



Strategic Intervention Material (SIM) in Aiding Difficulties on Distance Learning in Mathematics 7

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APPROVAL SHEET

The thesis of TRISHA MAE B. ORDONIO titled, “STRATEGIC INTERVENTION MATERIAL (SIM) IN AIDING DIFFICULTIES ON DISTANCE LEARNING IN MATHEMATICS 7” which is prepared and submitted in partial fulfillment of the requirements for the degree, Master of Arts in Education major in Mathematics, is hereby accepted.

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ABSTRACT

This study aimed to develop and validate a Strategic Intervention Material (SIM) to aid difficulties on least learned competencies of Grade 7 students during distance learning in the subject Mathematics, specifically the branch Algebra. The least learned competencies revealed in Mathematics Second Summative Test on school years 2020-2021 and 2021-2022 of Victoria National High School (VNHS) served as the basis in developing Strategic Intervention Materials (SIM).

The study sought to answer the following objectives: 1. To develop a Strategic Intervention Material (SIM) in aiding difficulties on the least learned competencies of Grade 7 learners in Algebra; 2. To validate the Strategic Intervention Material (SIM) in Algebra - Mathematics 7 by: a. Mathematics Specialists in terms of objectives, content, format and layout, presentation, and instructional characteristics; and b. Users. 3. To draw an implication in teaching Mathematics.

The validation of the SIMs was done by 5 Mathematics Specialists, results accumulated a mean of 4.9 from different indicators which has an equivalent description of “Very Evident”. After validating the material, it was tested among selected Grade 7 students. Results from the pretest and posttest revealed that the use of Strategic Intervention Material (SIM) and traditional teaching method were both effective in teaching and remediation. However, comparing the results on posttest, the use of SIM in teaching least learned competencies was more effective than the traditional teaching method. The SIM is useful to aid the difficulties in Algebra and at the same time to improve the performance of the students.

Based on the findings of this study, the researcher recommended the use of SIM as teaching and intervention tool since it is effective in aiding difficulties on least learned competencies and improving the skills of the students in Algebra. Teachers should be encouraged to create more SIM in enhancing the mastery of students not only in Mathematics, but also in other subject areas.

DEDICATION

This work is dedicated to my supportive and loving

Papa Kiko and Mama Lanie,

My sisters, Jane and Jairish,

My soon to be Husband, Amiel,

My Beshies, Sue & Rechelle,

To the whole Barlaan and Ordonio Family,

And above all, to the Almighty God who gives me strength, wisdom, guidance, competence, and good health while doing this research.

All of these, I offer to you

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CHAPTER ONE INTRODUCTION

➤ *The Problem and its Background*

The number one priority of United Nation - Sustainable Development Goals (UN SDG) is to eliminate poverty. It is believed that obtaining a quality education is the foundation of improving people's lives since it enables the socioeconomic mobility which reduces poverty. In line with this, it is important that children to achieve proficiency standards in reading and Mathematics.

Mathematics as one of the learning areas in the K to 12 Program has always been in the limelight for it is considered by several students as the most challenging subject in the curriculum. Hence, competence in Mathematics is one of the factors needed for survival particularly in this time of modernization. Students must acquire Mathematics skills as early as possible for them to have a strong foundation for a life-long learning. In addition, the said subject provides an effective way of building mental discipline and encourages logical reasoning and mental rigor. Ergo, it plays a pivotal role in understanding the contents covered in other learning areas.

Several trainings, seminars, and webinar workshops that concern strategies and approaches in teaching Mathematics have always been a part of teachers' professional obligation to heighten Mathematics education. However, these preparations still prove to be inadequate in catering students' needs as it is reflected in the results of their academic performance. On that account, teachers are expected to find numerous ways to produce instructional materials and are obliged to look for styles and techniques suited for the students' interests and needs to enhance the teaching-learning process without compromising the quality of education.

In order to bridge the gaps and cope with the necessary competencies of students, teachers must serve as front liners in fixing their poor performance on the subject matter. Teachers need to be adaptable, creative, and open-minded for innovations to be applied in development of educational resources to be successful in improving the teaching-learning process and by finding the best pedagogical practices to implement in enhancing the instructional procedure.

The country's current curriculum which is the K-12 Basic Education Program, a standard and competence-based system is in spiral progression. The mission of Department of Education is to improve the quality of instruction and part of this mission happens inside the classroom; thus, every day's goal is to create an environment that is conducive for learning and promotes active participation of the learners.

In Mathematics 7, the branch Algebra is one of the key elements in introducing a lesson in secondary level since it serves as the starting point for all subsequent Mathematics discussions. Algebra is applied to different branches of Mathematics, therefore the need to bridge the gaps on least learned competencies is important considering this will build skills needed for the applications not only in different branches of Mathematics but also in real life situations.

Students seldom master even the basic concepts which leads to their low performance in terms of phasing of lessons, hence improvement is clearly affected. Further, students sometimes get confused when basic concepts are combined to complex topics. That is one of the reasons why it is necessary to have a better understanding of the lesson from the beginning. Moreover, the teacher adjusts by inserting such concepts and even recaps the different words that can be associated with the basic concepts. Thus, in order to lessen confusion and boost mastery, an instructional material should be utilized (Dahar, 2011).

Meanwhile, The Department of Education (DepEd) introduced the use of Strategic Intervention Materials (SIM) as a form of remediation to increase the academic achievement of low-performing learners in addressing the above-mentioned problem in schools. Individual needs are addressed by instructions and interventions.

DepEd also issued Department Order 08 s. 2015 or the Classroom Assessment Policy Guidelines. It states that there must be sufficient and appropriate instructional interventions to ensure that learners are ready before summative tests, and there must be an intervention by remediation and extra lessons from the subject teacher to a student who receives a grade below 75 in any subject in any quarter. This policy guideline outlines the need to arrest academic underachievement by giving the learners adequate intervention. It also emphasizes inclusive learning. As such, there will be no learners left behind as appropriate instructions and interventions are given to meet individual needs

Strategic Intervention Materials (SIM) are taught, delineated and created to aid teachers in dispensing students the needed support and boost interest to execute progress in their studies. The material used in enhancing and deepening their abilities and skills, knowledge, and comprehension of the students not only in Mathematics but also in other learning areas of the curriculum. This teaching tool can give students the opportunity to explore and grasp bunch of ideas and concepts that will deepen their comprehension of a variety of subject areas and boost their competence. Further, strategic instructional materials help students gain mastery and skills, and supplement the lessons especially the topics vague for them.

Victoria National High School corresponded to the full implementation of the strategic plan of the Department of Education as part of the educational sector and to give credence that it will help resolve the challenges and concerns which can possibly arise anytime. It is along in this line that the researcher presents this study to develop and validate Strategic Intervention Material (SIM) specifically a story and adventure-based tool that will serve as a supplementary material to alleviate difficulties in Mathematics of the Grade 7 students in the said school. It is timely and relevant to pursue this research as it addresses some issues under the current condition among the teachers and learners in the said subject and it facilitates the rapid design process and implementation of adaptive responses to the emerging education challenges as well as protecting students' educational opportunities.

➤ *Statement of Objectives*

This study aimed to develop and validate a Strategic Intervention Material (SIM) as a remediation material in Mathematics 7- Algebra that can aid difficulties among Grade 7 learners of Victoria National High School during the school year 2021-2022. Moreover, it sought to achieve the following objectives:

- To develop a Strategic Intervention Material (SIM) in aiding difficulties on the least learned competencies of Grade 7 learners in Mathematics 7 - Algebra:
- To validate the Strategic Intervention Material (SIM) in Mathematics 7 - Algebra:

✓ By Specialists in terms of:

- Objectives;
- Content;
- Format and layout;
- Presentation; and
- Instructional characteristics.

✓ By Users

- To draw an implication of the study in teaching Mathematics.

