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Curiosity, Motivation, Attitude, Gender, and Mathematics Peformance

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CURIOSITY, MOTIVATION, ATTITUDE, GENDER, AND MATHEMATICS PERFORMANCE

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by
Maria Charina A. Jaen
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APPROVAL SHEET

This special project entitled **CURIOSITY, MOTIVATION, ATTITUDE, GENDER, AND MATHEMATICS PERFORMANCE** prepared and submitted by **MARIA CHARINA A. JAEN** in partial fulfillment of the requirements for the degree of Master of Education major in Mathematics is hereby recommended for approval and acceptance.

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ABSTRACT

Researcher	**:**	**Maria Charina A. Jaen**
Title	**:**	**Curiosity, Motivation, Attitude, Gender And Mathematics Performance**
Key Concepts	**:**	**Curiosity & Mathematics Performance** **Motivation & Mathematics Performance** **Attitude & Mathematics Performance** **Gender Factor**
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This study sought to determine the curiosity, motivation, and attitudes of fourth year students in Kaypian National High School in relation to their performance in Mathematics. It is deemed significant to students, parents, teachers and other stakeholders as it provides relevant information on psychological variables that are useful in enhancing performance in mathematics. This study was limited to fourth year students of KNHS of the school year 2014-2015.

The descriptive correlational method was utilized in this study. The research instruments consisted of a 30-item questionnaire on curiosity, another 30 items on

motivation, a 30-items interest inventory, and a developed 50-item mathematics performance test.

The findings reveal that in terms of curiosity, respondents feel that they have the ability to seek out opportunities to challenge themselves and grow as a person. In terms of motivation, the higher the respondent's motivation the higher the effect on mathematical performance of the students. Motivation directly affects respondents' perception towards performance while attitude contributes a lot to performance in mathematics. The result show that male students differed in their mathematical performance as compared to female. Female students are more curious, motivated and exhibit positive attitude towards mathematics than male students. However, there is no significant difference between the means of the male and female in all the variables. The result showed that motivation is a significant predictor of mathematics performance.

The results of this study lead us to important conclusions that the level of curiosity affects the inquisitiveness of the learner. Positive attitudes among students can strengthen their motivation and engagement to learn in mathematics.

It is recommended that the study provide mathematics activities that will increase students' curiosity towards mathematics. Motivate students properly to make them hooked on the topic presented. Motivation affects the learning process of students. Teachers must use more suitable learning strategies to make the subject important and useful to students in order to prevent negative outcomes and future studies may consider covering a larger scope of respondents and differences of turn-over among respondents.

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Introduction

One of the important tools in life is Mathematics. It is a tool we can use to deal with quantitative data. Knowing mathematics may make life little bit easier and help us become more creative. It helps improve our critical thinking abilities and problem solving skills. It also prepares to address real life situations that is rife with numbers. Mathematics is a tool in which students and youngsters get involved and experience about life; they learn how to deal with problems and apply their knowledge to solve real life problems (Gomleksiz, 1997). Many people also consider mathematics as a key to open future career options (Stanslein, 2001)

Understanding what factors affect academic performance gives us a better picture of how teachers can help students perform well in mathematics (Mata, Monteiro,Peixoto, 2012). Curiosity, motivation and attitudes are very important factors in mathematics performance. This study was conducted to find out which among the variables predict mathematics performance. Some researchers found out that academic performance can be increased if students' intellectual curiosity is regularly renewed and stimulated. Perry (2001) stressed that if a child stays curious, he will continue to explore and discover. When a learner experiences the joy of discovery, he will be very eager experience again to his exploration. Doronila (2012) mentioned in his study that the philosophical and psychological constructs namely: epistememology, motivation, curiosity, cognition, and metacognition affect the performance in mathematics.

Students need motivation to learn and perform better in mathematics. In a recent study published in the Medwell Journal (2009), students need to be motivated so that they can do better in their academic pursuit. Both extrinsic and intrinsic motivation is needed in motivating students. The two ways are significant which are indispensable. According to the study of Farooq and Shah (2008), students' success in mathematics depends upon attitude toward mathematics. They added that it also influences the participation rate of learners. In the recent TIMSS 1999, generating positive attitudes towards mathematics among students is an important goal of mathematics education in many jurisdictions. The teaching method, the support of the structure of the school, the family and students' attitude towards school affect the attitudes towards mathematics (Farooq and Shah, 2008). Having positive attitude towards mathematics may bring academic success to students. The authors and lecturers at Institute of Education Research concluded that attempt to improve attitudes towards mathematics at lower level provides base for higher studies. Attitude is based on value and belief, as well varying degree of factual knowledge (Mullis, Martin, Gonzales, Conner, Chrostowski, Gregory, Garden and Smith 2001). Farooq and Shah, (2008) mentioned that the attempt to improve attitude towards mathematics at lower level provides base for higher quality learning.

From these studies it seems that in order for students to succeed in mathematics they should be curious, motivated, and have a positive attitude towards the subject. However, there is no sufficient evidence of their predictive values. This gap prompted the conduct of this study.

Conceptual Framework

Performance of students in mathematics is often determined by the final grade in the subject. In the Philippines, achievement test is also basis for national policy formulation. In other words, a student who is able to pass in the subject is expected to have mastered the important skills and knowledge needed. It is necessary to determine how students perform mathematically and how their skills are integrated in the context of mathematical problem solving. This study consider the relationship between curiosity, motivation, attitude, and the mathematics performance of students. To promote increased mathematics performance, educators must employ strategies that enhance increase the self-esteem and self-confidence in their ability to do mathematics.

In the context of the study, Victorino (2011) found out that the identified independent variables are the internal and external factors that may have or may not have relation to the awareness, knowledge, attitude, and skills of the students. Victorino added that in piecemeal, the inputs are the data aimed by the researcher to gather. Curiosity can reflect the pleasurable anticipation of acquiring knowledge (e.g., an opportunity to hear gossip) but can also involve feeling deprived by not having access to new information (Kelleretal; Loewenstein,1994). Curiosity, motivation and attitude are also units of analysis as what Victorino (2012) also considered, but this study added gender as one of the predictive variables to add dimension to the study, for the reason that these behavioral factors may vary among boys and girls. These are the dependent variables (performance effected by the existing condition). In this manner, the researcher is able to determine the extent as to how the variables interact or relate to the performance of fourth year students in mathematics.

Curiosity formed by students were categorized into exploration, absorption, epistemic, and perceptual (Doronilla, 2012). Among other adaptive outcomes, curiosity is suspected to play a role in the development of intelligence, wisdom, happiness, meaning in life, distress tolerance, and satisfying and engaging social relationships (Kashdan, 2009; Silvia, 2006). Curiosity is basically a "hunger for exploration," stated by Stumm & Hell (2012).They were not surprised that curiosity was so important. Likewise, the teacher is a strong believer in the importance of a hungry mind for achievement, so the researcher considered this as one of the variable to this study, toward this endeavor (Stumm, Hell & Chamorro, 2000). These statements denote that teachers have a great opportunity to inspire curiosity in their students, to make them engaged and independent learners, which can help them do better in mathematics.

Curiosity is the willingness, and perhaps desire, to continually accumulate new abilities and experiences as Kashdan (2009) mentioned. Kashdan, et al (2009) proposed that curiosity be defined as recognizing, embracing, and seeking out knowledge and new experiences. However, Loewenstein,G, (2007) mentioned that St. Augustine described curiosity as a "certain vain and curious longing for knowledge" (1943, p.54). Another feature of curiosity as a feeling of deprivation (CFD) reflects feelings of uncertainty and tension that Motivate information-seeking and problem-solving behavior, Litman and Jimerson (2004). Curiosity was conceptualized as a positive emotional-motivational system associated with the recognition, pursuit, and self-regulation of novelty and challenge (Kashdan, Rose & Fincham, 2004). According to Kashdan, Rose, & Fincham, (2004) curiosity and exploration facilitate positive subjective experiences and personal growth opportunities. Implicit in this understanding of curiosity is that people must feel

they have the ability to effectively cope with or make sense of the novelty, ambiguity and uncertainty being confronted during explorations (Silvia, 2008). Kashdan (2009) learned that research on the benefits of curiosity is only beginning to accumulate.

Epistemic curiosity states are aroused by novel questions, complex ideas, ambiguous statements, and unsolved problems, all of which may point to a "gap" in one's knowledge, and reveal a discrepancy between that which one knows one knows and desires to know (Litman & Spielberger, 2005). Epistemic and perceptual curiosity differed in terms of the types of stimuli that activated the emotions states and behaviors that were motivated by them as Collins, Litman, Spielberger (2004) ascertained. Early research in this area have identified perceptual curiosity evoked by complex or ambiguous pattern of sensory stimulation (e.g. lights, sounds) motivated behaviors such as visual inspection in order to acquire new information (Loewenstein, 2007). In this study, it tried to explore the impact of curiosity on how it affects the interest towards Mathematics, because it was emphasized that the more curious students are the higher the interest they will have towards the subject.

One of the most important factors that lead one to their goals is the drive as Singh (2011) mentioned. This drive is known as motivation. It is a zest and determination with a kind of excitement that leads one to persevere to reach greater height (Singh K., 2011). In the study of Peklaj, & Puklek, (2007) of the University of Ljubljana in Slovenia, they concluded that motivation plays a major role in students' academic work and in their achievement.

Motivation is defined as an internal state that arouses, directs, and maintains behavior (Woolfolk, 2008). It reflects in students' choices of learning tasks, and in the time

and effort they devote to them, in their persistence on learning tasks, in their coping with the obstacles they encounter in the learning process (Peklaj & Puklek, 2007). In the study of Singh, K. (2011), he defined motivation as an internal drive that activates behavior and gives it direction. Many motivational scholars agree that academic motivation is a multidimensional construct (Pinfrich, 2003; Wiegfield & Eccles, 2001).

Self-efficacy, task value and goal orientation are the three components of motivation (Doronilla, 2012). According to Chemers and his collaborators (2001), self-efficacy plays a significant role in achievement since confident students use better learning and problem solving strategies, work harder, persist longer and have higher academic expectations. Self-efficacy is commonly defined as the belief in one's capabilities to achieve a goal or an outcome (Kirk K. 2007). Margolis & McCabe, (2006) quoted that students with a strong sense of efficacy are more likely to challenge themselves with difficult tasks and be intrinsically motivated (Kirk, 2013). Students with low self-efficacy, believe they cannot be successful. Thus, students with poor self-efficacy have low aspirations which may result in disappointing academic performances, becoming part of a self-fulfilling feedback cycle (Margolis and McCabe, 2006). Piper defined self-efficacy as a person's judgment about being able to perform a particular activity. It shows that students are assured in doing specific tasks.

Eccles (2002) identified task values predict course plans and enrollment decisions in mathematics. Wigfield (1997) proposed that initially, young children’s competence and task-value beliefs are likely to be relatively independent of each other. Another component of motivation is goal orientation. Goal Orientation Theory of Motivation (2010) defines goal oriented behavior as a goal orientation that focuses on mastering the task at hand and

doing the best that can be done with the ability one has under the circumstances faced. Goals influence what a student chooses to study, how strategic they are in their study patterns, how persistent they are in the face of difficulties, and whether or not they are willing and able to go beyond the course requirements (Svinicki D., 2011). Peklaj & Puklek (2007) cited the most important motivational construct, related to the question "Do I want to do this activity and why?" is intrinsic end extrinsic motivation. Intrinsically motivated students engage in an activity for its own sake – because they find working on the task enjoyable. Motivation is the activation of goal-oriented behavior. Motivation is said to be intrinsic or extrinsic (Singh K. 2011). Singh mentioned that intrinsic motivation refers to motivation that is driven by an interest or enjoyment in the task itself, and exists within the individual rather than relying on any external pressure. Singh has found that it is usually associated with high educational achievement and enjoyment by students while extrinsic motivation comes from outside of the individual. Eccles added that when individuals are intrinsically motivated, they engage in an activity because they are interested in it and enjoy the activity. On the other hand, extrinsically motivated individuals engage in activities for instrumental or other reasons, such as receiving a reward (Eccles J.S. & Wigfiel A. 2002).

Another important factor that entails attention for inclusion in this study in learning process is the attitude. Attitude is based on value and belief, as well as varying degree of factual knowledge (Mullis, Martin, Gonzales, Conner, Chrostowski, Gregory, Garden, and Smith, 2001). Attitudes can be distinguished as more positive or less positive. This positive or negative feeling is of moderate intensity and reasonable stability; sometimes it is especially resistant to change as emphasized by Nicolaidou and Philippou. A positive attitude towards mathematics reflects a positive emotional disposition in relation to the

subject and, in a similar way, a negative attitude towards mathematics relates to a negative emotional disposition (Mata, Monteiro, and Peixoto, 2012). Positive attitude toward mathematics can be linked with positive beliefs about the discipline (Zan, 2013). Having a positive attitude towards mathematics means in general that students are enjoying dealing with mathematics and they are confident in their own ability to do it. Mata, (2012) discovered that emotional dispositions have an impact on an individual's behavior, as one is likely to achieve better in a subject that one enjoys, has confidence in or finds useful. For this reason, positive attitudes towards mathematics are desirable since they may influence one's willingness to learn and also the benefits one can derive from mathematics instruction, as stated in TIMSS (2013). Nicolaidou and Philippou showed that negative attitudes are the result of frequent and repeated failures or problems when dealing with mathematical tasks, and these negative attitudes may become relatively permanent. Mata found out that when children first go to school they usually have positive attitudes towards mathematics however, as they progress their attitudes become less positive and frequently become negative at high school such as the pressure to perform well, over - demanding tasks, uninteresting lessons and less than positive attitudes on the part of teachers.

