares	Df	Mean of Square	F	Sig. *P*	Interpretation
Between-Treatment	468.9939	3	156.3313	7.56218	0.000	Significant
Within-Treatment	847.5839	41	20.6728			
Total	1316.5778	44				

Significant at alpha 0.05

Table 7 Results on the Readiness of Grade 10 Students According to Educational Attainment of Parents shows a Significant Difference in General Mathematics readiness with a *p value of 0.000* at *alpha of 0.05*. This implies that the Educational Attainment of the Parents influences the preparedness of the student at a higher level. Supporting the evidence, according to Khan, Iqbal, and Tasneem (2015, 76-79), parents possessing a higher educational background tend to exert a more substantial impact on their children's success and performance in secondary school. This assertion gains support from the observation that well-educated parents typically display a heightened interest in and concern for their children's academic accomplishments, their chosen subjects, and their career aspirations choices while in secondary school. Furthermore, in such cases, if the child possesses strong willpower and determination, parents with high educational attainment serve as an inspiration to their children, inspiring them to strive for the same goals as their parents and to pursue what they desire or what their parents wish for them to become.

Conclusion and Recommendations

The Grade 10 students of Sinunuc National High School displayed a moderate level of readiness in General Mathematics, with specific weaknesses identified in differentiating equations and inequalities within Rational Functions and Inverse, Exponential, and Logarithmic Functions, solving word problems involving simple interest in Business Mathematics, and utilizing inductive and deductive reasoning in arguments within Logic. Notably, this readiness varied significantly based on family

monthly income and parental educational attainment, while it remained consistent across gender and ethnicity. In light of these findings and conclusions, the researcher proposes several recommendations for improvement. Firstly, the CID Chief should ensure that the Division provides instructors and students with top-notch teaching and learning resources, as well as instructional support tools. School principals should focus on addressing the specific needs of mathematics teachers to enhance their effectiveness. Teachers must ensure junior high school students have fully grasped the prerequisite competencies in General Mathematics, and a remedial program should be implemented to address the least mastered competencies. Additionally, teachers should develop validated Strategic Intervention Materials (SIM) for teaching or remediation. Parents are encouraged to maintain regular monitoring of their children's progress, learners should invest more effort in mastering competencies, and future researchers should consider conducting similar studies at the district level for a more comprehensive perspective on educational readiness and performance.

Dissemination and Advocacy Plans

The study's findings were disseminated through research presentations in various venues such as school, district, and division research forums. This was done during the School Year 2020-2021.

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Financial Report

This section approximates the funds utilized in the actual conduct of this research work. The breakdown of cost per research task is detailed.

A. Supplies and Materials					
Item	**Qty**	**Unit**	**Description**	**Unit**	**Total amount**
1	2	reams	A4 size s20 Bond Paper	225.00	500.00
2	1	set	Printer Ink (Epson)	1280.00	1,280.00
3	3	sets	Hardbound	400.00	1,200.00
4	1	card	Internet load	300.00	300.00
5	1	pax	Fare	500.00	500.00
Total cost estimates:					**P 3,780.00**

Appendix A

Informed Consent

Date: _____

THE RESPONDENTS

Dear Ma'am/Sir,

I am Mr. Najar M. Narud, Head Teacher I, of Sinunuc National High School and currently working on my research entitled: **Readiness of Grade 10 Students of Sinunuc National High School in General Mathematics.**

Please be informed that you are hereby identified as one of the respondents in this study, I am humbly seeking your participation, with your **consent** please answer honestly the Instruments that is provided. This data will be used to answer the specific problems in my study. Your responses will be kept with utmost confidentiality.

Your positive response to this request will be highly appreciated as you are a contributor to the success of this endeavor.

Thank you very much and God bless!