➤ *Significance of the Study*

This study which aimed to develop and validate a Strategic Intervention Material (SIM) that will aid the difficulties in Mathematics 7- Algebra of Grade 7 students during the school year 2021-2022 will prove significant and valuable contribution to the following:

To Schools Division of Tarlac Province, the outcome of this study may serve as a basis for identifying, planning, implementing, or upgrading programs/activities for teachers that would be responsive to the needs of students especially in aiding their difficulties in the said subject.

To Department Heads of Mathematics, this study may provide pattern for making remediation material for students in aiding their difficulties in the least learned competencies in Mathematics subjects. In addition, this study may serve as the basis for conducting department-based trainings and webinars in helping Mathematics teachers to create relevant intervention materials.

To Mathematics Teachers, this study may significantly help them in creating material for remediation on least learned competencies during the distance learning. Moreover, this will serve as a guide for them in developing their own Strategic Intervention Material (SIM) in other least learned competencies in different grade levels.

To the students, the result of this study may help them discover how they learn best. This may also help them see the vital role that strategic intervention materials play in the improvement of their Mathematics academic achievement as well as in their other subjects.

To the parents, the findings of the study may enhance parent's active participation in supporting the needs of their child and improve their relationship as supporters and partners of the school in achieving high academic performance of their children.

To Future Researchers. This study will serve as a guide for developing innovations in higher and deeper studies in aiding least learned competencies during the distance learning. This may also be used as a springboard for other studies and researchers as it could give them pertinent data.

➤ *Scope and Delimitations of the Study*

This study focused on developing and validating Strategic Intervention Material (SIM) to aid difficulties on the least learned competencies of Grade 7 learners in Mathematics 7 – Algebra.

The least learned competencies of Grade 7 students in Mathematics 7 - Algebra for the two consecutive school years of distance learning, 2020-2021 and 2021-2022 were the basis for the development of SIM. The top four least learned competencies served as the content in the SIM and these were deriving laws of exponents, multiplying and dividing polynomials, finding special products using models and algebraic methods, and solving linear inequality in one variable.

This study is delimited on developing a Strategic Intervention Material (SIM) for Mathematics 7-Algebra and validating this tool by specialists in terms of the following: objectives, content, format and layout, presentation, and instructional characteristics and by users.

A total of five (5) Mathematics Specialists validated the material before it was used to test selected Grade 7 students. Results from the pretest and posttest were used to determine whether the use of Strategic Intervention Material (SIM) is more effective than traditional teaching method in teaching least learned competencies.

CHAPTER TWO

REVIEW OF RELATED LITERATURE AND STUDIES

This section presents a review of related local and foreign literature and studies which served as a frame of references for the present study. These readings have bearing on the study since they aimed to assess the performance of students for developing and validating material for development in education.

➤ *Related Literature*

The pandemic has affected the entire world which shined a harsh light on the vulnerabilities and challenges humanity faces. It has given us a clearer picture of the inequities that already exist as well as the next measures we need to take, the most important of which is to address the education of the more than 1.5 billion pupils whose learning has been impeded by school closures. This report is the result of the collective work of the International Commission on the Futures of Education (UNESCO, 2020).

In September 2015, at the United Nations Sustainable Development Summit, Member States formally adopted the 2030 Agenda for Sustainable Development in New York. The agenda contains 17 goals including a new global education goal, it is to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” and has seven targets which numeracy and literacy is one of these. (UNESCO, 2015)

Education in school is determined by provision of resources, their maximum utilization, and management. A direct relationship exists between the quality of school facilities, teaching and learning materials, teaching personnel and the education process.

In the upcoming School Year (SY) 2022-2023, the Department of Education (DepEd) plans to fully integrate face-to-face instruction across the country. There are 27 million students in primary and secondary schools and just six million have returned to the classroom this School Year 2021-2022.

The Department of Education (DepEd) is creating a framework for a learning recovery plan to direct schools in bridging learning gaps caused by disruptions relating to the pandemic following the progressive expansion of face-to-face instruction. According to Briones (2022), as more schools open their doors for physical learning, the department is currently crafting a learning recovery program as part of the sector’s post-pandemic efforts. This is done to guarantee that interventions are successful, allowing everyone to catch up and quicken their learning. Different learning area competencies will be reassessed and validated. Moreover, the academic achievement and performance of the students will be checked so learning intervention can have a concrete base line.

The extensive remark that numerous students execute poorly in Mathematics put much effort for the necessity to improve delivery of instruction. This subject is a basic skill every person needs to survive in this world. However, many people find Mathematics difficult because of the way it is taught. Some students are not confident with their mathematical ability and view the skills they gained as irrelevant (Antonio 2011).

According to Gomez (2013), conceptual understanding is needed by the students for learning Mathematics successfully because it enables them to learn new ideas by connecting those ideas to what they already know. It helps them to remember, use, and reconstruct those ideas when they need them. He added that students need conceptual understanding to support the mathematical concepts as a foundation in solving mathematical problem. The findings of numerous studies emphasized that early mathematical knowledge is associated with later success in the subject (Volume 46, Issue 5, of *Developmental Psychology*; Eccles, 2010) and may even be consequent on the concerns of secondary graduation.

Jones (2012) explained that the mastery of mathematics corresponds directly to each student’s future and life, be it in the work force, college, and especially in business. In addition, the mastery of basic mathematics skill better prepares one for higher level mathematics, which in turn develop students who are in college and career ready upon graduation of high school. In addition, according to Brown & Quinn (2007), students who fail to master the foundation of conceptual understanding often exhibit error patterns when learning higher mathematics.

Gritt, et al. (2010) emphasized that junior high school level is an important time of transition and growth in students’ mathematical thinking. Junior high school students begin to investigate increasingly complex ideas, building their capacity to deal with more formal concepts. Early mathematical achievement predicts not only advanced Mathematical achievement but also success in other domains. With this, they recommend providing children with prospects to play, discover by exploring, and encounter Mathematical patterns and structures as they engage with mathematics in different ways to help them enhance and gain a certain foundation of mathematical understandings.

Students’ mathematical achievement in secondary level has an influential effect on their performance in college and their future careers. Possessing a good foundation in mathematics supports students to develop sophisticated perceptions and offers more future career opportunities. The significance of mathematical learning has frequently been highlighted by educators and politicians (Wilkins, 2011). In modern society, Mathematical proficiency is necessary to educational and economic feats and is now quickly

emerging in secondary student's Mathematics achievement which forecasts tertiary admission and graduation, early career, income, and income's growth (National Mathematics Advisory Panel or INMAP, 2012).

On the other hand, the teacher's attitude towards Mathematics and the approach in teaching Mathematics is said to have an effect on a student's learning, particularly in developing the conceptual understanding of the students. As stated by Chan (2019) attitudes toward Mathematics are important since there is a reciprocal relationship between achievement in Mathematics and attitudes towards the subject. Additionally, teachers with poor attitudes toward Mathematics often cause their avoidance of teaching strong mathematical content and have an impact on students' attitudes and behaviors (Evans, 2011).

Teacher plays a vital role in enhancing the conceptual knowledge of the students by the pedagogical method of teaching that is applicable on the development of the student. Teachers should design educational tools which will help the students in the understanding of conceptual knowledge. It has long been proven that instructional materials play a very important function in the teaching and learning-process since they will enhance the memory level of the students. Therefore, the teachers must be resourceful by utilizing learning materials to make teaching and learning process effective and fascinating.

Garcia (2013) described teaching materials as tools utilized for sensible reasons such as demonstration in the class situation by the teachers and students. According to Oluwagbohunmi & Abdu-Raheen (2014), teaching aids are used in order to help simplify explanations and make learning of subject matter comprehensible to students. Moreover, Salvador (2014) emphasized the significance of the availability of instructional materials in attaining effectiveness in the teaching and learning process and supervision in the school system.