Curiosity, motivation and attitude are all aspects contributing to the mathematics performance of a student. These variables play a major role in students' performance in mathematics. Some researcher found out that academic performance can be increased if students' intellectual curiosity is regularly renewed and stimulated. Tella (2007) mentioned that the important aspect of effective learning is the tissues of motivation of students in education and the impact on academic performance.

All of the variables discussed are found in the conceptual paradigm (Figure 1) of this study. The independent variables are curiosity, motivation, and attitude. The dependent variable is the mathematics performance. The study sought to determine whether the independent and the dependent variables are significantly correlated. The symbol of the line segment indicates relationship.

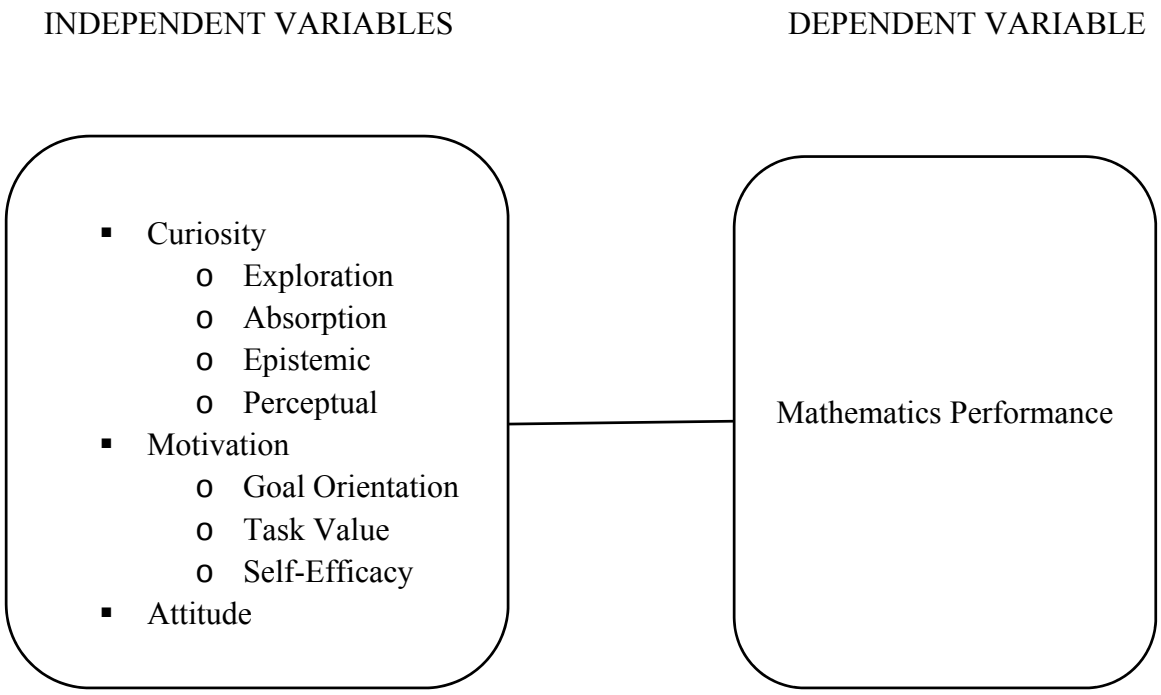

Figure 1

Conceptual Paradigm

Statement of the Problem

This study aimed to determine the curiosity, motivation and attitudes of fourth year students in Kaypian National High School in relation to their performance in Mathematics.

The study was designed to answer the following specific questions:

1. How may fourth year students be described in terms of
   1.1 Curiosity
   1.2 Motivation
   1.3 Attitudes
   1.4 Mathematics Performance
2. Is there any significant difference between male and female students perception in terms of their
   2.1 Curiosity
   2.2 Motivation
   2.3 Attitude
   2.4 Mathematics Performance
3. Which of the independent variables predict mathematics performance?

Significance of the study

Stakeholders of education can gain much from the results of this study. The findings will enlighten the principal, teachers, parents and students on the influence/relationship of curiosity, motivation and attitudes to the learning of and performance in mathematics by students. The principal will provide an appropriate budget for the enhancement of the students' performance. Teachers particularly will be informed on the relationship of curiosity, motivation and attitudes of students on their performance in mathematics. Teachers will also find ways to learn why students are having difficulties towards learning mathematics, they will be enlightened on the need to foster favorable attitudes towards

mathematics amongst students. Parents will become conscious on their responsibility to provide their children's needs and guide them to deal with mathematics positively. They will be enlightened on the need to provide enabling environment for learning mathematics. Students will profit from this study. They will be given appropriate and enough attention that could make them successful in mathematics.

Scope and Delimitations of the study

The study involved fourth year students from Kaypian National High School during the school year 2014-2015; hence the sample comprised from 6 sections with 55 students. There is no assumption that the findings would serve as representative of the whole division, region, and country.

Definition of Terms

For a better understanding of this study, the following terms are operationally defined:

Attitude. This refers to the attentiveness and participation of students towards the mathematics subject. In this study, it refers to students' perception of or feeling towards Mathematics. Generalized feeling towards a particular object, subject or situation.

Curiosity. This pertains to the level or desire for acquiring new knowledge and new sensory will effect greater advancement in mathematics (Litman and Spielberger, 2003). In this study, this refers to the construct that captures the level of individual's epistemic curiosity, perceptual curiosity, exploration and absorption

(Doronilla, 2012). As measured through as adapted questionnaire.

Gender. This refers to the feminity and masculinity of the students' respondents.

Mathematics Performance. This refers to knowledge of numbers to solve practical problems that involve whole numbers, fractions, decimals, fractions, percents and proportions. In this study, it refers to mathematical proficiency test in Appendix H.

Motivation. This refers to the factors/driving force that makes students excited and leads them to persevere to reach greater height (Singh, 2011). In this study, it reflects in students' choices of learning tasks, in the time and effort they devote to them, in their persistence on learning tasks and in their coping with the obstacles they encounter in the learning process.

Performance. This refers to the results of the accomplishments in mathematics by reasons of skill, hard work or interest and attitudes. In this study, it is measured by a self-developed test approved by the researchers' adviser.

Chapter II
Review of Related Literature

This chapter reviewed literature related to the study with relevant background and information on curiosity, motivation and attitudes in relation to performance on selected areas in mathematics among fourth year students.

Curiosity and Mathematics Performance

It is already given that children are such curious creatures (Perry, 2001). Perry mentioned that they question, and wonder, and by doing so, learn. Perry mentioned that is is also during the moment of birth, likely even before, humans are drawn to new things. Perry mentioned that when we are curious about something new, we want to explore it and exert effort. While exploring, we discover. According to Kashdan, et.al (2009) curiosity captures people's propensity to stretch their capabilities. Curiosity is like adrenalin that makes students to do something out of the box.

On the other hand, academic performance can be increased if students' intellectual curiosity is regularly renewed and stimulated. Thus, students should be encouraged to follow challenging paths and not be exclusively rewarded for their "acquiescent application of intelligence and effort (Reis of Tomorrow's Professor). This inventory index is highly significant for which it is adopted to gather data pivotal for the completion of research. Based on the detailed review of literature on curiosity, Collins, Litman, Spielberger (2004) concluded that individual spend significantly more "gaze time" in examining novel, complex, or ambiguous stimuli, as previously noted, he did not endeavor perceptual

curiosity construct. That is why in this study, the said index was utilized in aid of measuring the variables.

Curiosity is comprised of two(2) dimensions: exploration and absorption (Kashdan, Rose & Fincham, 2004). Focusing on the objects of curiosity is different from focusing on the qualities of curiosity as Cavojova & Sollar (2007) mentioned. One example question is from the item of Epistemic Curiosity Scale; (Litman & Spielberger, 2003) It is already proven that curious students given a new kind of arithmetic problem, enjoys imagining solutions. A highly curious person is someone who can absorb and recognize challenging experiences. As an emotional motivational state, epistemic curiosity is complex in that its arousal can involve positive feelings of interest associated with the anticipation of learning something new, as well as relatively unpleasant feelings of uncertainty due to lack of knowledge (Litman & Jimerson, 2004).

Hong and Aqui (2004) studied academically gifted mathematics students and students with creative talent in mathematics and found significant differences in cognitive strategies with the creatively talented group being more cognitively resourceful. Resourcefulness, persistence, and the desire to explore alternative methods of solution are all characteristics of the potentially creative mathematical thinker identified by Carlton. Traditional tests to identify mathematically gifted students do not identify creativity (Kim, Cho, & Ahn, 2003), but rather value accuracy and speed. Doing so causes many children's natural curiosity and enthusiasm for mathematics to disappear as they get older, creating a tremendous problem for mathematics educators who are trying to instill these very qualities (Meissner, 2000). Keeping students interested and engaged in mathematics by recognizing and valuing their mathematical creativity may reverse this tendency (Mann, E., 2005).

Mann mentioned that the first step in focusing on mathematical creativity is the identification of this characteristic in students. Emphasis is placed on creating authentic learning situations where students are thinking, feeling, and doing what practicing professionals do (Renzulli, Leppien & Hays, 2000; Tomlinson et al., 2001).

In contrast, their study explore the difference in terms of gender and their performance in Mathematics. The differences between academically gifted students who achieved high grades in school math, and the creatively talented in mathematics, those students with a high interest, active and accomplished in math but not necessarily high achieving in school math. Hong and Aqui found significant differences in cognitive strategies used by the two groups with the creatively talented being more cognitively resourceful. Reis on Tomorrow's Professor found out that empirical evidence strongly suggests that academic performance can be predicted by a combination of cognitive ability and effort. Cognitive ability and effort associates with academic performance however, researchers found out that effort can be potentially more meaningful than intelligence because less able students can compensate for lower levels of cognitive ability by becoming more conscientious, studying harder, and paying greater attention to details and rules. To investigate whether curiosity is a strong determiner for academic performance, Von Stumm, Hell & Chamoroo-Premuzic performed a meta-analysis, gathering the data from about 200 studies with a total of about 50,000 students. They found that curiosity did, indeed, influence academic performance. In fact, Stumm found out that curiosity had quite a large effect, about the same as conscientiousness that when put together, conscientiousness and curiosity had a big effect on performance as intelligence. Stumm wasn't surprised that curiosity was so important. He believes in the importance of a hungry

mind for achievement. Most students need academic challenge as well as creative opportunity to explore mathematics, nature and to develop mathematical skill and conceptual understanding. Young children explore mathematics naturally and yet the skills-based mathematics encountered in many classrooms fails to connect their natural curiosity with the established curriculum of mathematics (Mann, 2005). Stumm emphasized that teachers have a great opportunity to inspire curiosity in their students, and it is important to make them engaged and become independent learners. Curiosity among students is innate that is why it is considered as one of the variables in this study. The level of curiosity can be a predictor to mathematical performance which is the main concern of this study.

Motivation and Mathematics Performance

Various factors have been adduced for poor performance of students in mathematics. Wentzel (1998) stated that interest in activities tends to increase the likelihood that individuals formulate goals relating to that activity and invest time and effort to achieve them. Important aspect of effective learning is the tissues of motivation of students in education and the impact on academic performance (Tella, A. 2007).

Researchers studied the influence and relationship of motivation in learning mathematics. Garut, (2011) indicated that motivational beliefs are the outcome from direct learning experience. Motivational beliefs act as favourable contexts of learning and also refer to the students' opinion of the efficiency and effectiveness of learning and teaching method (Boekerts, 2002). Other research findings have shown that individual student's characteristic variables such as motivational orientations, self-esteem and learning

approaches are important factors influencing academic achievements (Tella, 2007). Of all the personal and psychological variables that have attracted researchers in this area of educational achievement, motivation seems to be gaining more popularity and leading other variables (Tella, 2003).

Most effective aspects of effective learning is to motivate learners. In fact psychologists believe that motivation is a necessary ingredient for learning (Biehler and Snowman, 1986). They believe that satisfactory school learning is unlikely to take place in the absence of sufficient motivation to learn (Fontana 1981). The study looked at the influence and relationship of motivation on students' mathematics performance. Cheung (1998) hypothesized that conceptions of success of achieving goals affect both the inclination to and actual performance.

Motivation is a multidimensional construct. Researchers in the field of motivation (Wiegfield & Eccles, 2001) agree that a student engaging in any learning situation has to answer three fundamental questions: 'Can I do this activity?', 'Do I want to do this activity and why?', and 'What do I need to do to succeed?' (Wiegfield & Eccles, 2001).

According to Peklaj & Puklek, (2007), constructs relating to the question "Can I do this activity?" are the expectations students have according to their capabilities to perform a certain activity in different areas. Self-efficacy affects students' choice of activity, their effort and persistence in it. Students constantly judge their intellectual capabilities against the curriculum demands and values of school tasks, and they then decide to persist in the coursework or not. Different studies show that self-efficacy is one of the most powerful predictors of student achievement (Bandalos, Geske & Finney 2005). In a longitudinal study among first year college students, self-efficacy proved to be positively related to

performance, personal adjustment, health and commitment to stay in school (Chemers, Hu, Garcia, 2005).

Singh found out a social psychological research has indicated that extrinsic rewards can lead to over justification and a subsequent reduction in intrinsic motivation. On the other hand, students can also be motivated through their own effort when they believed that working on the task will result in a positive outcomes (e.g. reward, good grade, parents' and teachers' approval, avoidance of punishment). Intrinsic motivation usually results in more cognitive engagement than extrinsic motivation (Ryan & Deci, 2000).