Sincerely yours;

NAJAR M. NARUD
Researcher

Please Check your Response.
○ Allow ○ Not Allow

_____
Signature over printed name of Respondent

Zamboanga Peninsula

Appendix A

Research Instrument

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RESPONDENT'S PROFILE

Name (Optional) _____
Direction: Blacken the circle that corresponds to your appropriate profile.

A. Sex
- o Male
- o Female

B. Ethnicity
- o Bicolano
- o Bisaya
- o Chabacano
- o Ilocano
- o Illonggo
- o Yakan
- o Samal
- o Subanen
- o Tagalog
- o Tausug
- o Waray
- o Others, Specify _____

C. Family Monthly Income
- o Above Php 15,000.00
- o Php 10,001.00 – Php 15,000.00
- o Php 5,001.00 – Php 10,000.00
- o Php 1,001.00 – Php 5,000.00
- o Below Php 1,000.00

D. Educational Attainment of Parents
- o Doctorate Degree Holder
- o With units in Doctorate Degree
- o Master's Degree Holder
- o With units in Master's Degree
- o Bachelor's Degree Holder
- o High School Graduate
- o High School Level
- o Elementary Graduate
- o Elementary Level

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READINESS OF GRADE 10 STUDENTS IN GENERAL MATHEMATICS EXAMINATION

Name (Optional): _____ Score: _____

DIRECTION: Read and Understand each of the following items, choose the correct answer and write the letter of your answer on the space provided before the number.

__ 1. Perform the indicated operation: $(3 \times 7) \div [(-5) - 2]$
a. -1 b. -2 c. -3 d. -4

__ 2. Determine the result when $8 + (-12)$ is subtracted from $21 + (-9)$
a. 8 b. 16 c. -8 d. -16

__ 3. Perform the indicated operation: $\left(\frac{3}{4} + \frac{3}{2}\right) \div \left(\frac{3}{4} - \frac{1}{2}\right)$
a. 9 b. 8 c. 7 d. 6

__ 4. Which of the following expressions will have the largest value when $x = 5$ and $y = \frac{4}{7}$
a. $7y + 5x$ b. $\frac{x}{y}$ c. $\frac{y}{x}$ d. $6x - 7y$

__ 5. Find the value of $x^2y - 2xy^2z$ when $x = 3, y = 7$ *and* $z = 2$
a. 525 b. – 525 c. 627 d. 625

__6. When $6xy + 3y$ is subtracted from $-6xy - 3y$, which of the following is the result?
a. $-12xy - 6y$ b. $18xy$ c. 0 d. $12xy + 6y$

__ 7. Perform the indicated operation: $(7x^2 + 5x + 2) - (8x^2 + 3x - 4)$.
a. $15x^2 + 8x - 2$ c. $15x^2 - 8x + 2$
b. $-x^2 + 2x + 6$ d. $x^2 - 2x - 6$

__8. Find the product of $(3m + 5)(m^2 - 9m + 3)$
a. $3m^3 + 22m^2 - 36m + 15$ c. $3m^3 - 22m^2 + 36m - 15$
b. $3m^3 - 22m^2 + 36m + 15$ d. $3m^3 - 22m^2 - 36m + 15$

__9. Divide $x^5 - 3x^2 - 20$ *by* $x - 2$
a. $x - 1$ c. $x^4 + 2x^3 + 4x^2 + 5x + 10$
b. $x^4 - 1$ d. $x^4 - 2x^3 + 4x^2 - 5x + 10$

__ 10. Which of the following is the mathematics sentence of $2x - 3$?
a. The difference when 3 is subtracted from the product of 2 and x.
b. The difference when 3 is subtracted by the product of 2 and x.
c. Twice a number x subtracted from 3.
d. Thrice a number x subtracted by 3.