Numerous educators have diverse viewpoints on employing teaching materials, henceforth adhering to the concept of no two persons are the same. There had been a roaster of academicians who conducted multivariate analyses on the efficacy of remediation materials and related teaching methodologies.

Teaching Mathematics is more productive when there are available, sufficient, and strategically designed instructional materials suited for the type of students. Instructional approaches may succeed or fail, they are dependent on the learning needs of the students. Teachers must recognize both the students' emotional needs and their approaches to learning. Creating instructional materials plays an essential role in the teaching – learning process. Use of instructional materials has a strong relationship with academic performance at the secondary students as mentioned by Dahar (2011).

In the context of Philippines' educational system, instructional materials are considered as tools for the low achievers to cope up with the lesson discussion. One of the proposed instructional materials by Department of Education is the Strategic Intervention Material or also known as "SIM". This refers to a teaching aid introduced in the class to encourage the students to learn or master the skill they failed to learn in regular class. The utilization of the said material for remediation increases students' level of understanding (Dy & Cubillas, 2018). Moreover, this is strategically prepared and designed for teaching remediation for the least learned skills.

Strategic Intervention Materials (SIM) is an instructional material suggested by the Department of Education to improve student's performance. The education sectors claim this tool as pivotal in the teaching-learning process as it enhances the memory level of the students and makes the teaching-learning process interesting (De Guzman, 2011).

In addition, the said instructional material which was conceptualized for remediation purposes is one of the solutions employed by the Department of Education to enhance academic achievements of students performing low in the field of science and technology. In fact, DepEd Memo No. 117, series of 2005 entitled "Training Workshop on Strategic Intervention Materials (SIMs) for Successful Learning" was conducted in selected DepEd Division Offices. Strategic Intervention Material (SIMs) have six parts: Guide Card, Activity Card, Assessment Card, Enrichment Card, Reference Card, and Score Card.

Bunagan (2012) defined Strategic Intervention Material as meant to re-teach the concepts and least mastered skills. In order to help the students master competency-based skills that they were unable to acquire during traditional classroom instruction, this material is provided to them. It consists of both learning strategies for students and content enhancement for teachers. It is a multifaceted approach in assisting students to become independent and successful learners. He further differentiated SIM and modules. According to him, this intervention material focuses on the skill not mastered by the students during regular class. Moreover, fun activities are included, and there are no pretests or posttests. On the other hand, modules contained different topics included in each chapter and intended for regular classroom teaching and distance learning. It requires pretest and posttest and includes fun activities, too.

In this matter, upgrading the Strategic Intervention Material by story and adventure-based design utilized by teachers can also be used as a supplementary material which enhance the interest of the students to learn that promotes active participation during lesson discussions.

➤ *Related Studies*

• *Foreign*

The issues on difficulties in Mathematics of students have been addressed by several studies worldwide. Meanwhile, the current study developed an intervention material to aid least learned competencies in Algebra of Mathematics 7.

Jupri (2014) conducted a study on the difficulties encountered in Algebra by Junior High School students. Individual assessment using written and oral examination were conducted to fifty-one Grade seven students. The study found out that the most frequently observed difficulty was translating word problems into mathematical sentences and confusion on what processes to be used so it can be solved. In addition to these, performing operations on algebraic expressions, understanding variables, equality and inequality signs was also observed. The finding of the study implied that most competencies in learning Algebra were not attained.

In the study of Dowker (2019) titled "Children's Mathematical Learning Difficulties Some Contributory Factors and Interventions" he claimed that mathematical difficulties are a widespread problem for many students around the world. The research focused on factors that predict difficulties and interventions used to improve children's math skills. Numeracy interventions were classified according to their level of intensiveness. According to the result of his study, the significance of teaching methods and tools in influencing children's academic progress was highly emphasized. Poverty and mathematical anxiety were also found out as factors affecting students' learning progress.

Zerafa (2017) conducted a study titled "Supporting Children with Mathematical Learning Difficulties: Outcome of an Intervention Program", with a purpose of assessing the number of students struggling in Mathematics and use Dynamo Assessment in determining the strength and weaknesses in different important concepts in Mathematics. The result of the study emphasized the serious life consequences that is caused by failure in acquiring basic Mathematics skills. The researcher suggested that importance of finding ways and tools to enable students to acquire numeracy skills. The profile of the children who underwent intervention showed improvement in most of the components on the said subject.

Dahar (2011) in his study titled "Effect of the Availability and the Use of Instructional Material on Academic Performance of Students in Punjab, Pakistan", a total of 288 schools, 20 teachers and students in each school were selected as samples and the results emphasized that instructional materials are vital in teaching-learning process. The findings in the study concluded the availability of instructional materials to the academic performance of the students has significant relationship. In addition, students had lower academic performance because of less availability and misallocation of instructional materials. The result pointed out that if teaching tools are properly allocated and efficiently used with the standard quantity and quality, it can have an enormous effect on the academic performance of the students.

According to the study of Gross and Duhon (2013) titled "Evaluation of Computer-Assisted Instruction for Math Accuracy Intervention", diagnostic test revealed that students in the United States have a low level of mathematical proficiency. Computer-assisted instruction, a promising intervention, was used for remediation. It was found out in the study that the use of computer-assisted instruction can help students improve their accuracy and fluency in addition and multiplication. When students' performance was examined using a multiple baseline design, it was discovered that they all improved their accuracy in their targeted mathematical skill.

In Forrest et.al. (2017) study titled "Math Remediation Intervention for Student Success in the Algebra-based Introductory Physics Course", in order to improve student's success rates in algebra-based introductory physics. At the start, the researcher of the course a diagnostic test was used to identify at-risk students based on their scores. Students who were at risk of failing the course were advised to use an online math tutorial to improve their chances of passing. The tutorial and the diagnostic test are aligned. The result of the study showed that among the 643 students enrolled in the course, the 61 at-risk students who finished the Mathematics tutorial raised their chances of passing the course by almost four times of those who did not. The intervention applied in the study was simple to implement, short in duration, and can be delivered concurrently with the course. As a result of the study, Mathematics tutorials have been implemented in all sections of introductory algebra and calculus-based physics courses.

Rastogi (2013) in his research titled "Self-Instructional Material (SIM) on Educational Statistics of B. Ed. students", this experimental study aimed to change the attitude of the students towards Mathematics and enhance the level of knowledge in Elementary Statistics. The utilization of traditional Classroom Teaching and Self-Instructional Material was compared in this study and two groups demonstrated a considerable improvement in their knowledge of educational statistics. The study proved that through the use Self-Instructional Material Strategy, there was greater retention and concluded that the use of proper visualization and memory skill, SIM helps the students for better understanding of the lessons. The study also revealed the used of self-instructional materials was more effective than the used of traditional classroom instruction. However, both strategies could not help the students to change their attitudes towards Mathematics.

In the study of Linder and Emerson (2019), a "Project Math Pack" take-home bag intervention focused on early children Mathematics was used. The main goal of the project was to create more effective Mathematics environments in homes and to provide

embedded professional development for parents on how to engage in Mathematics play with their children. In the study, participants were engaged in five weeks intervention that promotes mathematical interactions through guided play exercises. Parents showed modifications in perceptions linked to their role during Mathematics play and improved motivation for engaging in mathematics play with their child. These findings suggest that there should be more possibilities for families to participate in Mathematics play. Moreover, it was showed that take-home bag intervention is a strategy that helps families understand how children engage in Mathematics play.

In the study of Hulac, Dejong, and Benson (2012) titled “Can Students Run Their Own Intervention?: A Self-Administered Math Fluency Intervention.”, the self-administered intervention has shown improvement in student on-task behavior and increase the desirability of schoolwork. A modified multiple baseline design was used to evaluate a self-administered folding-in technique on a group of students identified by their teachers as having difficulty enhancing multiplication skills. The result revealed that, individually, seven of the eleven students showed greater growth during the intervention phase than during the baseline phase. During the intervention phase, no student demonstrated higher Maze Curriculum-Based Management (CBM) growth rates than during the baseline phase. In contrast, three of the four students for whom no link could be established between the intervention and the baseline demonstrated higher levels of performance on math CBMs following the intervention phase.