Related to the question "What do I need to be successful in an activity?" is the use of cognitive and metacognitive strategies in a learning activity. Cognitive (i.e. rehearsal, elaboration, organization) and metacognitive strategies (planning, monitoring, evaluation) also proved to be connected to motivation and to learning achievement (Peklaj & Puklek, 2007). The cognitive benefits of cooperative learning in comparison with students' individual learning can be seen in their higher achievement (Johnson & Johnson, 2002). The metacognitive strategies help students to plan (setting goals), monitor (supervising, controlling understanding) and modify (regulating) their learning (Parmentier & Romainville, 1998).

In his later years, Maslow realized that an environmental precondition of stimulation, or challenge, was needed to motivate individuals. Understanding this theory clarifies the hierarchical needs of the students that is considered in their study which boils down again to teacher – factor. Maslow concluded that it is the teachers' responsibility to include a means of stimulation in their teaching programs to catch students' interest. The

learning environment and teachers` motivation upon knowledge development relatively need attention in the field of mathematics teaching and learning. What happens in the classroom between psychological implication of teachers concerning their motivation and the student ability to study well has an impact on students' opportunity to learn (Samuelsson, 2008). Students and teachers are engage in the repeated actions and activities in the classroom as they learn are important because they comprise the knowledge that is produced. The knowledge produce through motivating environment or activities directly affects the performance of the students.

Attitude and Mathematics Performance

Attitudes influence performance and performance in turn influences attitudes (Mubeen, Saeed, Arif, 2013). Fisher and Rickards (1998) found that students' attitude towards mathematics tended to be more positive in classroom where students perceived greater leadership and helping behaviors in their teachers, and more negative in their classrooms where students perceived their teacher as admonishing and enforcing strict behaviors. Researchers concluded that positive attitude towards mathematics leads students toward success in mathematics (Farooq & Shah , 2008). Poor attitude towards mathematics has often been cited as one factor that has contributed to lower participation and success of girls in mathematics (Willis, 1995; Fullarton, 1993). It is important to have interest and positive attitude of students in dealing with mathematics to be successful in learning mathematics which is criterion variable in this study.

Teachers of mathematics tried to find out the relationship of the students with their performance in mathematics (Farooq and Shah, 2008). Similarly, Farooq and Shah,

concluded that teaching process of mathematics depend upon the positive attitude towards mathematics. As students' progress through the educational system their interest in mathematics diminishes. The U.S. Department of Education (2003) reports that 81% of fourth graders have a positive or strongly positive attitude towards mathematics but four years later only 35% of eighth graders share that attitude. At the post-secondary level, less than 1% of degree-seeking baccalaureate students choose mathematics as their major field of study (National Center for Educational Statistics, 2005). Compared to our national standing, this is 20% higher.

Educators must find possibilities to inspire young people to continue solving problems in mathematics at higher levels, and to provide instruction that will increase their mathematics abilities and performance. Education Board and National Research council (1989), found out that students should be encouraged and prepared for accepting the challenges of day to day life. It is the attitude of the student which contributes a lot toward his perception about mathematics and it develops the adaptability and applicability in the learners (Schiefele & Csikszentmihalyli, 1995). Solving problems as one of the 21st Century Skills is duly directed from inspiration so that they will perform well. Learners will be more goal oriented towards Mathematics.

Gender Factor

Gender based differences are due to the individual's perception of own abilities and the sex role (Schiefele & Csikszentmihalyli, 1995). According to Mubeen, Saeed, & Arif (2013), one of the most common explanations for gender disparities in mathematics achievement has focused on attitude that students have towards mathematics. In the study

of Bono (1991), girls would enjoy math, increase their time on math task, and have positive emotional reactions to Mathematics were taught in cooperative settings. In some cases, boys were more confident than girls even when their mathematics achievement was similar to that of girls (Casey et al, 1997). Males are more inclined towards mathematics than females on being the male dominated domain. According to Boaler (2000) despite such consistent findings of girls' low confidence in mathematics, studies of classroom environment have shown that the girls' confidence in mathematics improved greatly in classes which actively involved girls in the learning of mathematics.

According to Samuelsson (2008) there are studies discussing mathematics as a boy's subject in terms of girls' lack of confidence in their ability (Hyde, Fenneman, & Lamon, 1990; Terlwilliger & Titus, 1995) and in terms of attitudes to mathematics as a school subject (Francis, 2000) and girls' achievement (Ernest, 1998). Boys are more interested in classroom settings where it is possible to take risks and where it is possible to find out different ways to solve problems - a more creative environment (Rodd & Bartholomew, 2006).

Varied factors might affect the quality of learning towards Mathematics specifically behavioral factors like curiosity, motivation and attitude, since this is an innate factor or variables which is varied depending upon the capacities and experience of the learner.

Curiosity should be renewed and stimulated. Challenging Math activities that will serve as stimulants will assure hooked students in class that can pave way to authentic products of learning. Curious students to Math is an assurance that their hunger to learn will be satisfied and it comes within the learner.

On the other hand, motivation is already proven psychologically a factor in learning but it is different when motivating students to learn, participate, collaborate and the like in Mathematics. Through a vast domain covers motivation highly motivated students make students to commit and adjust to perform well especially in Mathematics.

Lastly, attitude establishes positive rapport between teachers and students. In order students to perform there should be smooth interpersonal connection between teachers and students. If the positive attitude prevails towards Math, challenging problem and vague areas in instruction will be addressed because there is a free flow of communication.

Chapter III
Methodology

This chapter presents and explains research design, research instruments, sampling method, instrumentation and data gathering procedures and data analysis that were used in the study.

Research Design

The descriptive correlational method of research was used in the study which is designed for the researchers to gather information about present existing conditions needed in the chosen field of study. This method entitles the researchers to interpret the theoretical meaning of the findings and hypothesis development for further studies. According to Calderon & Gonzales, (2007) descriptive research describes and interprets *what is*. It is concerned with conditions of relationships that exist; practices that prevail; beliefs; processes that are going on; effects that are being felt, or trends that are developing. The process of descriptive research goes beyond mere gathering and tabulation of data. It involves the elements or interpretation of the meaning or significance of what is described. Thus description is often combined with comparison and contrast involving measurements, classifications, interpretation and evaluation. In this study the measured variables, were derived from a survey instrument were their differences will be accounted through the use of relative statistical technique.

Participants of the Study

This study was conducted at Kaypian National High School (KNHS) in San Jose Del Monte City, Bulacan particularly fourth year students. KNHS is a newly high school in the city, and operates for 3 years now. The first building was established on the first week of December 2011 and finished on May 10, 2012. Fortunately, the school started to operate on June 2012 and catered 980 students with 534 male and 446 female under the supervision of Elisa U. Jarabe, a head teacher of Paradise Farm National High School. A year after, the enrollees of KNHS become 1417 students with 751 male and 666 female. At present, the enrollees of KNHS is now 1685, with 839 male and 746 female.

The population of the study comprised of 321 respondents consisting of six (6) sections with 55 students in a class. The participants of this study belonged in two (2) sections with 25 students each, consisting of 25 boys and 25 girls. They were given the Curiosity Inventory, Motivation Inventory, Attitude Inventory and Mathematical Proficiency Test. Samples were drawn using a stratified random sampling technique, which is done by simply drawing randomly the desired sample size from each subgroup.

Research Instrument

There were four instruments used in this study. The first two instruments were the Curiosity Inventory and the Motivation Inventory which consisted of 30-item questions each adapted from the study of Doronila, (2012) as shown in Appendix E and F. The third instrument is the Attitude Inventory where some statements were adapted from the instrument of Nicolaidou and Philippou (2003). This tool was pilot tested to 50 students

from other sections for face validity. The final copy of the instrument is shown in Appendix G.

The 5 - point rating scale design was used in the tools to measure students' curiosity, motivation and attitude in relation to performance in mathematics. The students were asked to rate themselves from 1 to 5 (5 being the highest and 1 being the lowest) according to how accurate the statements truly applies to them.

The mean score for these tools were interpreted based on this scale:

Rating	Verbal Description
4.20 – 5.00	Always
3.40 – 4.19	Often
2.60 – 3.39	Sometimes
1.80 – 2.59	Rarely
1.00 – 1.79	Never

The same 5- point rating scale design was used to measure students' attitude in relation to performance in mathematics.

The mean score for positive attitude were interpreted based on this scale:

Rating	Verbal Description
4.20 – 5.00	Strongly Agree
3.40 – 4.19	Agree
2.60 – 3.39	Undecided
1.80 – 2.59	Disagree
1.00 – 1.79	Strongly Disagree

The mean score for negative attitude were interpreted based on this scale:

Rating	Verbal Description
4.20 – 5.00	Strongly Disagree
3.40 – 4.19	Disagree
2.60 – 3.39	Undecided
1.80 – 2.59	Agree
1.00 – 1.79	Strongly Agree

The test is made with the following item placement from the study of Doronilla (2012) as shown in Appendix E, F and G.

Exploration	1-6
Absorption	7-11
Epistemic Curiosity	12- 21
Perceptual Curiosity	22- 30

Components of Motivation

Goal Orientation	1,7,11,13,17,20,23,25,28,30
Task Value	4,8,12,14,15,19,21,22,24,29
Self-Efficacy	2,3,5,6,9,10,16,18,26,27

Components of Attitude

Positive Attitudes	1-15
Negative Attitudes	16-30

The fourth instrument is Mathematical Proficiency Test, a researcher- developed test used to measure the conceptual understanding on selected areas in mathematics.

In determining the validity of the 50-item test, the three basic concepts mentioned by Anastassi (1976) were considered, namely: face validity, content validity and item analysis. To insure its face validity, the researcher make sure that every item included in the test was pertinent to the topics taken up.

Stage 1. Preliminary Stage

To develop the preliminary test, literature on assessment was read. Books, journals and theses about Measurement and Evaluation, Educational Testing and Measurement, Reliability of Test were also read.

Stage 2. Writing and Validation Stage

In this stage, the Table of Specification was prepared to insure a balanced distribution of the test item to the learning skills considered in the study. Initially, a 70-item test was prepared as shown on Appendix K. The items were presented to a master teacher for the initial validation, then the test was tried out to Section 1 and Section 6. The result of the first trial was used for the test improvement. Twenty (20) items from the original questions were deleted to form a 50-item test question. Items #5, #9, #13, #20, #21, #24, #25, #30, #31, #32, #41, #43, #44, #48, 49, #50, #51, #55, #56, #68, were deleted and some items were revised and reworded for the refinement of the test items. Thorough inspection of the items were determine by this researcher and other mathematics teachers. Master Teachers and Head Teachers of the respondent school reviewed the content of the

test as shown in Appendix D. Positive responses of the validators of the test was high (3.75), indicating that they all agree in judging the test content valid. The comments/suggestions of the evaluators in the test were incorporated before the final tried out to the students.

Data Gathering Procedure

The instruments for gathering information were administered to the fourth year students of KNHS last March 23, 2015 the survey questionnaires adapted from Doronila (2012) and researcher-developed test. The test was conducted to the respondents before the end of the school year 2013-2014 through random sampling. The questionnaires on Curiosity, Motivation and Attitude were administered after the final examination of students. The students properly guided in accomplishing the instruments. The following day the test to measure their mathematics performance was administered.

Data Analysis Procedure

The purpose of the study determine the curiosity, motivation, and attitude of fourth year students of KNHS in mathematics. The data were coded and entered in the computer using SPSS program. Data collected were analyzed by computing the mean and the standard deviation. Specifically, it was analyzed using simple descriptive statistics: percentages, means and frequencies. To answer and explain which of the independent variables predict mathematics performance, regression analysis was used. The data was presented with the aid of tables.

Chapter IV
Presentation, Analysis and Interpretation of Data

This chapter presents the data gathered, its analyses and interpretation. The data were gathered and collected from fourth year students of KNHS in San Jose Del Monte City, Bulacan.

Problem 1: How may fourth year students be described in terms of curiosity, motivation, attitude and mathematics performance?

Curiosity was divided into four dimensions: Exploration, Absorption, Epistemic Curiosity and Perceptual Curiosity. Table 1 shows the mean perception on curiosity in terms of exploration, absorption, epistemic and perceptual curiosity of the fourth year students.

Table 1 summarizes the respondents' perception on curiosity in terms of exploration. Among the six statements, number 5 *I am always looking for experiences that challenge how I think about myself and the world* has the highest mean of 4.22 and a standard deviation of 0.86. Number 3 *I actively seek as much information as I can in new situations* obtained the lowest mean of 3.66 and a standard deviation of 0.96. In line with the Maslow's theory, teachers need to expose learners to motivating activities in order for them to self-actualize or be satisfied. Human beings are motivated by unsatisfied needs, and that certain lower factor need to be satisfied before higher needs be satisfied. Furthermore, "Maslow's Need Pyramid" emphasized that the lower-order need have to be satisfied in order to pursue higher level motivators. After a need is satisfied, it stops acting as a motivator and the next need one rank higher starts to motivate as it attain psychological

precedence. Students who are very eager towards challenging activities are intrinsically driven to solve mathematical as Kashdan, et al (2009) emphasized. Litman and Spielberger (2003) mentioned that a highly curious person is someone who can absorb and ready to recognize a challenging experience. This means that the students' responses are on the stage of looking for more motivating activity. They are eager to meet challenges but not keen in getting new information. According to Madden, Slavin, Simons, (1999) students work on performance tasks at the end of each unit to use the skills they have earned to solve practical real world situations and explain and communicate about their thinking.