__ 11. An algebraic expression for "*seven times a number is increased by 2*" is _____
a. $7x + 2$ b. $7x - 2$ c. $7(x - 2)$ d. $7(x + 2)$

__ 12. Which of the following ordered pairs represents a function?
a. {(7, -3), (-5, -3), (7, -5)} c. {(7, 1), (7, -3), (7, -3)}
b. {(7, 3), (4, -3), (5, -3)} d. none of these

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REGION IX, ZAMBOANGA PENINSULA
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__ 13. Which of the following relations DOES NOT represent a function?
a. $y = x^2 - 3x + 4$ c. $y = |x| - 11$
b. $y = x^5 - 3x^4 + x - 3$ d. $y^2 = 3x - 4$

__ 14. Which of the following is a quadratic function?
a. $f(x) = 2x + 3 - 5\sqrt{x}$ c. $f(x) = 2(x-3)^2 + 4$
b. $2x^2 - 6x = -3$ d. $f(x) = (x-1)^2 + 4 - x^2$

__ 15. Find the polynomial function given the following information:
$a_4 = -2, \quad a_3 = -4 \quad a_2 = 3, \quad a_0 = 4 \quad n = 4$
a. $f(x) = -2x^4 - 4x^3 + 3x^2 + 4x$ c. $f(x) = -2x^4 - 4x^3 + 3x^2 + 4$
b. $f(x) = 2x^4 + 4x^3 - 3x^2 - 4x$ d. $f(x) = 2x^4 + 4x^3 - 3x^2 - 4x$

__ 16. Which situation describes a linear function?
a. A text sent to 3 friends, each sends to 3 friends also, and so on.
b. The number patients admitted in a certain hospital doubles every week.
c. The population of the SNHS increases by five every two years.
d. A motor boat consumes 1.5 Liters of gasoline per kilometer.

__ 17. Which of the following is NOT an inequality?
a. $2x + 5y > 6$ c. $34s - 65t \neq m$
b. $11x - 5y \geq 18$ d. none of these

__ 18. What is the value of x in the equation $3x + 5 = 7x - 7$?
a. 3 b. 0 c. 0.5 d. 7

__ 19. Which will satisfy the equation $8y - 11 > -3$?
a. (0) b. (1) c. (2) d. (-3)

__ 20. Factor out completely: $x^3 - 125$
a. $(x+5)(x-5)$ c. $(x+5)(x^2 - 5x - 25)$
b. $(x-5)(x^2 + 5x + 25)$ d. $(x-5)(x+5)(x+5)$

__ 21. Which of the following is NOT a rational algebraic expression?
a. $\frac{x^2}{x-1}$ b. $\frac{7y}{3x^{-3}}$ c. $\frac{x+3x}{x^{-4}-4x}$ d. $-25x^3$

__ 22. What value of x will not be permissible in $\frac{x+3}{x^2-5}$?
a. -3 b. $\sqrt{5}$ c. -3 d. $\sqrt{5}$ and $-\sqrt{5}$

__ 23. Simplify: $\frac{16a^2b^3c^8}{14}$
a. $\frac{16b^3c^8}{14}$ b. $\frac{8b^3c^8}{7}$ c. $\frac{16a^2b^3c^8}{14}$ d. $\frac{8a^2b^3c^8}{7}$

__ 24. Reduce $\frac{3x^2+3y^2}{6(x+y)^2}$ to its simplest from.
a. $\frac{1}{2}$ b. $\frac{x^2+x^2}{(x+y)^2}$ c. . $\frac{x^2+x^2}{2(x+y)^2}$ d. 1

__ 25. Perform the indicated operation: $\frac{y^2+2xy}{x+y} + \frac{y^2}{x+y}$
a. $2y$ b. $\frac{y^2+2xy}{x+y}$ c. $\frac{2y^2+xy}{x+y}$ d. $\frac{y^2+xy}{x+y}$

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Department of Education
REGION IX, ZAMBOANGA PENINSULA
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__ 26. What is the Least Common Denominator (LCD) of $\frac{x+1}{x+2}$ *and* $\frac{x+3}{x}$
a. $2x + 2$ b. $2x^2 + 2x$ c. $x^2 + 2x$ d. $x^2 + 2$