The study of Bricko (2021), titled “Examining the Efficacy of an Intervention Package Delivered via an Online Learning Tool to Improve the Prerequisite Algebra Skill Fluency.”, focused on the potential utility of interventions to assess the effects of multi-component intervention on Mathematics fluency of sixth-grade students as prerequisite algebra skills. Due to concerns about academic performance, target skills were tailored to each student based on screening assessments and were continuously assessed during both the baseline and intervention phases. The results on Quizlet intervention package via online learning revealed that students improved their math fluency on prerequisite skills using the multiple probes across skills design. In addition, the features provide meaningful practice opportunities, immediate feedback, as well as prompting and modeling, all of which resulted in improved performance on prerequisite algebra probes.

The study of Jupri (2014) and Dowker (2019) focused on the difficulties in Mathematics of students which affect progress and performance. It was emphasized in the study of Zefara (2017) that the acquisition of numeracy skills is important, while in the study of Bricko (2021), Linder and Emerson (2019), Forrest (2017), Rastogi (2013), Gross and Duhon(2013), Hulac, Dejong, and Benson (2012) and Dahar (2011) it was highlighted that the use of different intervention materials is important to cater the needs of the students to solve the emerging problems. These studies were related to the present study which aims to aid the difficulties of students by developing strategic intervention material and to enhance the skills of the learners to be ready for the next level of learning.

- *Local*

Dumigsi and Cabrela (2017) conducted a study titled “Effectiveness of Strategic Intervention Material in Mathematics as Remediation for Grade 9 Students in Solving Problems Involving Quadratic Functions” in Digos City National High School. They utilized a Quasi-experimental design to investigate the effects on the performance of Grade 9 students in solving quadratic equations using Strategic Intervention Material (SIM). The data were gathered using the researchers’ self-made pretest and posttest. The result of the study revealed that Strategic Intervention Material can help improve the academic achievement of Grade 9 students in Mathematics. The said intervention material supports students to develop the fundamental knowledge, skills, and understanding and aid them in the transfer of learning in Mathematics. Therefore, students who are exposed to the said material have a greater chance of increasing or improving their performance in mathematics.

Saclao (2016) used descriptive experimental design in his study “Development and Impact of SIM-MOD (Strategic Intervention Material and Module Combined) on Students’ Academic Achievement in Mathematics at the 8th Grade Level”. The material was developed using ADDIE Model and evaluated by designs, presentation and its usefulness. By implementing the material, the results concluded that there is a significant relationship from the control and experimental groups from the mean of the gain scores in pretest and posttest with the p-value of 0.000 with a t-value of 7.727. It implies that SIM-MOD has a positive effect on improving performance of Grade 8 in Mathematics subject.

The study titled “Strategic intervention material: A tool in enhancing grade nine students’ Mathematical Performance” by Arpillada (2018) used the material where students can study and explore on their own that consist of activities and simple interactive discussions in the topics under Integrated Mathematics which includes Positive, Zero, and Negative Integral Exponents. The reflected performance in the post-test results of the two groups revealed significant difference. It concluded that the strategic intervention materials have a positive impact in mastering the least-learned competency. Thus, the researcher encourages schools to conduct training, programs and activities that will solve students’ least learned competencies by enhancing more the skills of the teachers in crafting innovative strategic intervention materials to aid the students’ needs.

The performance of Grade 6 students in Science on three different elementary school Second quarter test in the study of Sinco (2018) was analyzed. The result of the said study revealed that there are three least learned competencies in Science. The researcher developed a SIM as a tool for re-teaching the topics on students who scored below 75%. After the implementation, results of posttest revealed “satisfactory”, which indicates it passed the 75%. Moreover, the use of Strategic Intervention Materials results to students’

positive perception. Responses of the students on their perception on using SIM find it enjoyable, interesting and it contributes positive attitude towards learning more concepts in Science. Students commented that they like using SIMs features are easy to understand, it is colorful, and the stories are exciting which are appealing to the students. The study emphasized that interest of the students on the material will boost their motivation, as a result, there will be most likely an increase in their effort and persistence to learn more.

To assess the effectiveness of Strategic Intervention Material (SIM) on academic performance in science among grade VI students, Suarez and Casinillo (2018) conducted a study titled “Effects of Strategic Intervention Material (SIM) on Academic Performance: Evidence from Students of Science VI.” to use a SIM as a treatment of the least mastered skills in the Science VI. The study used a control group and an experimental group, comparing pretest and posttest, which through hypothesis testing, the study determined that there is significant effect of SIM to students’ academic performance. Results showed that the use of SIM is effective in terms of improving students’ performance particularly on the topic pertaining to the least mastered skills in Science VI which implies that SIM is an effective tool in learning process. Thus, teachers should be provided opportunities, given room for improvement and further elevate to a higher level of SIM implementation to further meet the desired instructional objectives.

The study of Pasion (2019) titled “The Efficacy of Strategic Intervention Materials (SIMs) in Teaching Social Studies among Third Year High School Students.” investigated the efficacy of the Strategic Intervention Materials (SIMs) in teaching Social Studies among the third-year high school students of Bugsukan Integrated School, Philippines. The researcher made use of the group pretest-posttest design. Five learning areas in Social Studies were presented in a pretest and mean was used to determine the academic performance of the student-respondents while t-Test was used to determine the significant difference in the results between the pretest and posttest. The SIM includes watching video clips, films, and movies which resulted in an increase on students’ performance in exams. The students in the fourth grading period got high examination scores. In the implementation of effective techniques the teacher employs results in a significant difference in the students’ performance in the pretest and posttest. The SIMs are thought to be beneficial in improving students’ retention of subject content as well as sustaining their interest in learning and integrating the lessons into their real-life experiences as they identify with the characters they see in the videos, films, and other audio-video materials presented to them.

Reyes and Falle (2019) in their study titled “Strategic Intervention Material: Performance Level of Grade 7 Students of Zambales National High School Schools.” aimed to determine the effectiveness of teacher made Mathematics Strategic Intervention Material (SIM) to the performance level of the Grade 7 students of Zambales National High School. Based on the investigations, the researcher found out that the performance of the students in Mathematics was fairly satisfactory in pre-test to outstanding in post-test using the Strategic Intervention Material. The perception of the 116 students toward the effectiveness of teacher made strategic intervention material on knowledge, process, and transfer and application was very effective while motivation resulted to be very effective. Knowledge, motivation, process, and transfer and application was evident in the test scores of mathematics competencies. The use of SIM made by the researchers claimed a significant relationship between students’ pre-test and post-test performance.

In the study of De Guzman and Lazo (2021) titled “Strategic Intervention Material: A Learning Approach in Teaching Economics during Distance Education.” They assessed the Strategic Intervention Material (SIM) effectiveness in Social Studies - Economics among Grade 9 Junior High School of Zambales National High School during remote/distance learning (COVID19 pandemic) school year 2020-2021. The purpose of Strategic Intervention Material (SIM) is to help the students to master competency-based skills which were not able to develop using Online and Modular Distance Learning. The study utilized a descriptive – experimental research design which the investigations revealed that the academic performance of the students before the utilization of SIM in Economics resulted in a descriptive equivalent of Did Not Meet Expectation or Fair. At the same time, the performance of the same group of students after the utilization of SIM in Economics was Satisfactory. The SIM was evaluated by the specialists and found out that the objectives under content, structure, and usability compositions/requirements of acceptability and usefulness were very evident. They suggested the consideration of preparation of SIM on enhancing the development of desirable values and traits, active learning activities aimed to increase motivation, understanding and for the development of critical and higher-order thinking needed in higher Mathematics and better efficiency on its assessment methods.