Table 1
Mean Perception of Respondents on Curiosity in Terms of Exploration

No. Statement	*Indicators*	*Mean*	*SD*	*Verbal Description*
1	I would describe myself as someone who actively seeks as much information as I can in a new situation.	3.84	0.79	Often
2	I find myself looking for a new opportunities to grow as a person (e.g., information, people, and resources).	4.12	0.94	Often
3	I actively seek as much information as I can in new situations.	3.66	0.96	Often
4	I am at my best when doing something that is challenging.	4.10	0.95	Often
5	I am always looking for experiences that challenge how I think about myself and the world.	4.22	0.86	Always
6	I frequently seek out opportunities to challenge myself and grow as a person.	4.14	0.83	Often
	Overall	4.01	0.59	Often

The following table, Table 2 displays the mean perception on curiosity in terms of absorption, among the five statements, number 2 *Everywhere I go, I am out looking for*

new things or expressions obtained the highest mean of 4.14 and a standard deviation of 0.88. Statement number 3 *I like to do things that are little scary* obtained the lowest mean of 3.0 and a standard deviation of 1.12. This means that students have a high level of awareness of themselves in their physical world. Litman & Spielberger, (2003) mentioned that a highly curious person is someone who can absorb and ready to recognize a challenging experience. Students are engaged to explore and seek new experiences that they think will help them to grow as a person. They are applying their learnings to cope with the places they have been. According to Herzberg, the hygiene theory of motivation, highly self-actualized person in this study, the students, and every learning experience in Math denotes seeing it in daily contacts to the environment.

Table 2
Mean Perception on Curiosity in Terms of Absorption

No. Statement	*Indicators*	*Mean*	*SD*	*Verbal Description*
1	When I am actively interested in something, it takes a great deal to disturb me	3.58	1.21	Often
2	Everywhere I go, I am out looking for new things or experiences.	4.14	0.88	Often
3	I like to do things that are little scary.	3.00	1.12	Sometimes
4	I prefer activities that are excitingly unpredictable.	3.40	1.11	Often
5	I am kind of person who accepts unfamiliar people, events, and places.	3.68	1.24	Often
	Overall	3.56	0.74	Often

The following table, Table 3 presents the mean perception of the respondents in terms of Epistemic Curiosity. It was perceived that the respondents enjoy learning about

subjects that are familiar to them with a mean of 4.52 or always as stated in number 2. This means that students should be equipped with necessary prior knowledge to enjoy a particular subject because the more familiar the students, the more they can participate and generate complex skills and knowledge. Since the students are eager in looking new things or experiences, provision of activities which are new among them will make the absorption of a Math concept easier.

Table 3
Mean Perception on Curiosity in Terms of Epistemic Curiosity

No. Statement	*Indicators*	*Mean*	*SD*	*Verbal Description*
1	Difficult conceptual problems can keep me awake all night thinking about solutions	3.08	1.26	Sometimes
2	I enjoy learning about subjects that are familiar to me.	4.52	0.84	Always
3	I can spend hours of a single problem because I just can't rest without knowing the answer.	2.86	1.09	Sometimes
4	If I read something that puzzles me at first, I keep reading until I understand it.	3.96	0.97	Often
5	It bothers me if I come across a word that I don't know, so I will look up its meaning in a dictionary.	3.56	1.16	Often
6	I feel frustrated if I can't figure out the solution to a problem, so I work even harder to solve it.	3.60	1.01	Often
7	I ponder for a long time in an attempt to solve some fundamental problems	3.28	1.03	Sometimes
8	I am critical of current ideas and theories.	2.92	0.94	Sometimes
9	I enjoy discussing abstract concepts.	3.12	1.15	Sometimes
10	If I am given an incomplete puzzle, I like to try to find the final solutions	3.36	1.17	Sometimes
	Overall	3.43	0.55	Often

Statement number 3 *I can spend hours of a single problem because I just can't rest without knowing the answer* obtained the lowest mean of 2.86 and a standard deviation of 1.09. Familiar subjects that can be applied to daily living is enjoyed by student respondents like Math. This denotes the great challenge of teachers to make problems as realistic as possible as what the Singaporean Math entails, which is not adopted in K to 12 Curriculum.

Table 4

Mean Perception on Curiosity in Terms of Perceptual Curiosity

No. Statement	*Indicators*	*Mean*	*SD*	*Verbal Description*
1	When someone asks me a riddle, I am interested in trying to solve it.	3.72	1.09	Often
2	When I am given a new kind of arithmetic problem, I enjoy imagining the solutions.	3.22	1.11	Sometimes
3	When I see a complicated piece of machinery, I like to ask someone how it works.	3.58	1.14	Often
4	I enjoy exploring new ideas.	4.12	0.98	Often
5	I find it fascinating to learn new information.	3.94	1.00	Often
6	If I am given an unfamiliar task, I like trying how it gets done.	3.74	1.10	Always
7	When I learn something new, I would like to find out more about it.	3.96	1.03	Often
8	When I see an incomplete puzzle, I like imagining how to solve it.	3.92	1.08	Often
9	I am interested in discovering how things work.	4.22	0.91	Always
	Overall	3.82	0.61	Often

It can be seen from Table 4 the mean perception of the respondents in terms of Perceptual Curiosity. Among the nine statements of Curiosity in Terms of Perceptual Curiosity, Number 9 *I am interested in discovering how things work* obtained the highest

mean of 4.22 and a standard deviation of 0.91. Statement number 2 *When I am given a new kind of arithmetic problem, I enjoy imagining the solutions* obtained the lowest mean of 3.22 and a standard deviation of 1.11. This means that the perception of the respondents are generally inquisitive which aims to study the underlying pedagogical processes that help produce the achievement levels reflected in test scores as what Hadley (2002) mentioned.

Table 5
Summary of Mean Perception on Curiosity

Components	*Mean*	*SD*	*Verbal Description*
Exploration	4.01	0.59	Often
Absorption	3.56	0.74	Often
Epistemic Curiosity	3.43	0.55	Often
Perceptual Curiosity	3.82	0.61	Often
Overall	3.71	0.48	Often

It can be concluded based from the values shown in Table 5 the summary of the mean perception of curiosity. Exploration obtained the highest mean of 4.01 with a standard deviation of 0.59 while Epistemic Curiosity obtained the lowest mean of 3.43 and a standard deviation of 0.55. This means that the bulk of curiosity remains in curiosity of abstractness of the concept. Students feel that they have the ability to seek out opportunities to challenge themselves and grow as a person. It also denotes the need to make such complex-abstract ideas to be presented in more concrete and practical ways.

Table 6 shows the mean perception on motivation in terms of goal orientation. Among the 10 statements, the two highest means obtained in Number 3 and 4 that the most satisfying thing in a math class is trying to understand the lessons as thorough as possible and when there is an opportunity in a math class, students chose activities that they can learn from, even if they weren't guaranteed a good grade. Details are really needed to be presented in step-by-step manner so that the concepts can be easily absorbed by the students. Students come to the conclusion that they are not good at math but they are eager to learn things and grasp the mathematical concepts. They perform activities and willing to be able to understand the lessons in mathematics even though they do not have an assurance or guarantee to get a high grade.

Among the 10 statements, the lowest mean was obtained by statement number 9 *The mathematical uses of mathematics subject are clear to me*. This means that students cannot see the personal uses or applications of mathematics in their daily lives. They tried to study and understand the lessons for the purpose of passing the subject yet they do not know the importance of this in real life situation. Nowadays, student have a strong need to know why they should learn mathematics, but unfortunately many of them do not know on how to apply what they have learn in school in real life. The connection between the subject and their lives are not clear to them. This is due to the fact that the way students process information and their motivation for learning does not correspond with the traditional methods of classroom teaching. According to Maslow's Theory, it is the role and responsibility of a teacher to know the needs of the students. Similarly with Garut (2011) these beliefs are the outcome from direct learning experience. This is also in

consonance with Tella (2007) that motivation is really an influencing factor to academic achievements.

Table 6
Mean Perception on Motivation in Terms of Goal Orientation

No. Statement	*Indicators*	*Mean*	*SD*	*Verbal Description*
1	I like mathematics because it really challenges me to learn new things.	3.86	0.90	Often
2	I like mathematics lessons because it arouses my curiosity, even if it is difficult to learn.	3.82	1.06	Often
3	The most satisfying thing for me in a mathematics class is trying to understand the lessons as thoroughly as possible.	3.96	0.90	Often
4	When I have the opportunity in a math class, I choose activities that I can learn from, even if they don't guarantee a good grade.	3.96	0.90	Often
5	I want to do my best in a math class because it is important to show my mathematical ability to my family and friends.	3.82	1.14	Often
6	I feel confident that I will do well in a mathematics class.	3.78	0.89	Often
7	In a math class, I try to set and achieve high standard of excellence.	3.58	1.03	Often
8	The content of a mathematics subject relates to my expectations and goals.	3.74	0.88	Often
9	The personal uses of mathematics subject are clear to me.	3.50	0.91	Often
10	The amount of work I have to do is appropriate for this type of subject.	3.86	0.90	Often
	Overall	3.79	0.55	Often

The table that follows, Table 7 presents the mean perception on motivation in terms of task value. Among the 10 statements of Task Value, the highest mean obtained in Number 10 with a mean 4.00 *I find the challenge level in math to be about right: neither too easy, nor too hard* and number 7 obtained the lowest mean with 3.32 *The mathematics teacher makes the lesson seem important* interpreted as often students prefer math

challenges to be one average level of difficulty so that everyone can participate, solve and understand problems in mathematics. This connotes that Math is really a challenging subject. This is the reason why its main goal is to develop 21st century skills to create critical thinkers, problem solvers, and responsive numerical literates.

Table 7
Mean Perception on Motivation in Terms of Task Value

No. Statement	*Indicators*	*Mean*	*SD*	*Verbal Description*
1	It is important for me to learn the lessons in mathematics class.	3.48	1.18	Often
2	I am very interested in the lessons of a mathematics subject.	3.44	0.95	Often
3	I think the lessons in a mathematics class are useful for me to learn.	3.96	0.97	Often
4	I like mathematics as a subject.	3.52	1.05	Often
5	Understanding the subject matter of mathematics is very important to me.	3.52	1.01	Often
6	The things I am learning in math will be useful to me.	3.80	0.93	Often
7	The mathematics teacher makes the lesson seem important.	3.32	0.91	Sometimes
8	I feel that mathematics gives me a lot of satisfaction.	3.58	1.07	Often
9	I feel satisfied with what I am getting from a mathematics class.	3.92	0.88	Often
10	I find the challenge level in mathematics to be about right: neither too easy, nor too hard.	4.00	1.07	Often
	Overall	3.65	0.60	Often

Table 8
Mean Perception on Motivation in Terms of Self-Efficacy

No. Statement	*Indicators*	*Mean*	*SD*	*Verbal Description*
1	I believe I will receive an excellent grade in a mathematics class.	4.28	1.03	Always
2	I'm certain I can understand the most difficult lesson presented in a mathematics class.	3.54	0.99	Often
3	I'm confident I can learn the basic concepts taught in mathematics class.	4.20	0.99	Always
4	I'm confident I can understand the most difficult lesson present by the teacher in a mathematics class.	3.82	1.00	Often
5	I'm confident I can do an excellent job ion the assignments and tests in mathematics.	4.10	0.93	Often
6	I expect to do well in a mathematics class.	4.16	0.96	Often
7	I'm sure I can master the skills being taught in a mathematics class.	4.14	0.95	Often
8	Considering the difficulty of math course, the teacher, and my skills, I think I will do well in a mathematics class.	3.62	0.95	Often
9	To accomplish my goals, it is important that I do well in mathematics	3.90	1.02	Often
10	As I am taking a mathematics class, I believe that I can succeed if I try hard enough.	3.52	0.99	Often
	Overall	3.93	0.60	Often

Table 8 presents the mean perception on motivation in terms of self-efficacy. Among the 10 statements of Self-Efficacy, the highest mean of 4.28 with a standard deviation of 1.03 was obtained by statement number 1 *I believe I will receive an excellent grade in mathematics class*. This implies that students believe to get high grades in mathematics since they have abilities to deal with math difficulties and challenges. They believe in their abilities to achieve their goal. According to Bandalos, Geske & Finney (2005), self-efficacy is one of the most powerful predictors of student achievement.

Statement number 10 *As I am taking a mathematics class, I believe that I can succeed if I try hard enough* obtained the lowest mean of 3.52 witha standard deviation of 0.99. Self-efficacy is the innate effect of the lesson towards the learner. The indicative statement reflects the motivation of the students that they can surpass the math challenges.

Table 9

Summary of Mean Perception on Motivation

Components	*Mean*	*SD*	*Verbal Description*
Goal Orientation	3.79	0.55	Often
Task Value	3.65	0.60	Often
Self - Efficacy	3.93	0.60	Often
Overall	3.79	0.53	Often

It can be seen from Table 9 that the highest mean of 3.93 with a standard deviation of 0.60 was obtained by self-efficacy and the lowest mean of 3.65 and a standard deviation of 0.60 was obtained by task value. This means that students are confident enough to perform the specific task. Motivation directly affects students' perception towards performance. The higher the students' motivation, the higher the effect on mathematical performance of the students. The drive of the students, since they are motivated makes them excited and attentive to mathematics. Students with a strong sense of efficacy are more likely to challenge themselves with difficult tasks and be intrinsically motivated as stated by Margolis & McCabe, (2006).