__ 27. What is set of all y in the function $f(x) = x^2 - 4$?
a. All real numbers b. $\{y|y \geq 4\}$ c. $\{y|y \geq -4\}$ d. $\{y|y \leq 4\}$

__ 28. Determine the domain of $f(x) = x^2 - 7x + 8$.
a. All real numbers b. $\{x|x \geq 8\}$ c. $\{x|x \leq -1\}$ d. $\{x|x \leq 0\}$

__ 29. At what point does the graph of $f(x) = x^2 - 2x + 3$ intersect the *y-axis*?
a. (3, 0) b. (-3, 0) c. (0, 3) d. (0, -3)

__ 30. Determine the *x-intercept* of $f(x) = 2x^2 - 4x - 30$.
a. $x = -5;\ x = 3$ b. $x = 5;\ x = -3$ c. $x = -5;\ x = -3$ d. $x = 5;\ x = 3$

__ 31. In $y = 4x + 5$, determine the *slope* and its *y-intercept*.
a. $m=4;\ b = -5$ b. $m=4;\ b = 5$ c. $m = -5;\ b = 4$ d. $m = 5;\ b = 4$

__ 32. Which of the following is the vertex of $f(x) = 3(x - 2)^2 + 4$?
a. (-2, 4) b. (2, 4) c. (3, 4) d. (3, -2)

__ 33. Which of the following is not a possible zero of $f(x) = x^3 - 2x^2 - x - 3$?
a. ± 1 b. ± 2 c. ± 3 d. none of these

__ 34. Simplify: $(2x^{-2}y^4)^{-3}$
a. $8x^6y^{12}$ b. $\frac{x^6}{8y^{12}}$ c. $\frac{x^6y^{12}}{8}$ d. $\frac{8x^6}{y^{12}}$

__ 35. Apply the laws of exponents and simplify $\left(\frac{xy^2}{x^2y^3}\right)^3$
a. x^3y^3 b. $\frac{x^3}{y^3}$ c. $\frac{y^3}{x^3}$ d. $\frac{1}{x^3y^3}$

__ 36. A loan of P 2000 is made at a simple interest rate of 12 percent annually. Determine the amount to be repaid if the period of the loan is one year.
a. P 2, 220 b. P 2, 230 c. P 2, 240 d. P 2, 250

__ 37. Which of the following is a well-defined set?
a. Effective teachers of SNHS. c. Algebra books in the library.
b. Strange looking buildings in the Philippines. d. Tall trees in the backyard.

__ 38. Given A = {English vowels}. Which of the following is a subset of A.?
a. {a, b, c, d, e} b. {a, e, i, o, f} c. {q, r, s, t, u} d. {s}

__ 39. A universal set is composed of two sets. One set is composed of positive integers and the second set is composed of 0. Describe the universal set.
a. All real numbers c. All integers
b. All rational numbers d. All whole numbers

__ 40. In a survey, 12 students prefer Geometry, 13 prefer Algebra while 3 prefer both. How many students like neither if 35 students were interviewed?
a. 13 b. 7 c. 28 d. 32

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Given: A={a, b, c, 1, 2}; B={1, 2, 3, 4, a, b}; C={1st five letters of the English alphabet}

__41. Determine $A \cup C$.
a. {a, b, c, d, e, 1, 2} b. {a, b, c} c. {a, b, c, 1, 2} d. {a, b, c, d, e}

__ 42. Determine $A \cap (b \cap C)$.
a. {a, b, c, d, e, 1, 2} b. {a, b} c. {1, 2} d. {a, b, c, d, e}

__ 43. Determine $A - B$.
a. {c, d, e, 1, 2} b. {a, b, 1, 2} c. {c, 3, 4} d. {c}

__ 44. In the statement, "$7x = 49$ *implies* $x = 7$ which is the hypothesis?
a. $7x$ b. 7 c. $7x = 49$ d. $x = 7$

__ 45. Rewrite into an equivalent If-Then statement the statement, "All students like Geometry".
a. If you are a student, then you like Math.
b. If you like Geometry, then all students like it.
c. All students like Geometry.
d. If you are a student, you like Math.