The study of Abuda et.al (2019) titled “Struggling Learners’ Mathematics Achievement Level using Quick Response Embedded Strategic Intervention Material.” focused on the effect of the Material (QRSIM) on the achievement level of 11th Grade Students in General Mathematics via Solomon-four group research design, focusing on the least learned competencies in solving exponential equations. In addition, researchers emphasized that Mathematics teachers must be geared with appropriate knowledge on the use of 21st century teaching and learning resources such as Strategic Intervention Material to help a student who finds mathematics concepts difficult to understand.

The above-mentioned studies are similar to the present study since innovations on teaching tools was used as a supplement in improving students’ performance. On the other hand, the present study’s the goal is to develop a Strategic Intervention Materials based on the least learned topics of Grade 7 students in Algebra during the distance learning under the new Curriculum guide of

DepEd which focuses only on MELCs (Most Essential Learning Competencies). The studies above served as a reference and guide for the researcher in the conduction of this study.

➤ *Conceptual Framework*

The success of delivering the lessons well to the students depends on the teachers’ subject-content expertise and careful planning. The appropriateness of the materials utilized by the teacher in the different learning styles of the students will ensure the students’ better achievement (Tanke,2013).

The survey led by Toh and Lui (2014) discovered that some Singapore instructors have just utilized cartoons, comics and storytelling to allure learners who have low mathematics self-idea and who are less scholastically inspired to learn Mathematics. In any case, there seems an absence of deliberate exertion among Singapore educators to grow such material for school Mathematics educational program and researchers to examine the effect of utilizing this elective methodology in Mathematics instruction in Singapore on learners’ arithmetic self-idea and inspiration to gain proficiency with the subject.

The concept of this study is best understood through the illustration of Figure 1.

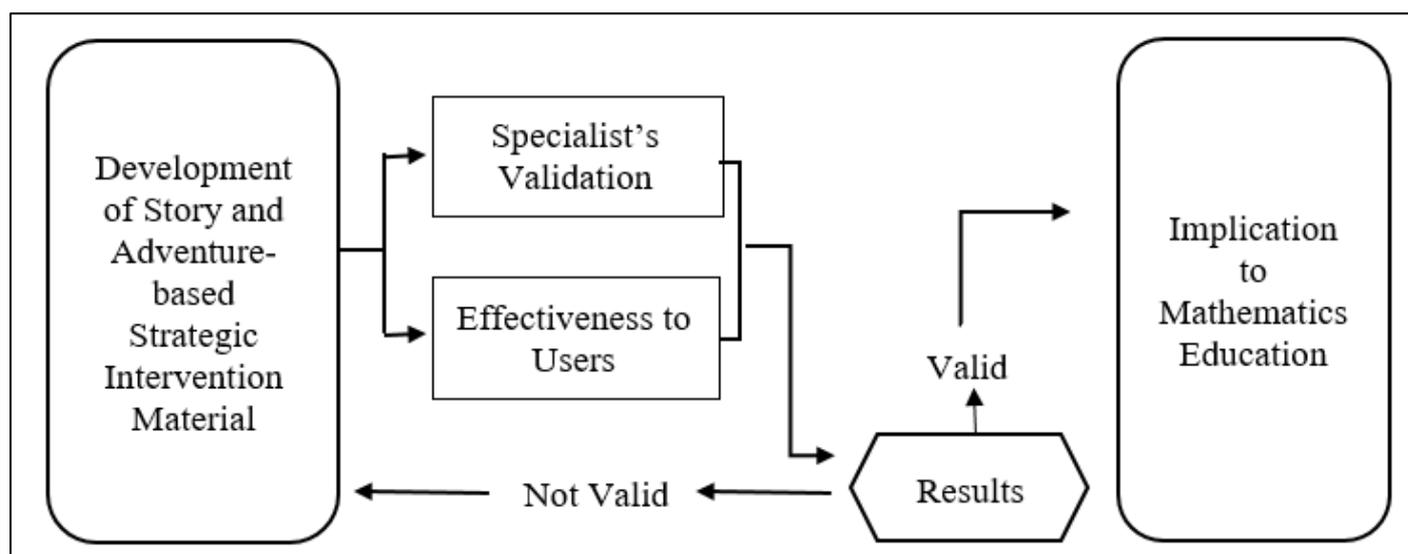


Fig 1 Paradigm of the Study

Figure 1 shows the specific variables that this study aimed to investigate. The study anchored in the least learned competencies in Mathematics 7 - Algebra of Grade 7 students at Victoria National High School during the school year 2021-2022 including the past two (2) school years as a basis in the development and validation of Strategic Intervention Materials (SIM) in Mathematics 7 - Algebra. The SIM was evaluated by 5 Mathematics Specialists in Tarlac Province: 3 Master teachers, 1 Teacher III and 1 Learning Resource Management and Development System (LRMDS) school coordinator using different indicators in objectives, content, format and layout, presentation, and instructional characteristics. All comments, corrections and suggestions from Math specialists were used for the improvement of the SIM. Moreover, the users validated the effectiveness of the SIMs using pretest-posttest control group design. Once the SIMs are proven not valid, comments and suggestions were used as guide in modifications. On the other hand, if SIMs are proven valid, the implications of the study to Mathematics Education are addressed.

CHAPTER THREE

METHODS OF STUDY AND SOURCE OF DATA

This chapter describes and presents the research design, subjects of the study, research procedure, research instruments and statistical treatment of the data that was used in gathering data and statistical treatment of the gathered data.

➤ *Research Design*

In this study, Research and Development design was utilized. This method includes creating innovative materials based on discovered knowledge which is needed by society. Quasi-Experimental design was used since the aim of this study was to aid the least learned competencies in Algebra using Strategic Intervention Material (SIM) and to be validated by selected 5 Mathematics Specialists and limited number of respondents.

This study developed a Strategic Intervention Material (SIM) based on the least learned competencies on distance learning in Mathematics 7 – Algebra on the school year 2020-2021 and 2021-2022. The material was evaluated by the specialists in terms of (5) indicators on objectives; (5) indicators on content; (5) indicators on format and layout; (4) indicators presentation; and (5) indicators on instructional characteristics.

Meanwhile, the effectiveness of SIM was validated by the users through pretest-posttest control group design. The design is presented below.

G_1	O_1	X	O_2
G_2	O_1		O_2

Where:

G_1 – Experimental Group, G_2 - Control Group
 O_1 – pretest, O_2 – posttest
 X – (Strategic Intervention Material)

The control and experimental groups' pre- and post-test scores were examined for statistically significant differences. Conclusions regarding the intervention material's efficacy in retaining and improving the learners' skill and identifying the implications for Mathematics education were based on the statistical analyses of the data collected from the users and specialists in mathematics for the validation of the intervention material.

➤ *Locale of the Study*

The study was conducted at Victoria National High School, Victoria, Tarlac – Third District. The school has 21 sections of Grade 7 which consists of 796 students and handled by 4 Mathematics Teachers. The total of 146 students attended face to face learning from the middle of third quarter until the end of the school year. The school complied with the program of Division of Tarlac Province – Project All Numerates (PAN) to provide intervention to Grade 7 students in order to improve their Mathematics competence.

➤ *Sampling Design*

The study used purposive sampling design in selecting the participants of the study. The study limited the number of participants from the students who participated in face-to-face classes, and these were the students who were assessed to be low performing students in Modular Distance Learning. It is to aid the difficulties in Most Essential Learning Competencies (MELCS) using an intervention.