Table 10

Mean Perception on Positive Attitudes

No. Statement	*Indicators*	*Mean*	*SD*	*Verbal Description*
1	Mathematics thrills me! It is enjoyable and fun.	4.00	1.03	Agree
2	Mathematics is useful for anyone's life.	4.34	1.00	Strongly Agree
3	I enjoy the struggle to solve a mathematical problem because it helps develop my mind.	4.00	0.95	Agree
4	I love mathematics, and it is my favorite subject.	2.36	1.17	Disagree
5	In mathematics you can be creative and discover things by yourself.	3.94	0.91	Agree
6	Mathematics is needed in order to keep the world running.	4.00	0.88	Agree
7	I am interested and willing to acquire further knowledge of mathematics.	4.06	0.89	Agree
8	Mathematics is important for my chosen profession.	3.84	0.98	Agree
9	Mathematics is needed in designing practically everything.	3.90	1.02	Agree
10	Communicating with other students helps me have a better attitude towards mathematics.	5.00	7.70	Strongly Agree
11	I am willing to learn all mathematics concepts.	4.04	1.01	Agree
12	Mathematical rules learned in school help me solve real problems.	3.88	1.15	Agree
13	The skills I learn in mathematics class can help me become a better person.	4.02	1.04	Agree
14	I usually help my classmates understand problems in mathematics.	3.66	0.94	Agree
15	I can solve mathematical problems.	3.68	0.98	Agree
	Overall	3.92	0.77	Agree

The result shows that among the 15 statements number 10 *Communicating with other students helps me have a better attitude towards mathematics* obtained the highest mean of 5.00 with a standard deviation of 7.70. This means that the people surround us

affect the attitudes towards mathematics. Most students communicate with their classmates and friends in dealing with their assignments, activities and lessons in mathematics. Group activities and peer tutoring among students can give them more enthusiasm in learning mathematics. Attitude affect behavior, influencing what the learner selects from the environment, how he will react towards teachers, towards the material being used and towards the other students (Mubeen, Saeed, Arif, 2013). Fisher and Rickards (1998) found that students' attitude towards mathematics tended to be more positive in classroom where students perceived greater leadership, and help, and friendly behavior from their teachers.

Among then, statement number 4 *I love mathematics and it is my favorite subject* obtained the lowest mean of 2.36 with a standard deviation of 1.17. This implies that most students do not love mathematics because they hate numbers and they feel sick every time they solve problems involving math. Some students feel like math is a foreign language in which they can't introduce themselves and find difficulties in solving mathematical equations. When students fail to progress in a math class they may feel stupid and avoid math as much as possible in the future.

The following table, Table 11 displays that among the 15 statements number 13 *I learned mathematics well from my teacher* obtained the highest mean of 3.74 with a standard deviation of 1.19. This means that teacher is a major factor in students' learning. Many factors contribute to a student's academic performance, including individual characteristics, family and neighborhood experiences. But research suggests that, among school-related factors, teachers matter most. When it comes to student performance on math tests, a teacher is estimated to have two to three times the impact of any other school factor, including services, facilities, and even leadership. It is important that teachers

believe in themselves and in their abilities as a role model and educator, because it plays an important role on their student's self-perception and performance.

Table 11

Mean Perception on Negative Attitudes

No. Statement	*Indicators*	*Mean*	*SD*	*Verbal Description*
1	Mathematics is boring; it's just memorizing formulas and things.	2.58	1.23	Agree
2	Mathematics is NOT important in everyday life.	2.14	1.39	Agree
3	I am a weak student in mathematics.	2.76	1.19	Undecided
4	I get anxious when solving mathematics problem.	2.64	1.08	Undecided
5	I detest mathematics and avoid it all the times.	2.68	1.15	Undecided
6	Mathematics is a solitary activity, done by individuals in isolation.	2.94	1.20	Undecided
7	Mathematics is less important to people than art or literature.	2.56	1.39	Agree
8	I never liked mathematics.	2.22	1.18	Agree
9	Math is uninteresting subject.	2.44	1.42	Agree
10	Mathematics makes me confused and uneasy.	3.24	1.13	Undecided
11	Mathematics is a very hard subject.	3.20	1.20	Undecided
12	I am having difficulty in solving real mathematical problems by using common sense.	3.14	1.09	Undecided
13	I learned mathematics well from my teacher.	3.74	1.19	Disagree
14	Problem solving about mathematics makes me sick.	2.62	1.54	Undecided
15	I have difficulties in solving mathematical equations.	3.08	1.18	Undecided
	Overall	2.84	0.68	Undecided

Among the statements on Table 11, item number 2 *Mathematics is NOT important in everyday life* obtained the lowest mean of 2.14 with a standard deviation of 1.39. This overall mean perception describes that mathematics is a very important ingredient in our

daily lives because through mathematics we can be creative and can discover many things by ourselves.

An undecided attitude is a negative attitude. The overall mean of 2.84 implies that students do not have a healthy attitude towards mathematics. This may translate to a low performance in mathematics.

Table 12
Summary of Mean Perception on Attitude

Components	*Mean*	*SD*	*Verbal Description*
Positive	3.92	0.77	Often
Negative	2.84	0.68	Sometimes
Overall	3.38	0.53	Sometimes

It can be concluded from Table 12 that the higher mean is obtained by Positive Attitudes. With a mean of 3.92 with a standard deviation of 0.77, positive attitudes among students still prevail even if they think that learning mathematics is difficult. Attitude contributes a lot toward perception of mathematics. Attitude in life allows us to make sense of ourselves, make sense of relationships and make sense of the world around us (Mubeen, Saeed, Arif, 2013).

Problem 2: Is there any significant difference between male and female students in terms of their curiosity, motivation, attitude and performance in mathematics?

In order to find out the difference between male students and female in terms of curiosity, motivation and attitude, Table 13 is presented.

Table 13

Summary of Mean Perceptions on Curiosity, Motivation and Attitude

Components	*Gender*	*Number of Students*	*Mean*	*SD*	*t value*	*p value*	*Verbal Description*
Curiosity	M	25	3.57	0.50	-2.003	0.051	Not Significant
	F	25	3.84	0.44			
Motivation	M	25	3.69	0.60	-1.324	0.192	Not Significant
	F	25	3.89	0.43			
Attitude	M	25	3.28	0.65	-1.315	0.195	Not Significant
	F	25	3.48	0.38			

* Q= .05

The Table indicates the summary of mean perceptions on curiosity, motivation, and attitudes. The p-values indicate that there is no significant difference among the means. The overall performance in mathematics of male and female has a mean of 23.84 with a standard deviation of 9.43. This can be interpreted to mean score in the low average of distribution in kurtosis, since the computed value is lesser than the tabled value, the relationship is not significant, and thus there exist no significant correlation. This means that all the variables are not correlated with their mathematics performance.

Problem 3: Which of the independent variables predict mathematics performance?

In order to answer this question, regression analysis was conducted.

Table 14

Regression Values

Mode 1	*Beta*	*t value*	*p value*	*Interpretation*
Curiosity	-0.14	-0.72	0.47	Not significant
Motivation	0.32	2.34	0.02	Significant
Attitude	-0.06	-0.44	0.66	Not significant

**Dependent variable: Math Performance

As shown in Table 14, among the independent variables, motivation is a predictor of mathematics performance with a Beta value of 0.32. Motivation is a driving force that challenge students be engaged in learning mathematics. It is motivation and determination that lead one to persevere to greater heights in mathematics, Singh (2011). The regression analysis shows that curiosity and attitude do predicts mathematics performance.

Motivation whether intrinsic or extrinsic predicts mathematics performance likewise with findings of Garut (2011) that motivational outcome directs mathematics learning.

Chapter V
Summary of Findings, Conclusions and Recommendations

This chapter presents the salient findings, conclusions and recommendations based on the given results of the study.

Summary

The respondents of the study were composed of 50 students, 25 were female and 25 were male. Random sampling was used to select the respondents in this study. The aim of the study was to determine students' curiosity, motivation, and attitude in relation to their mathematics performance.

Findings

From the results of this study, the following findings were obtained.

1. In terms of curiosity, students feel that they have the ability to seek out opportunities to challenge themselves and grow as a person. They need to make complex-abstract ideas to be presented in more concrete and practical ways.
2. In terms of motivation, the higher the student's motivation the higher the effect on mathematical performance of the students. Motivation directly affects students' perception towards performance.
3. Attitude contributes a lot to performance in mathematics.
4. There is no significant difference between the means of the male and female in all the variables.

5. The result showed that motivation is a significant predictor of mathematics performance.

Conclusions

The results of this study lead us to important conclusions:

1. Level of curiosity affects the inquisitiveness of the learner.
2. Motivation is a significant predictor variable of Mathematics Performance.
3. Positive attitudes among students can strengthen their motivation and engagement to learn more in mathematics.

Recommendations

The researcher recommends the following based on the findings of the study:

1. Provide mathematics activities that will increase students' curiosity towards mathematics.
2. Motivate students properly to make them hooked on the topic presented.
3. Motivation affects the learning process of students. Teachers must use more suitable learning strategies to make the subject important and useful to students in order to prevent negative outcomes.
4. Future studies may consider covering a larger scope of respondents and differences of turn-over among respondents.
5. In further research efforts, this study might be extended with considering other factors effective in attitude and achievement in Mathematics. And also, this study might be modified to a study in a secondary school level

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APPENDIX A

FLORIDA C. GONZALES, Ph. D
Principal I
Kaypian National High School
City of San Jose Del Monte, Bulacan

Dear Madam:

I have the honor to request permission to gather data and conduct survey relevant to my study in Fourth Year students in Kaypian National High School in connection with my research *"Curiosity, Motivation and Attitude, and Mathematics Performance"*.

In view of this, I am humbly asking assistance from your good office to allow the researcher to conduct a study in Kaypian National High School. The following are the research instruments that Fourth Year Students will answer.

1. Mathematical Proficiency Test
2. Curiosity Inventory
3. Motivation for Learning Inventory
4. Attitude Inventory

Your cooperation and support in accomplishing this research will be highly appreciated. Thank you very much and I look forward to merit your gracious approval.

Very Truly Yours,

Maria Charina A. Jaen
Researcher

Approved:

FLORIDA C. GONZALES, Ph.D.
Principal I

APPENDIX B

SURVEY QUESTIONNAIRE

For the respondent,

Greetings!

I am Maria Charina A. Jaen, currently enrolled in Philippine Normal University under the program of Master in Education major in Mathematics. I am currently completing a study entitled*"Curiosity, Motivation and Attitude, and Mathematics Performance"*.

To make this study possible, I need your honest responses on the following questions with regards to the study. Please be assured of the confidentiality of your responses as no one except me will use the data to be obtained from this undertaking.

Thank you for your cooperation.

I hope this request would merit your kind approval.

Maria Charina A. Jaen

Researcher

APPENDIX C

March 15 ,2015

FLORIDA C. GONZALES, Ph. D
Principal I
Kaypian National High School
City of San Jose Del Monte, Bulacan

Dear Madam:

Greetings of Peace!

My name is **Maria Charina A. Jaen**, MAT student at Philippine Normal University in Manila. As one of the requirements in my masteral, I am currently conducting a study entitled "*Curiosity, Motivation and Attitude, and Mathematics Performance*".

This study aims to help to increase the school administrators' awareness of the factors that influence mathematical proficiency. The information will aid them in enhancing the instructional program of the school. It is assumed that by gathering information by observation and interpreting what is found will add to the wide body of knowledge attributed to numeracy skills.

In view of this, I am humbly asking assistance from your good office to allow the researcher validate his self-made test that could determine the level of Mathematical Proficiency of the research participants in terms of conceptual understanding, procedural fluency, strategic competence and sound reasoning.

Your cooperation and support in accomplishing this research will be highly appreciated. Thank you very much and I look forward to merit your gracious approval.

Respectfully yours,

MARIA CHARINA A. JAEN
Researcher

Approved:

FLORIDA C. GONZALES, Ph. D
Principal I

APPENDIX C

March 11 ,2015

LUISITO JOAQUIN
Master Teacher I
San Jose del Monte National High School
City of San Jose Del Monte, Bulacan

Dear Luisito Joaquin,

Greetings of Peace!

My name is **Maria Charina A. Jaen**, MAT student at Philippine Normal University in Manila. As one of the requirements in my masteral, I am currently conducting a study entitled *"Curiosity, Motivation and Attitude, and Mathematics Performance"*.

This study aims to help to increase the school administrators' awareness of the factors that influence mathematical proficiency. The information will aid them in enhancing the instructional program of the school. It is assumed that by gathering information by observation and interpreting what is found will add to the wide body of knowledge attributed to numeracy skills.

In view of this, I am humbly asking assistance from your good office to allow the researcher validate his self-made test that could determine the level of Mathematical Proficiency of the research participants in terms of conceptual understanding, procedural fluency, strategic competence and sound reasoning.

Your cooperation and support in accomplishing this research will be highly appreciated. Thank you very much and I look forward to merit your gracious approval.

Respectfully yours,

MARIA CHARINA A. JAEN
Researcher

Approved:

LUISITO JOAQUIN
Master Teacher I

APPENDIX C

March 9 ,2015

JOYCE LANOZO

Head Teacher II

Muzon National High School

City of San Jose Del Monte, Bulacan

Dear Joyce Lanozo,

Greetings of Peace!

My name is **Maria Charina A. Jaen**, MAT student at Philippine Normal University in Manila. As one of the requirements in my masteral, I am currently conducting a study entitled *"Curiosity, Motivation and Attitude, and Mathematics Performance"*.

This study aims to help to increase the school administrators' awareness of the factors that influence mathematical proficiency. The information will aid them in enhancing the instructional program of the school. It is assumed that by gathering information by observation and interpreting what is found will add to the wide body of knowledge attributed to numeracy skills.

In view of this, I am humbly asking assistance from your good office to allow the researcher validate his self-made test that could determine the level of Mathematical Proficiency of the research participants in terms of conceptual understanding, procedural fluency, strategic competence and sound reasoning.

Your cooperation and support in accomplishing this research will be highly appreciated. Thank you very much and I look forward to merit your gracious approval.