__ 46. Which of the following is the converse of the statement: If today is Monday, then tomorrow is Tuesday?
a. If today is not Monday, then tomorrow is not Tuesday.
b. If tomorrow is Tuesday, then today is Monday.
c. If tomorrow is not Tuesday, then today is not Monday.
d. If today is Monday, then tomorrow is Tuesday.

__ 47. "Intelligent students love Mathematics. If Ethan is intelligent, then Ethan is love Mathematics". What type of reasoning is used to arrive at the conclusion in the given statement?
a. Logical reasoning c. Deductive Reasoning
b. Inductive Reasoning d. All of these

Use the table and figure below to answer the following questions (48 – 50)
In the figure $\overline{FA} = \overline{ME}$ prove that $\overline{FM} = \overline{AE}$

Statements	Reasons
FA = ME	Given
AM=AM	
FA + AM = ME + AM	
FM =	Definition of Betweenness
AE = ME + AM	
FM = AE	
$\overline{FM} = \overline{AE}$	Definition of Congruent segments

__ 48. What will complete the statement #4?
a. ME + AM b. FA + AM c. AM + AM d. FM + AE

__ 49. What is the reason for statement #5?
a. Addition Property c. Transitive Property
b. Definition of Betweenness d. Substitution Property

__ 50. Which is the appropriate reason for #6?
a. Transitive Property c. Reflexive Property
b. Symmetric Property d. Substitution Property

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READINESS OF GRADE 10 STUDENTS IN GENERAL MATHEMATICS
ITEM DISTRIBUTION PER COMPETENCY

Competencies	Blooms Taxonomy						No. of Items	Placement
	Re	Un	Ap	An	Ev	Cr		
1. Performs Fundamental Operations on Integers			2				2	1, 2
2. Perform Operations on Rational Numbers			1				1	3
3. Evaluates Algebraic Expressions for given values of the variables			2				2	4, 5
4. Adds and subtracts polynomials			2				2	6, 7
5. Multiplies and Divides Polynomials			2				2	8, 9
6. Translates English sentence to Mathematical sentence and vice versa				2			2	10, 11
7. Verifies if the given relation is a function		1		1			2	12, 13
8. Illustrates linear functions, quadratic functions and polynomial functions	1	1					2	14, 15
9. Models real-life situations using linear functions, quadratic functions and polynomial functions				1			1	16
10. Differentiates between equations and inequalities				1			1	17
11. Finds solution of any linear equation or inequality in one variable			2				2	18, 19
12. Factors completely different types of polynomials			1				1	20
13. Illustrates rational algebraic expressions		1		1			2	21, 22
14. Simplifies rational algebraic expressions		1	1				2	23, 24
15. Performs operations on rational algebraic expressions			2				2	25, 26
16. Finds the domain, range and intercept of a function	1	2	1				4	27, 28, 29, 30
17. Graphs linear functions quadratic functions and polynomial functions	2	1					3	31, 32, 33
18. Applies the laws of exponents			2				2	34, 35
19. Solves word problems involving simple interest					1		1	36

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20. Describe well-defined sets, subsets, universal sets, and the null sets and cardinality of sets	1			1	2		4	37, 38, 39, 40
21. Illustrates the union and intersection of sets and the difference of two sets			3				3	41, 42, 43
22. Transforms a statement into an equivalent If-Then statement	1	1					2	44, 45
23. Determines the inverse, converse, and contrapositive of If-Then statement		1					1	46
24. Use inductive and deductive reasoning in an argument		1					1	47
25. Write a proof					3		3	48, 49, 50

Legend:
Re = Remember
Un = Understand
Ap = Apply
An = Analyze
Ev = Evaluate
Cr = Create

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