➤ *Participants of the Study*

The participants of the study were the Grade 7 students from Victoria National High School of school year 2021-2022. Two sections from face-to-face learning were used in this study. Both in Grade 7 – Diligence and Grade 7 – Charity there were 17 students enrolled in each class. The participants were a total of 34 students, who were under the classes of the researcher. The number of each class was enough to conduct the study for according to Borg and Gall (1992), in comparative and experimental research, each group should have a minimum of 15 participants.

➤ *Research Instruments*

Two instruments were used in this study to validate the Story and Adventure-based Strategic Intervention Material (SIM). The first instrument is an evaluation scale for the SIM. The evaluation scale used by Math specialists has a rating from 1 to 5, 1 as lowest and 5 as the highest for objectives; content; format and layout; presentation; and instructional characteristics, the instrument was adopted from the study of Torrefranca (2009). The researcher modified the adopted instrument to meet the study's objectives, and the adviser validated the improved version.

For the pre-test and post-test to assess how well SIM served its users, a teacher-made test served as the second instrument. The teacher-made test was developed and validated by the following.

- *Construction*

The forty (40) item pretest/posttest multiple choice type consist of topics under the least-learned competencies of Grade 7 students. The test covers the topics from the branch of Mathematics - the Algebra, which has four parts - a) 10 items for laws of exponents; b) 10 items for multiplication and division of polynomials; c) 10 items for special products; and d) 10 items for solving linear inequality in one variable. The researcher used the table of specification (See Appendix C) as a guide in determining the number of items in every competency.

- *Scoring the Test*

Every correct response of the student in the pretest/posttest in least learned competencies in Algebra is equivalent to 1 point.

- *Validation*

The administering of dry run of teacher-made test was conducted to the (44) Grade 7 students of Victoria National High School via google forms. The data collected and evaluation of (4) Mathematics specialists was used to establish the validity of the 40-item test.

- ✓ *Content Validity*

The content of the pretest/posttest was checked and validated by 4 Mathematics teachers using table of specification where each competency has its number of items based on the time allotment in the curriculum guide. In addition, each item was checked to see if it is high quality with the use of choices that are plausible but incorrect options which are good distractors.

- ✓ *Face Validity*

The face validity of the test was evaluated by 4 Mathematics teachers. The comments and suggestions were incorporated to revise and improve the test.

- ✓ *Item Analysis*

Following the dry run with 44 grade 7 students, an item analysis was used to validate items in the pretest/posttest. Item analysis was used to the test results in order to assess the test's reliability, discrimination index, and difficulty index.

- Downloading the results of test using google forms.
- The scores were arranged from highest to lowest according to scores using Excel Microsoft Office.
- Highlighting the 27% of high scoring group (12 students) to determine the upper group and 27% also from the low scoring group (12 students) for the lower group. The formula and table in Appendix F were used to obtain the discrimination index and difficulty index.

The table on Appendix G was used to determine acceptable items and those needed to be revised or discarded which data came from Appendix F (The summary of correct answers of upper and lower group per item). The reasonable difficulty index ranges from 44.60 to 74.50. On the other hand, the discrimination index ranges from 0.3 to 1.0 (Friendenberg, 1995). Those items located within the shaded region were accepted, whereas those found outside were revised or rejected.

- ✓ *Reliability of the Test*

See Appendix I for the summary of reliability test. The reliability of the test used the formula of Kuder-Richardson:

$$KR_{20} = \frac{k}{k-1} \left[1 - \frac{\sum pq}{\sigma_x^2} \right]$$

Where:

- k - total number of items
- σ_x^2 - variance of the test
- p - proportions of those who got the item correctly
- q - 1 - p
- $\sum pq$ - The sum of the products of each items p and q

- *Data Gathering Procedures*

The procedures for the data gathering in this study are the following:

- Step 1: Development of Story and Adventure-based Strategic Intervention Material.

- Step 2: Validation of the Story and Adventure-based SIM by Mathematics specialists.
- Step 3. Reproduction of Story and Adventure-based SIM
- Step 4: Validation of the Story and Adventure-based SIM by Users

➤ *Development of Strategic Intervention Material in Mathematics 7*

The least learned competencies of Grade 7 students in Victoria National High School in Mathematics 7 – Algebra during the distance learning - school years 2020-2021 and 2021-2022 were the content in a Strategic Intervention Material (SIM). The parts of a SIM include Guide Card, Activity Card, Assessment Card, Enrichment Card, Reference Card and Score Card.

➤ *Validation of the SIM by Mathematics Specialists in Mathematics 7*

After the development of the materials, it was validated by 5 Mathematics Specialists in terms of objectives, content, format and layout, presentation, and instructional characteristics. The comments and suggestions were considered in revising and improving the materials.

➤ *Reproduction of SIM in Mathematics 7*

The researcher used digital SIM in remediation inside the classroom and the respondents were provided a printed copy which served as a reviewing tool and activity worksheet.

➤ *Validation of the SIM by Users*

The clarification of the purpose of this study to the respondents was made before administering the test. The scores on posttest of control and experimental group were compared using t-test of independent samples to determine if the material helps the students in diminishing difficulties in Algebra. The posttest of the control and experimental group were also compared to determine which method is more effective in remediation.

➤ *Data Analysis*

The performance of control and experimental group through the pretest and posttest scores were compared using the t-test of mean difference to differentiate the level of the students before and after the intervention period.

The data gathered was encoded into the computer using the Statistical Package for Social Sciences (SPSS) version 20 to test the hypothesis of the study.

Hypothesis was drawn in this research.

- Ho = There is no significant difference between the posttest scores of the control and experimental group.
- Ha = There is a significant difference between the posttest scores of the control and experimental group.

The validation of SIM by Mathematics specialists was verified by a five-point evaluation scale which follows indicators on objectives, content, format and layout, presentation, and instructional characteristics as:

Scale	Range	Qualitative Rating
5	4.50 – 5	Very Evident
4	3.50 – 4.49	Evident
3	2.50 – 3.49	Moderately Evident
2	1.50 – 2.49	Less Evident
1	1.00 – 1.49	Least Evident

➤ *Ethical Considerations*

Prior to the conduct of research, the school Principal was notified through request letters in the conduct of the study. The researcher ensured that all the actions and activities were scheduled and authorized. Likewise, the researcher also sent letters to the validators for approval. With regards to the respondents, the researcher conducted orientations to seek permission and approval. The respondents were informed of the purpose and conduct of the study. The rationale and procedures of the study were explained clearly to them.

The procedures of the study were scheduled two days a week as suggested by the DepEd - Division Tarlac Province to provide intervention to the students who need guidance and practice. The study did not intend to modify the thoughts, knowledge, attitudes, feelings or behavior of the respondents.

The respondents' personal information was kept confidential. Throughout the study, students' identities were protected, and anonymity was maintained. Names in the pretest and posttest were optional. The recordings of the assessment of the respondents were not divulged without prior consent from the individuals concerned. Lastly, the researcher assured the respondents that no harm and injustice will happen to them.

CHAPTER FOUR

PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

This chapter deals with the detailed analysis of data gathered through the evaluation scale and test questionnaires. The interpretation of the findings on the research objectives are presented in this chapter.

➤ *Development of the Strategic Intervention Material (SIM)*

The topics covered in the developed SIM were based on the four least learned competencies from Algebra during the school year 2021-2022 and the past 2 school years, namely: deriving laws of exponents, multiplying and dividing polynomials, using models and algebraic methods to find the special products, and solving linear inequality in one variable.

The Strategic Intervention Material (SIM) has an integration of story and adventure-type of lesson design which underwent meticulous processes since the researcher considered the level, interest and learning styles of the participants following the research and development design.

The Strategic Intervention Material consists of different parts, the Guide Card, Activity Card, Assessment Card, Enrichment Card, Answer Card, Reference Card and Score Card which were proposed by the Department of Education.