Respectfully yours,

MARIA CHARINA A. JAEN
Researcher

Approved:

JOYCELYN LANOZO
Head Teacher II

APPENDIX D

Evaluation Form for Proficiency Test

This is the Mathematical Proficiency Test (MPT) for fourth year students that is designed to determine the proficiency in mathematics before the learners move on to the next academic level. Please rate the MPT using the following scale:

4 – Very Acceptable 2 – Unacceptable

3 – Acceptable 1 – Very Unacceptable

Thank you for your valuable comments and suggestions.

I. Content	4	3	2	1
1. The questions are free from any discrimination from any bias.				
2. Each item in the instrument accurately measures mathematical proficiency.				
II. Organization				
1. Test item arrange from easy to difficult responses.				
2. Each item is plausible.				
3. Instructions for taking the test are easy to follow.				
4. Each item arrange from easy to difficult.				
III. Style and Format				
1. The format and font style of print is appropriate for the test.				
2. The format is visually appropriate to read.				

Comments and Suggestions:

Name of Evaluator: _____ Signature: _____

Educational Attainment: _____ Specialization:_____

Designation: _____ Years in Teaching:_____

APPENDIX E

Curiosity Inventory (CI)
(Doronila, 2012)

Part IA – Curiosity Inventory (CI)

Your answer to all items in the test will help the researcher achieve his purpose in his study. Please answer all items as honestly and accurately as you can and return the accomplished form to the researcher. ***Rest assured that your responses will be kept in confidence and will be used for research purposes only.***

Thank you very much.

MARIA CHARINA A. JAEN
Researcher

Directions: Rate the statements below for how accurately they reflect the way YOU GENERALLY FELL AND BEHAVE NOW by encircling the numbers. Items are anchored on the following scale:

5 - Always
4 - Often
3 - Sometimes
2 - Rarely
1 - Never

1.	I would describe myself as someone who actively seeks as much Information as I can in a new situation.	5 4 3 2 1
2.	I find myself looking for a new opportunities to grow as a person (e.g., information, people, and resources).	5 4 3 2 1
3.	I actively seek as much information as I can in new situations.	5 4 3 2 1
4.	I am at my best when doing something that is challenging.	5 4 3 2 1

5. I am always looking for experiences that challenge how I think about myself and the world. 5 4 3 2 1
6. I frequently seek out opportunities to challenge myself and grow as a person. 5 4 3 2 1
7. When I am actively interested in something, it takes a great deal to disturb me. 5 4 3 2 1
8. Everywhere I go, I am out looking for new things or experiences. 5 4 3 2 1
9. I like to do things that are little scary. 5 4 3 2 1
10. I prefer activities that are excitingly unpredictable. 5 4 3 2 1
11. I am kind of person who accepts unfamiliar people, events, and places. 5 4 3 2 1
12. Difficult conceptual problems can keep me awake all night thinking about solutions. 5 4 3 2 1
13. I enjoy learning about subjects that are familiar to me. 5 4 3 2 1
14. I can spend hours of a single problem because I just can't rest Without knowing the answer. 5 4 3 2 1
15. If I read something that puzzles me at first, I keep reading until I understand it. 5 4 3 2 1
16. It bothers me if I come across a word that I don't know, so I will look up its meaning in a dictionary. 5 4 3 2 1
17. I feel frustrated if I can't figure out the solution to a problem, so I work even harder to solve it. 5 4 3 2 1
18. I ponder for a long time in an attempt to solve some fundamental problems. 5 4 3 2 1
19. I am critical of current ideas and theories. 5 4 3 2 1
20. I enjoy discussing abstract concepts. 5 4 3 2 1
21. If I am given an incomplete puzzle, I like to try to find the final solution. 5 4 3 2 1
22. When someone asks me a riddle, I am interested in trying to solve it. 5 4 3 2 1

23. When I am given a new kind of arithmetic problem, I enjoy imagining she solutions. 5 4 3 2 1
24. When I see a complicated piece of machinery, I like to ask someone how it works. 5 4 3 2 1
25. I enjoy exploring new ideas. 5 4 3 2 1
26. I find it fascinating to learn new information. 5 4 3 2 1
27. If I am given an unfamiliar task, I like trying how it gets done 5 4 3 2 1
28. When I learn something new, I would like to find out more about it 5 4 3 2 1
29. When I see an incomplete puzzle, I like imagining how to solve it 5 4 3 2 1
30. I am interested in discovering how things work. 5 4 3 2 1

Scoring Key:

Exploration	1 – 6
Absorption	7 – 11
Epistemic Curiosity	12 – 21
Perceptual Curiosity	22 – 30

APPENDIX F.

Motivation for Learning Inventory (MLI)
(Doronila, 2012)

Part IB – Motivation for Learning Inventory (MLI)

Directions: Rate the statements below for how accurately they **truly applies to you** by encircling the numbers. Items are anchored on the following scale:

5 - Always
4 - Often
3 - Sometimes
2 - Rarely
1 - Never

1.	I like math because it really challenges me to learn new things.	5 4 3 2 1
2.	I believe I will receive an excellent grade in a math class	5 4 3 2 1
3.	I'm certain I can understand the most difficult lesson presented in a math class.	5 4 3 2 1
4.	It is important for me to learn the lessons in math class.	5 4 3 2 1
5.	I'm confident I can learn the basic concepts taught in math class	5 4 3 2 1
6.	I'm confident I can understand the most difficult lesson present by the teacher in a math class.	5 4 3 2 1
7.	I like math lessons because it arouses my curiosity, even if it is difficult to learn	5 4 3 2 1
8.	I am very interested in the lessons of a math subject.	5 4 3 2 1
9.	I'm confident I can do an excellent job ion the assignments and tests in mathematics.	5 4 3 2 1
10.	I expect to do well in a math class.	5 4 3 2 1
11.	The most satisfying thing for me in a math class is trying to understand the lessons as thoroughly as possible.	5 4 3 2 1

12. I think the lessons in a math class are useful for me to learn. 5 4 3 2 1
13. When I have the opportunity in a math class, I choose activities that I can learn from, even if they don't guarantee a good grade. 5 4 3 2 1
14. I like mathematics as a subject. 5 4 3 2 1
15. Understanding the subject matter of mathematics is very important to me. 5 4 3 2 1
16. I'm sure I can master the skills being taught in a math class 5 4 3 2 1
17. I want to do my best in a math class because it is important to show my mathematical ability to my family and friends. 5 4 3 2 1
18. Considering the difficulty of math course, the teacher, and my skills, I think I will do well in a math class. 5 4 3 2 1
19. The things I am learning in math will be useful to me. 5 4 3 2 1
20. I feel confident that I will do well in a math class 5 4 3 2 1
21. The math teacher makes the lesson seem important. 5 4 3 2 1
22. I feel that math gives me a lot of satisfaction. 5 4 3 2 1
23. In a math class, I try to set and achieve high standard of excellence. 5 4 3 2 1
24. I feel satisfied with what I am getting from a math class. 5 4 3 2 1
25. The content of a math subject relates to my expectations and goals. 5 4 3 2 1
26. To accomplish my goals, it is important that I do well in math. 5 4 3 2 1
27. As I am taking a math class, I believe that I can succeed if I try hard enough. 5 4 3 2 1
28. The personal uses of math subject are clear to me. 5 4 3 2 1
29. I find the challenge level in math to be about right: neither too easy, nor too hard. 5 4 3 2 1
30. The amount of work I have to do is appropriate for this type of subject 5 4 3 2 1

Scoring Key:

Goal Orientation	1, 7, 11, 13, 17, 20, 23, 25, 28, 30
Task Value	4, 8, 12, 14, 15, 19, 21, 22, 24, 29
Self – Efficacy	2, 3, 5, 6, 9, 10, 16, 18, 26, 27

APPENDIX G.

Attitude Inventory (AI)

Part IC – Attitude Inventory (AI)

Directions: Rate the statements below that describe your attitudes influencing the performance towards mathematics for how accurately they truly applies to you by encircling the numbers. Items are anchored on the following scale:

5 - Always
4 - Often
3 - Sometimes
2 - Rarely
1 - Never

Statements

1. Mathematics thrills me! It is enjoyable and fun.	5 4 3 2 1
2. Mathematics is useful for anyone's life.	5 4 3 2 1
3. I enjoy the struggle to solve a mathematical problem because it helps develop my mind.	5 4 3 2 1
4. I love mathematics, and it is my most favorite subject.	5 4 3 2 1
5. In mathematics you can be creative and discover things by yourself.	5 4 3 2 1
6. Mathematics is needed in order to keep the world running.	5 4 3 2 1
7. I am interested and willing to acquire further knowledge of mathematics.	5 4 3 2 1
8. Mathematics is important for my chosen profession.	5 4 3 2 1
9. Mathematics is needed in designing practically everything.	5 4 3 2 1
10. Communicating with other students helps me have a better attitude towards mathematics.	5 4 3 2 1
11. I am willing to learn all mathematics concepts.	5 4 3 2 1
12. Mathematical rules learned in school help me solve real problems.	5 4 3 2 1
13. The skills I learn in mathematics class can help me become a better person.	5 4 3 2 1
14. I usually help my classmates understand problems in mathematics.	5 4 3 2 1
15. I can solve mathematical problems.	5 4 3 2 1
16. Mathematics is boring; it's just memorizing formulas and things.	5 4 3 2 1
17. Mathematics is NOT important in everyday life.	5 4 3 2 1
18. I am a weak student in mathematics.	5 4 3 2 1

19. I get anxious when solving mathematics problem.	5 4 3 2 1
20. I detest mathematics and avoid it all the times.	5 4 3 2 1
21. Mathematics is a solitary activity, done by individuals in isolation.	5 4 3 2 1
22. Mathematics is less important to people than art or literature.	5 4 3 2 1
23. I never liked mathematics.	5 4 3 2 1
24. Math is uninteresting subject.	5 4 3 2 1
25. Mathematics makes me confused and uneasy.	5 4 3 2 1
26. Mathematics is a very hard subject.	5 4 3 2 1
27. I am having difficulty in solving real mathematical problems by using common sense.	5 4 3 2 1
28. I learned mathematics well from my teacher.	5 4 3 2 1
29. Problem solving about mathematics makes me sick.	5 4 3 2 1
30. I have difficulties in solving mathematical equations.	5 4 3 2 1

Scoring Key:

Positive Attitudes	1-15
Negative Attitudes	16 - 30

APPENDIX H

Questionnaire for Fourth Year Students

Part IIA – Mathematical Proficiency Test (MPT)

Your answer to all items in the test will help the researcher achieve his purpose in his study. Please answer all items as honestly and accurately as you can and return the accomplished form to the researcher. ***Rest assured that your responses will be kept in confidence and will be used for research purposes only.***

Thank you very much.

MARIA CHARINA A. JAEN
Researcher

Directions: Read each item carefully. Encircle the letter of the best.

1. In a given linear function f(x) = 5x + 3, what is the value of x where the graph crosses the x axis?
   A. 3 B. -3 C. 2/5 D. -3/5

2. Where does the graph of f(x)= -3x + 5 cross the y – axis?
   A. 5 B. (0,5) C. (5,0) D. (0,-5)

3. What is the value of g(n+2) if g(n)= $\frac{7}{n-2}$?
   A. $\frac{n}{7}$ B. $\frac{7}{n}$ C. $\frac{7}{n+4}$ D. $\frac{7}{n-4}$

4. Which is the domain of the function f(x) = $\frac{2x}{x-5}$?
   A. {x/x= 2} B. {x/x ≠ 2} C. {x/x= - 5} D. {x/x≠ 5}

5. What is the value of x in f(x) = 2x-3 where the graph crosses the x-axis?
   A. $\frac{2}{3}$ B. $\frac{-2}{3}$ C. $\frac{3}{2}$ D. $\frac{-3}{2}$

6. What could be the value of f(x) in the given function $f(x) = x^2 - 3x$ if x=5?
   A. 25 B. 15 C. 10 D. 5

7. Find the equation of a line with slope and y intercept -3 and 5 respectively?
   A. y = 5x-3 B. 3y = 5x C. y = -3x+5 D. y = 3x-5

8. What could be the slope intercept form of the equation 2x-5y =10?
   A. $y= \frac{2}{5}x-2$ B. $y= \frac{5}{2}x+2$ C. $y= \frac{5}{2}x - 2$ D. $y= \frac{-2}{5}x + 2$

9. What is the common factor of $2x^2$ and $3x^3$?
   A. x B. x^2 C.x^3 D. x+2

10. What is the composition of function f and g denoted by (f o g)(x) if f(x)=3x-5 and $g(x)=2x^2 +5x$?

    A. $6x^2+15x-5$ B. $18x^2-45x-5$ C. $6x^3+5x^2-25x$ D. $-2x^2-2x-5$

11. Which of the following has roots of -3 and 7?
    A. $x^2 + 4x – 21 = 0$ C. $x^2 - 4x + 21 = 0$ C. $x^2 - 4x – 21 = 0$ D. $x^2 + 4x + 21 = 0$

12. Find the two consecutive integers whose product is 42?
    A. 6 & 7 B. -6 & 7 C. 6 & -8 D. 8 & 5

13. If f(x)=4x-1 and g(x)=x-1, what is (g ● f) (x)?
    A. $4x^2 + 5x + 1$ C. $4x^2 - 5x – 1$
    B. $4x^2 - 5x + 1$ D. $4x^2 + 5x – 1$

14. What is the standard form of the equation that passes through (3,1) and slope is -4/5?
    A. 4x-5y=17 C. 4/5x+3y=5
    B. 4x+5y=17 D. -4/5x+3y = 1

15. Find the slope intercept form of the equation of the line that has a slope of 3 and passes through (8,2).
    A. y=-5x-26 B. y= 3x+26 C. y= 5x+22 D. y= 3x – 22

16. What is the sum when - $8x^2+3x-10$ is added to $10x^2 - 2x+1$?

    A. $2x^2-x-11$ B. $2x^2+5x-11$ C. $2x^2+x-9$ D. $2x^2-3x+1$

17. What is the x intercept of the linear function 2x+3y-9?
    A. 3 B. -3 C. 9/2 D. -3/2

18. What is the value of k in the function k + 3(k-2) = 34?

A . 7 B. 8 C. 9 D. 10

19. If the three lines f(x) =3x+2, g(x) =3x and h(x) = 3x-5 belongs to families of equations, what is common to them?

A. x-intercept B. y-intercept C. slope D. all of them

20. Which point does the graph of the function y= 2/3x – 9 intersects the y-axis?

A. (0, 1/2) B. (0, 9) C. (2/3, 0) D. (-9, 0)

21. What could be the equation of a line which passes through (0,5) and is perpendicular to the graph of y=4x+12?

A. $y= \frac{5x}{4} - 5$ B. y= -4x-5 C. $y= \frac{x}{4} + 5$ D. y=5x+4

22. What is the value of z in that satisfy the equation 3z+4 = 19?

A. 5 B. 7 C. 9 D. 10

23. Find the product of (x+4) (x+3).

A. $x^2 + 4x + 3$ C. $x^2 + 12x + 7$

B. $x^2 + 7x + 12$ D. $x^2 + 12x + 7$

24. Four more than four times a number is the same as 6 less than six times the number. Find the number.

A. 24 B. 12 C. 7 D. 5

25. Which is the factor of x^2+7x+6?

A. (x+1) (x+6) B. (x-1) (x-6) C. (x+1) (x-6) D. (x-1) (x+6)

26. Which relation is NOT a function?

A. {(0,5),(0,4),(4,0)(5,0),(5,4)} C. {(-3,2),(-2,5),(-1,8)(3,2)}

B. {(-2,5),(0,5),(2,5)(4,5)} D. {(8,0),(7,0),(6,0)(9,0),(-6,0)}

27. In which quadrant is the abscissa negative and the ordinate is positive?

A. Quadrant I B. Quadrant II C. Quadrant III D. Quadrant IV

28. Which of the following is the x-intercept of the line 9x -2y = 81?

A.-9 B. -12 C. 9 D. 12

29. Which is the correct form of f(x) =x+3 in standard form?

A. –x + y = -3 B. x + y = 3 C. x - y = -3 D. x + y = -3

30. What is the smallest possible value of n, if n+3 >8 and n is an integer?
A. 3 B. 4 C. 5 D. 6

31. Convert $\frac{7}{2}\pi$ to degree?
A. 720 º B. 630 º C. 405 º D. 215 º

32. Which of the following equations is expressed in standard form?
A. -3y +9x + 6 =0 B. 3y = 9x +6 C. 9y -3x = -6 D. -9x+3y = 6

33. What is the zero of the linear function g(x) = 3x - 12?
A. 2 B. 4 C. 9 D. 12

34. What is the slope of a line passes through (-6,-3), (2, 5)?
A. -1 B. 0 C. 1 D. 2

35. What is the equation of a line having a slope of -3/5 and y-intercept of 8?
A. f(x)= $\frac{3}{5}$x +8 B. f(x)= - $\frac{3}{5}$x -8 C. f(x)= - $\frac{3}{5}$x +8 D. f(x)= $\frac{3}{5}$x -8

36. Which of the following expressions is expressed in slope intercept form?
A. -2y=-x+3 B. 2x-y=3 C. -2y-3=x D. y=2x-3

37. What is the exact numerical value of sine 60º?
A. $\sqrt{2}$ / 2 B. $\sqrt{3}$ / 2 C. 1/2 D. -1

38. What is the value of x in y = 2x – 1, where the graph crosses the x- axis?
A. 1 B. 1/2 C.-1/2 D. -1

39. What is the value of g(-1) , if g(x) = x^2 – 4x + 5?
A. 0 B. 2 C. 5 D. 10

40. Find the product of ($3x^2$ +2) (x-2)?
A. $3x^2 + 6x^2$ - 2x - 4
B. $3x^3 + 4x^2$ - 4
C. $3x^3 - 4x^2$ - 4
D. $3x^3 - 6x^2$ + 2x – 4

41. What is the vertex of g(x) = x^2 + 10x?
A. (-5, 25) B. (5, 25) C. (-5, -25) D. (5, -25)

42. What is the mean of the scores 8,7,9,9 and 10?
A. 10 B. 9 C. 8.6 D. 4.3

43. The scores of a student in three tests are 19,17 and 15. What must be his 4^{th} score to gain an average of 17?
A. 18 B. 17 C. 16 D. 15

44. Find the quadratic equation having 8 and -7 as roots?
    A. $x^2 - x - 56$ C. $x^2 + 7x - 56$
    B. $x^2 - 8x - 56$ D. $4x^2 - 8x + 56$

45. Find g(2) if $g(x) = 2x^3 - 5x^2 + 6x - 11$.
    A. -3 B. -4 C. -11 D. -24

46. What is f(-2), if f(x) = 3x+5?.
    A. 6 B. 1 C. -1 D. -6

47. Find the numbers if one number is three more than a second number. Forty-nine more than the product of two numbers is 89.
    A. 6 & 9 B. 5 & 8 C. 4 & 7 D. 9 & 12

48. What is the reference angle of 218 º?
    A. 398 º B. 128 º C. 98 º D. 38 º

49. What is the exact numerical value of tan 135º?
    A. $\sqrt{2}/2$ B. $\sqrt{3}/2$ C. 1/2 D. -1

50. What is $\mathbf{5}\pi/3$ in degree measure?
    A. 200 º B. 250 º C. 300 º D. 320 º

Appendix I.

Key to Correction

Part IIB – Mathematical Proficiency Test (MPT)
Key to Correction

1	D	26	A
2	B	27	B
3	B	28	C
4	D	29	C
5	C	30	D
6	C	31	B
7	C	32	A
8	A	33	B
9	B	34	C
10	A	35	C
11	C	36	D
12	A	37	C
13	B	38	B
14	B	39	D
15	D	40	D
16	C	41	C
17	C	42	C
18	D	43	B
19	C	44	A
20	B	45	A
21	C	46	C
22	A	47	B
23	B	48	D
24	D	49	D
25	A	50	C

APPENDIX J

Descriptives

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Descriptive Statistics

	N	Mean	Std. Deviation
exp1	50	3.8400	.79179
exp2	50	4.1200	.93982
exp3	50	3.6600	.96065
exp4	50	4.100	.95298
exp5	50	4.2200	.86402
exp6	50	4.1400	.83324
exploration	50	4.0133	.59078
ab1	50	3.5800	1.21370
ab2	50	4.1400	.88086
ab3	50	3.000	1.12486
ab4	50	3.4000	1.10657
ab5	50	3.6800	1.23619
absorption	50	3.5600	.74066
epis1	50	3.0800	1.25909
epis2	50	4.5200	.83885
epis3	50	2.8600	1.08816
epis4	50	3.9600	.96806
epis5	50	3.5600	1.16339
epis6	50	3.6000	1.01015
epis7	50	3.2800	1.03095
epis8	50	2.9200	.94415
epis9	50	3.1200	1.15423
epis10	50	3.3600	1.17387
epistemic	50	3.4260	.55284
per1	50	3.7200	1.08872
per2	50	3.2200	1.11190
per3	50	3.5800	1.1446
per4	50	4.1200	.98229
per5	50	3.9400	.99816
per6	50	3.7400	1.10306
per7	50	3.9600	1.02936
per8	50	3.9200	1.08496
per9	50	4.2200	.91003
perceptual	50	3.8244	.61480
go1	50	3.8600	.90373

Descriptive Statistics

	N	Mean	Std. Deviation
go2	50	3.8200	1.06311
go3	50	3.9600	.90260
go4	50	3.9600	.90260
go5	50	3.8200	1.13731
go6	50	3.7800	.88733
go7	50	3.5800	1.03194
go8	50	3.7400	.87622
go9	50	3.500	.90914
go10	50	3.8600	.90373
goal	50	3.7880	.55389
tv1	50	3.4800	1.18218
tv2	50	3.4400	.95105
tv3	50	3.9600	.96806
tv4	50	3.5200	1.05444
tv5	50	3.5200	1.01499
tv6	50	3.8000	.92582
tv7	50	3.3200	.91339
tv8	50	3.5800	1.07076
tv9	50	3.9200	.87691
tv10	50	4.000	1.06904
task	50	3.6540	.59666
se1	50	4.2800	1.03095
se2	50	3.5400	.99406
se3	50	4.2000	.98974
se4	50	3.8200	1.00387
se5	50	4.1000	.93131
se6	50	4.1600	.95533
se7	50	4.1400	.94782
se8	50	3.6200	.94524
se9	50	3.9000	1.01519
se10	50	3.5200	.99468
self	50	3.9280	.59626
pos1	50	4.0000	1.03016
pos2	50	4.3400	1.00224
pos3	50	4.0000	.94761
pos4	50	2.3600	1.17387
pos5	50	3.9400	.91272
pos6	50	4.0000	.88063

Descriptive Statistics

	N	Mean	Std. Deviation
pos7	50	4.0600	.89008
pos8	50	3.8400	.97646
pos9	50	3.9000	1.01519
pos10	50	5.0000	7.70274
pos11	50	4.0400	1.00934
pos12	50	3.8800	1.15423
pos13	50	4.0200	1.03982
pos14	50	3.6600	.93917
pos15	50	3.6800	.97813
positive	50	3.9227	.76729
neg1	50	2.5800	1.23040
neg2	50	2.1400	1.38520
neg3	50	2.7600	1.18769
neg4	50	2.6400	1.08346
neg5	50	2.6800	1.15069
neg6	50	2.9400	1.20221
neg7	50	2.5600	1.38741
neg8	50	2.2200	1.18304
neg9	50	2.4400	1.41652
neg10	50	3.2400	1.13497
neg11	50	3.2000	1.19523
neg12	50	3.1400	1.08816
neg13	50	3.7400	1.19198
neg14	50	2.6200	1.53716
neg15	50	3.0800	1.17526
negative	50	2.8400	.67833
performance	50	23.8400	9.42502
curiosity	50	3.7059	.48323
motivation	50	3.7900	.52727
attitude	50	3.3813	.53395
Valid N (listwise)	50		

T-TEST GROUPS=gender (‘M’ ‘F’)
/MISSING=ANALYSIS
/VARIABLES=performance curiosity movtivation attitude
/CRITERIA=CI (.95) .

T-TEST

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Group Statistics

	gender	N	Mean	Std. Deviation	Std. Error Mean
performance	M	25	24.6400	10.89679	2.17936
	F	25	23.0400	7.82879	1.56576
curiosity	M	25	3.5731	.49555	.09911
	F	25	3.8388	.44093	.08819
motivation	M	25	3.6920	.60387	.12077
	F	25	3.8880	.42773	.08555
attitude	M	25	3.2828	.64358	.12872
	F	25	3.4799	.38426	.07685

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig	t	df
performance	Equal variances assumed	5.079	.029	.596	48
	Equal variances not assumed			.596	43.564
curiosity	Equal variances assumed	.302	.585	-2.003	48
	Equal variances not assumed			-2.003	47.360
motivation	Equal variances assumed	4.521	.039	-1.324	48
	Equal variances not assumed			-1.324	43.239
attitude	Equal variances assumed	2.715	.106	-1.315	48
	Equal variances not assumed			-1.315	39.182

Independent Samples Test

		t-test for Equality of Mean		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
performance	Equal variances assumed	.554	1.6000	2.68351
	Equal variances not assumed	.554	1.6000	2.68351
curiosity	Equal variances assumed	.051	-.26567	.13266
	Equal variances not assumed	.051	-2.6567	.13266
motivation	Equal variances assumed	.192	-.19600	.14800
	Equal variances not assumed	.192	-.19600	.148.00
attitude	Equal variances assumed	.195	-.19714	.14991
	Equal variances not assumed	.196	-.19714	.14991

Independent Samples Test

		t-test for Equality of Means	
		95% Confidence Interval of the Difference	
		Lower	Upper
Performance	Equal variances assumed	-3.79555	6.99555
	Equal variances not assumed	-3.80978	7.00978
Curiosity	Equal variances assumed	-.53240	.00107
	Equal variances not assumed	-.53250	.00116
Motivation	Equal variances assumed	-.49358	.10158
	Equal variances not assumed	-.49442	.10242
Attitude	Equal variances assumed	-.49856	.10428
	Equal variances not assumed	-.50033	.10604

Correlations

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Correlations

		Performance	Curiosity	Motivation	Attitude
Performance	Pearson Correlation	1	.147	.319*	.041
	Sig. (2-tailed)		.307	.024	.779
	N	50	50	50	50
Curiosity	Pearson Correlation	.147	1	.687**	.323*
	Sig. (2-tailed)	.307		.000	.022
	N	50	50	50	50
Motivation	Pearson Correlation	.319*	.687**	1	.309*
	Sig. (2-tailed)	.024	.000		.029
	N	50	50	50	50
Attitude	Pearson Correlation	.041	.323*	.309*	1
	Sig. (2-tailed)	.779	.022	.029	
	N	50	50	50	50

*. Correlation is significant at the 0.05 level (2-tailed)
**. Correlation is significant at the 0.01 level (2-tailed)

```
REGRESSION
        /MISSING LISTWISE
        /STATISTICS COEFF OUTS R ANOVA
        /CRITERIA=PIN ( .05 )  POUT ( .10 )
        /NOORIGIN
        /DEPENDENT performance
        /METHOD=STEPWISE curiosity motivation attitude.
```

Regression

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Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	motivation		Stepwise (Criteria:Probability-of-F-to-enter <=050,Probability-of-F-to-remove>=.100).

a. Dependent Variable: performance

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.319[a]	.102	.083	9.02376

a. Predictors: (Constant), motivation

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	444.165	1	444.165	5.455	.024[b]
	Residual	3908.555	48	81.428		
	Total	4352.720	49			

a. Dependent Variable: performance
b. Predictors: (Constant), motivation

Coefficients[a]

Model		Undstandardized Coefficient		Standardized Coefficient		
		B	Std. Error	Beta	T	Sig
1	(Constant)	2.199	9.353		.235	.815
	Motivation	5.710	2.445	.319	2.336	.024

a. Dependent Variable: performance

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Curiosity	-.137[b]	-.722	.474	-.105	.528
	Attitude	-.064[b]	-.444	.659	-.065	.904

a. Dependent Variable: performance

b. Predictors in the Model: (Constant), motivation

APPENDIX K

Questionnaire for Fourth Year Students

Your answer to all items in the test will help the researcher achieve his purpose in his study. Please answer all items as honestly and accurately as you can and return the accomplished form to the researcher. ***Rest assured that your responses will be kept in confidence and will be used for research purposes only.***

Thank you very much.