The Guide card is the first part of the SIM, and it gives the preview of what the students will learn, competencies to be mastered and skills to be enhanced. Next is Activity Card which contains the tasks that are parallel to the focus skills that can be completed by the students individually, by pair, or by small group. The purpose is to develop focus skills by challenging students' thinking and learning.

The third part is the Assessment Card which is used in monitoring and determining the learning and understanding of students after having different drills. It can be feedback on what the students need to develop and enhance further. After the feedback, additional reinforcement activities were given in the Enrichment Card.

The Reference Card consists of resources that they can read and watch for further reading of the focus skill. Using the Answer Card, students can compare and check their answer with the answer key after completing the activities.

Last is the Score Card in which the students can see the summary of the points they got in every activity.

Evidently, the Strategic Intervention Materials (SIM) corresponds with Psychology of colors. Dzulkifli & Mustafar (2013) found in their study, "The Influence of Colour on Memory Performance: A Review", that colors help learners in memorizing certain information by increasing their attentional level. Color increases student attention. The more attention a student dedicates to stimuli, the better chance they will remember that stimuli.

Color affects behavior as well as cognitive abilities, performance, and intentions (Kumi, Conway, Limayem, & Goyal, 2013). Some scholars regard that colors help learners increase their arousal. Greene, Bell, and Boyer's (1983) study indicates that among 10 different hues, yellow shows higher arousal and evaluation results than other colors, even though there is not much difference in terms of which colors influence people's boredom.

A study conducted by Plass, Heidig, Hayward, Homer, and Um (2014) indicates that warm colors such as yellow and orange rather than cold colors such as gray used in materials can enhance students' learning.

The developed Strategic Intervention Materials (SIM) in integration of story and adventure-type based in printed form are the following:

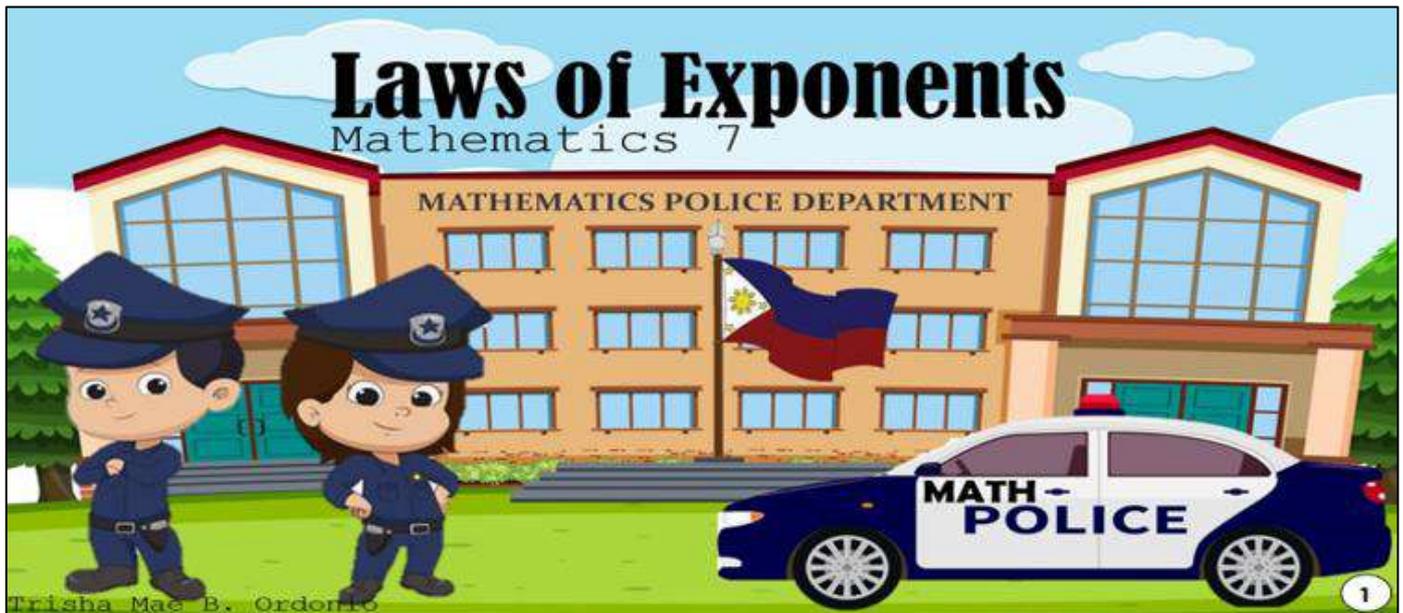
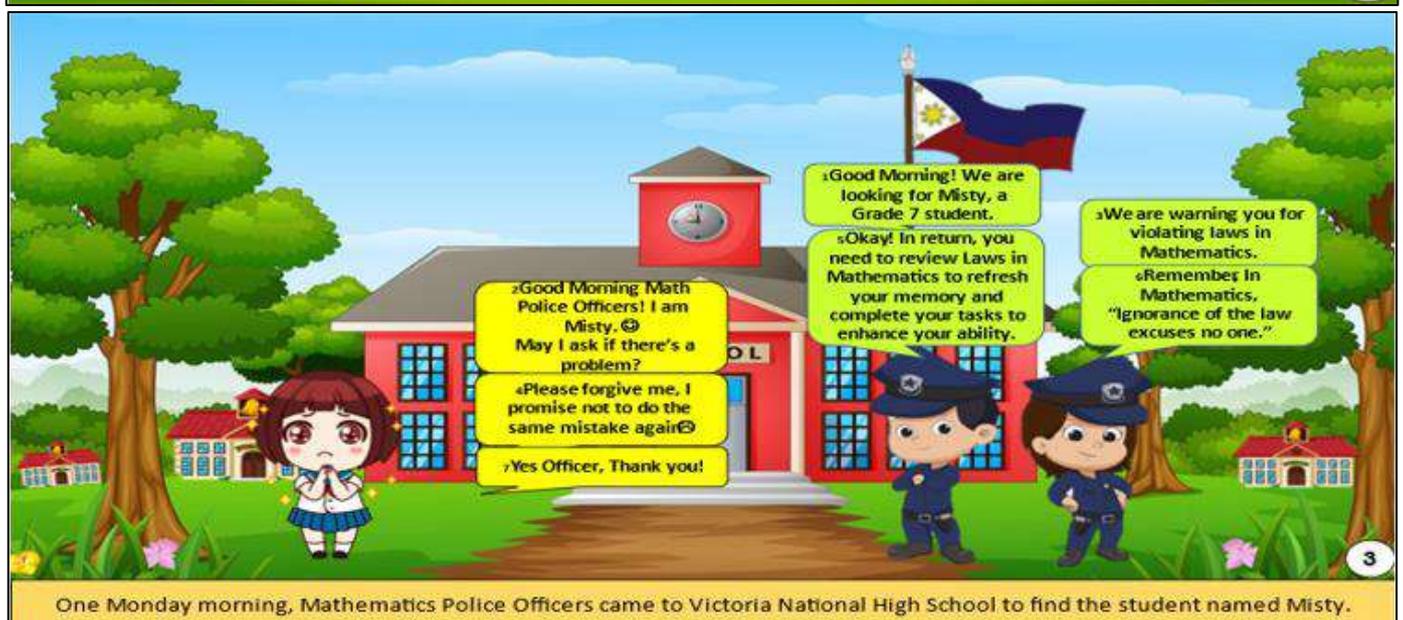


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One Monday morning, Mathematics Police Officers came to Victoria National High School to find the student named Misty.



After the conversation with the Math Police Officers, Misty went back to her classroom crying. Students from the other building heard her.

Laws of Exponents

MATHEMATICS POLICE DEPARTMENT

Learning Competency:
Derives the laws of exponent.

Objectives:

1. Identify the rule to apply in a given algebraic expression.
2. Apply laws on exponent in simplifying algebraic expressions.

Exponents are also called powers or indices. It is a symbol or a number at the upper right-hand corner of a variable or a constant.