MARIA CHARINA A. JAEN
Researcher

---

1. In a given linear function f(x) = 5x + 3, what is the value of x where the graph crosses the x axis?
   B. 3 B. -3 C. 2/5 D. -3/5

2. Where does the graph of f(x)= -3x + 5 crosses the y – axis?
   A. 5 B. (0,5) C. (5,0) D. (0,-5)

3. What is the value of g(n+2) if g(x)= $\frac{7}{x-2}$?
   B. $\frac{n}{7}$ B. $\frac{7}{n}$ C. $\frac{7}{n+4}$ D. $\frac{7}{n-4}$

4. Which is the domain of the function f(x) = $\frac{2x}{x-5}$?
   B. {x/x= 2} B. {x/x ≠ 2} C. {x/x= - 5} D. .{x/x≠ 5}

5. Find the range of the f(x) = /x-1/ ?
   A. {y/y = 0} B. {y/y ≥ 0} C. {y/y ≤ 1} D. {y/y = -1}

6. For the function f(x) = x+3, determine its domain and range?
   A. 3 B. -3 C. all real numbers D. no value

7. What is the value of x in f(x) = 2x-3 where the graph crosses the x-axis?
   B. $\frac{2}{3}$ B. $\frac{-2}{3}$ C. $\frac{3}{2}$ D. $\frac{-3}{2}$

8. What could be the value of f(x) in the given function f(x)= x^2 -3x if x=5??
   B. 25 B. 15 C. 10 D. 5

9. Find h(7) if h(x)= $\frac{x\ -2x+3}{x-5}$?
   A. 19 B. 17 C. 15 D. 13

10. Find the equation of a line with slope and y intercept -3 and 5 respectively?
    A. y = 5x-3 B. 3y = 5x C. y = -3x+5 D. y = 3x-5

11. What could be the slope intercept form of the equation 2x-5y =10?
    A. y= $\frac{2}{5}$x+2 B. y= $\frac{5}{2}$x+2 C. y= $\frac{5}{2}$x - 2 D. y= $\frac{-2}{5}$x – 2

12. What is the common factor of $2x^2$ and $3x^3$?
    B. x B.x^2 C.x^3 D. x+2

13. What is the value of *n* in the equation *n*x +3y=11 if the given ordered pair (7,2) is a solution
    of the equation?
    B. $\frac{5}{7}$ B. $\frac{3}{4}$ C. $\frac{2}{5}$ D. $\frac{2}{7}$

14. What is the composition of function f and denoted by (f o g)(x) if f(x)=3x-5 and g(x)=$2x^2$ +5x?

    A. $6x^2$+15x-5 B. $18x^2$-45x-5 C. $6x^3$+$5x^2$-25x D. -$2x^2$-2x-5

15. Which of the following has roots of -3 and 7?

    A. x^2 + 4x – 21 = 0 C. x^2 - 4x – 21 = 0
    B. B. x^2 - 4x + 21 = 0 D. x^2 + 4x + 21 = 0

16. Find the two consecutive integers whose product is 42?
    A. 6 & 7 B. -6 & 7 C. -8 & 5 D. 8 & 5

17. If f(x)=4x-1 and g(x)=x-1, what is (g ● f) (x)?

    A. $4x^2$ + 5x + 1 C. $4x^2$ - 5x – 1

    B. $4x^2$ - 5x + 1 D. $4x^2$ + 5x – 1

18. Find the standard form of the equation that passes through (-2,5) and (3,1).

    A. 4x+5y=17 C. 4/5x +3y=4/5

B. 5x+4y=17 D. -4/5x + 3y = -4/5

19. Find the slope intercept form of the equation of the line that ha a slope of ¾ and passes through (8,2)?

A. $y=\frac{3}{4}x - 4$ B. $y= \frac{4}{3}x + 3$ C. $y= -\frac{4}{3}x - 3$ D. $y= \frac{-3}{4}x + 4$

20. Simplify $(2x^2)\ (3x^2a)\ (4x^3a)$.

A . -24 B. -24 x C. $-24\ x^6a$ D. $-24x^2-a$

21. If the slope of a line is 1/2 , what could be the slope of a line that is perpendicular to this?

A. 1/2 B.-1/2 C. 2 D. -2

22. What is the sum when $-8x^2+3x-10$ is added to $10x^2-2x+1$?

B. $2x^2-x-11$ B. $2x^2+5x-11$ C. $2x^2+x-9$ D. $2x^2-3x+1$

23. What is the x intercept of the linear function f(x) = 2x+3y=9?

A. 3 B. -3 C. 9/2 D. -9/2

24. What is the general form of the equation of the line whose slope is ½ and passes through the origin?

A . $-\frac{2}{3}x - y =$ B. $\frac{x}{2} + y = 0$ C. $\frac{1}{2}x - y = 0$ D. $\frac{x}{2} - y = 0$

25. What is the equation of the line in slope intercept form which passes through points (-2,5) and (3,7)?

A . y=-7x+5 B. y = x+2 C. y = 2x +1 D. 2y = x-1

26. What is the value of k in the function k+3(k-2) = 34?

A . 7 B. 8 C. 9 D. 10

27. If the three lines f(x) =3x+2, g(x) =3x and h(x) = 3x - 5 belongs to families of equations, what is common to them?

A. x-intercept B. y-intercept C. slope D. all of them

28. What is the smallest possible value of n, if n+3> 8, and n is an integer?

A. 3 B. 4 C. 5 D. 6

29. What could be an equation of a line in slope intercept form which passes through (4, 2) and is perpendicular to the line whose equation is y=2x-4?

A. y=4x-2 B. y= $\frac{-x}{2}$ + 4 C. y= $\frac{x}{2}$ + 4 D. y= $\frac{x}{2}$ - 4

30. What could be the equation of a line which passes through (0,5) and is perpendicular to the graph of y=4x+12?
A. y= $\frac{5x}{4}$ - 5 B. y= $\frac{x}{5}$ -+ 4 C. y= $\frac{x}{4}$ + 5 D. y= $\frac{-x}{4}$ + 5

31. At what point does the graph of the function y= 2/3 x – 9 intersects the y-axis?
A. (0,1/2) B. (0,9) C. (2/3, 0) D. (-9,0)

32. What is the sum of the x and y – intercepts of y = 3x - 6?
A. -4 B. 9 C. -5 D. 7

33. What is the value of z in 3z+4 = 19?
B. 5 B. 7 C. 9 D. 10

34. Find the product of (x+4) (x+3).
B. $x^2 + 4x + 3$ B. $x^2 + 7x + 12$ C. $x^2 + 12x + 7$ D. $x^2 + 12x + 7$

35. Four more than four times a number is the same as 6 less than six times the number. Find the number.
B. 24 B. 12 C. 7 D. 5

36. Which is the factor of x^2+7x+6?
B. (x+1) (x+6) B. (x-1) (x-6) C. (x+1) (x-6) D. (x-1) (x+6)

37. Which relation is NOT a function?
C. {(0,5),(0,4),(4,0)(5,0),(5,4)} C. {(-3,2),(-2,5),(-1,8)(3,2)}
D. {(-2,5),(0,5),(2,5)(4,5)} D. {(8,0),(7,0),(6,0)(9,0),(-6,0)}

38. In which quadrant is the abscissa negative and the ordinate is positive?
B. Quadrant I B. Quadrant II C. Quadrant III D. Quadrant IV

39. Which of the following is the x-intercept of the line 9x -2y = 81?
A.-9 B. -12 C. 9 D. 12

40 . Which is the correct form of f(x) =x+3 in standard form?
B. –x + y = -3 B. x + y = 3 C. x - y = -3 D. x + y = -3

41. Who is the French Philosopher and mathematician that first devised the coordinate system?
B. Gabriel Fahrenheit B. Andres Celsius C. Rene Descartes D. Isaac Newton

42. Convert $\frac{7}{2}\pi$ to degree?
B. 720 º B. 630 º C. 405 º D. 215 º

43. What is the equation of the line that passes through the origin and with slope equal to zero?
A. x + y=0 B. x-y = 0 C. x = 0 D. y=0

44. Which is the equation of a line that passes through the points (4, 1) and (-1,-9)?
A. y = 2x - 7 B. y = -2x + 7 C. y = -2x - 7 D. y = 2x + 7

45. Which of the following equations is expressed in standard form?
B. -3y +9x + 6 =0 B. 3y = 9x +6 C. 9x -3y = -6 D. -9x+3y = 6

46. What is the zero of the linear function g(x) = 3x - 2?
B. 2 B. 9 C. -9 D. -12

47. What is the slope of a line passes through (-6,-3), (2, 5)?
B. -1 B. 0 C. 1 D. 2

48. $\log_b 5 + 3 \log_b 2$ is equivalent to?
A. $\log_b 20$ B. $\log_b 30$ C. $\log_b 32$ D. $\log_b 40$

49. What is the value of (f o g)(3), if f(x)=$\sqrt{x-5}$ and g(x)=x^2?

A. $\sqrt{14}$ B. $\sqrt{5}$ C. 9 D. 2

50. Which is the y-intercept of the line 5x +3y + 15 = 0?
A. 15 B. 5 C. -3 D. -5

51. To draw a line, what is the least number of points needed?
A. 0 B. 1 C. 2 D. 3

52. What is the equation of a line having a slope of -3/5 and y-intercept of 8?
B. f(x)= $\frac{3}{5}$x +8 B. f(x)= - $\frac{3}{5}$x -8 C. f(x)= - $\frac{3}{5}$x +8 D. f(x)= $\frac{3}{5}$x -8

53. Which of the following expressions is expressed in slope intercept form?
B. -2y=-x+3 B. 2x-y=3 C. -2y-3=x D. y=2x-3

54. What is the zero of the linear function g(x) =3x-2?
A. 2 B. 3 C. 2/3 D.3/2

55. Determine the value of $4^{x+4} = 4^{3x-1}$?
A. 5/2 B. 3/2 C. 5/4 D. 7/4

56. If f(x) = 3x +7 and g(x) = - $\frac{x-7}{3}$, find (g ∘ f)?
A. -10 B. -2 C. 1 D. 0

57. What is the value of x in y = 2x – 1, where the graph crosses the x- axis?
A. 1 B. 1/2 C.-1/2 D. -1

58. If g(x) = x^2 – 4x + 5 find g(g(1)).
A. 0 B. 1 C. 2 D. 6

59. Find the product of (3x^2 +2) (x-2)?
A. 3x^2 + 6x^2 - 2x - 4
B. 3x^3 + 4x^2 – 4
C. 3x^3 - 4x^2 - 4
D. 3x^3 - 6x^2 + 2x – 4

60. What is the vertex of g(x) = x^2 + 10x?
A. (-5, 25) B. (5, 25) C. (-5, -25) D. (5, -25)

61. What is the axis of symmetry of the graph of the function y = x^2 + 8x – 7?
A. x = 4 B. x = -4 C. x = -1 D. x = 1

62. Which of the following is the zeros of the function h(x) = x^2 +5x – 14?
A. -7 & -2 B. -2 & 7 C. 2 & -7 D. 7 & 2

63. Find the quadratic equation having 8 and -7 as roots?
A. x^2 - x – 56 B. x^2 - 8x – 56 C. x^2 + 7x – 56 D. 4x^2 - 8x + 56

64. Find g(2) if g(x) = 2x^3 – 5x^2 + 6x – 11.
A. -3 B. -4 C. -11 D. -24

65. What is f(-2), if f(x) = 3x+5?.
A. 6 B. 1 C. -1 D. -6

66. Find the numbers if one number is three more than a second number. Forty-nine more than the product of two numbers is 89.
A. 6 & 9 B. 5 & 8 C. 4 & 7 D. 9 & 12

67. What is the quadratic form of h(x) = $(x+2)^2$ -6?
A. x^2 + 4x – 2 B. x^2 + 4x + 8 C. $(x+2)^2$ - 6 D. x^2 + 4x +2

68. What is cos 45º?
A. $\sqrt{3}$ / 2 B. $\sqrt{2}$ / 2 C. 1/2 D. 2$\sqrt{3}$ / 2

69. What is the exact numerical value of tan 135º?
A. $\sqrt{2}$ / 2 B. $\sqrt{3}$ / 2 C. 1/2 D. -1

70. Convert 5π /3 in degree?
A. 200 º B. 250 º C. 300 º D. 320 º