The exponent of a number says how many times to use the number in a multiplication.

The base is the repeated factor in a product.

base → a^n ← exponent

Yes! not!

Guide Card

It's vacant time! Learning continues!

Laws of Exponents

Product of Powers

Power of a Power

Quotient of Powers

Zero Exponent

Negative Exponent

We have 5 Laws of Exponents.

SCHOOL

Guide Card

7

It's vacant time! Misty will be completing a task in a week.

Product of Powers

1 Can Assess Myself

I can do that! I'm ready to move on or explain to a friend.

I'm almost there! I may need more practice or help.

I don't understand. I need more work or help on this.

The first Law is **Product of Powers**

$(a^m)(a^n) = a^{m+n}$

In multiplying two powers that have the same base, you just **add the exponents.**

7 - BROWN

Guide Card

Do you have a question regarding Product of Powers?

Let's find keys to open the treasure in VNHS!

8

1. $(x^5)(x^4) = x^{5+4} = x^9$
2. $(a)(a^3)(a^7) = a^{1+3+7} = a^{11}$
3. $(2^2)(2^4) = 2^{2+4} = 2^6$
 $= (2)(2)(2)(2)(2)(2) = 64$
4. $(5^2)(5^2) = 5^{2+2} = 5^4$
 $= (5)(5)(5)(5) = 625$

On monday morning, Grade 7 Brown will help Misty to review the first Law of Exponent!

Victoria National High School Map

Brgy. San Gavino, Victoria, Tarlac

Misty, here is your task's Guide Map! Once you completed the tasks, you will be able to unlock the VNHS treasure! Good Luck!

Yes, Officer! Thank you. I will do my best!

Victoria National High School

Grade 7, 9, 10, 11, 12

VNHS Gym, VNHS Tennis Co., SHS-TVL, STE, Principal's Office

9

Victoria National High School Map

Brgy. San Gavino, Victoria, Tarlac

Are you ready to find the keys to unlock the treasure inside VNHS?

If yes, enter the gate, fill out a health form and sanitize!

First destination: GRADE 7 BUILDING!

You arrived! Now, answer the activity to get the 1st key!

Activity Card 10

Victoria National High School Map

Brgy. San Gavino, Victoria, Tarlac

Activity 1: Color my Power!

Instruction: Choose the answer from the colored shapes.

1. $(u^7)(u^5)$	u^{12}	u^{35}
2. $(a^3b^2)(a^4b^5)$	$a^{12} b^{10}$	$a^7 b^7$
3. $(c^4d^7e^2)(d^6)$	$c^4d^{13} e^2$	$c^{10}d^{13} e^8$

Are you ready to find the keys to unlock the treasure inside VNHS?

If yes, enter the gate, fill out a health form and sanitize!

First destination: GRADE 7 BUILDING!

You arrived! Now, answer the activity to get the 1st key!

Activity Card 11

How did you find the activity?

EASY AVERAGE HARD

1 Can Assess Myself

I can do this! I'm ready to move on or explain to a friend.

I'm almost there! I may need more practice or help.

I don't understand. I need more work or help on this.

Power of a Power

1. $(x^2)^{10} = x^{2 \cdot 10} = x^{20}$
2. $(c^5)^7 = c^{5 \cdot 7} = c^{35}$
3. $(3^2)^3 = 3^{2 \cdot 3} = 3^6$
 $= (3)(3)(3)(3)(3)(3) = 729$
4. $(10^2)^2 = 10^{2 \cdot 2} = 10^4$
 $= (10)(10)(10)(10) = 10\,000$

The Second Law is **Power of a Power**

$(a^m)^n = a^{mn}$

To raise a power to a power, just multiply the exponents.

Do you have a question regarding Power of a Power?

If none, let's complete the 2nd task!

Guide Card

Tuesday morning, Grade 7 Coral will help Misty to review the second Law of Exponen

Victoria National High School Map

Brgy. San Gavino, Victoria, Tarlac

Second destination:
VNHS GYM!

You arrived! Now, answer the activity to get the 2nd key!

Activity Card

13

Victoria National High School Map

Brgy. San Gavino, Victoria, Tarlac

Second destination:
VNHS GYM!

You arrived! Now, answer the activity to get the 2nd key!

Activity Card

14

Activity 2: Wheel of Power!

Instruction: Put an arrow to the part of the wheel which corresponds to your answer.

Quotient of Powers

1 Can Assess Myself

- I am so great! I'm ready to move on or explain to a friend.
- I'm almost there! I may need more practice or help.
- I don't understand. I need more work or help on this.

1. $\frac{x^9}{x^3} = x^{9-3} = x^6$
2. $\frac{a^5}{a} = a^{5-1} = a^4$
3. $\frac{2^7}{2^4} = 2^{7-4} = 2^3$
 $= (2)(2)(2) = 8$

The Third Law is Quotient of Powers.

$$\frac{a^m}{a^n} = a^{m-n}$$

To divide two powers with the same base, subtract the exponents.

Guide Card

Do you have any question regarding Quotient of a Powers?

Let's collect more keys!

15

Wednesday morning, Grade 7 Gray will help Misty to review the third Law of Exponen

Victoria National High School Map

Brgy. San Gavino, Victoria, Tarlac

Third destination:
SHS-TVL!

You arrived! Now, answer the activity to get the 3rd key!

Activity Card
16

Victoria National High School Map

Brgy. San Gavino, Victoria, Tarlac

Activity 3: The Power of Light!

Instruction: Make the lights on by choosing the right switch!

1.

b^{25}

b^{15}

2.

25

5

3.

$x^4 y^4$

$x^{20} y^4$

Activity Card
17

1 Can Assess Myself

I can do this! I'm ready to move on or explain to a friend!

I'm almost there! I may need more practice or help.

I don't understand. I need more work or help on this.

Guide Card

Zero Exponent

1. $a^0 = 1$
2. $100^0 = 1$
3. $x^0 + 2 = 1 + 2 = 3$
4. $5c^0 = 5(1) = 5$
5. $52,121^0 - 1 = 1 - 1 = 0$

The Fourth Law is Zero Exponent Rule.

$a^0 = 1; a \neq 0$

If the exponent is 0 and whatever the base is, the result is 1.

Do you have a question regarding Zero Exponents?

If none, try the fourth activity!

18

Victoria National High School Map

Brgy. San Gavino, Victoria, Tarlac

Fourth destination:
GRADE 8!

You arrived! Now, answer the activity to get the 4th key!

Activity Card
19

Victoria National High School Map

Brgy. San Gavino, Victoria, Tarlac

Activity 4: The Power of Zero

Instruction: Match Column A to Column B.

Column A	Column B
1. $(3x)^0 - 1$	-2
2. 200^0	-1
3. $1 + (-5)^0$	2
4. $-(25)^0$	0
	1

Activity Card
20

Negative Exponent

I Can Assess Myself

I can do this! I'm ready to move on or explain to a friend.

I'm almost there! I may need more practice or help.

I don't understand. I need more work or help on this.

Guide Card

$$1. x^{-8} = \frac{1}{x^8}$$

$$2. \frac{a^5 b^{-2}}{c^3} = \frac{a^5 \cancel{b^{-2}}}{c^3} = \frac{a^5}{b^2 c^3}$$

$$3. \frac{x^{-2} y^4}{u^3 z^{-3}} = \frac{\cancel{x^{-2}} y^4}{u^3 \cancel{z^{-3}}} = \frac{y^4 z^3}{u^3 x^2}$$

$$4. 2^{-4} = \frac{1}{2^4} = \frac{1}{(2)(2)(2)(2)} = \frac{1}{16}$$

The Fifth Law is Negative Exponent.

$$a^{-n} = \frac{1}{a^n}$$

If the exponent is negative, we need to change it into positive exponent by writing the same in the denominator and 1 in the numerator.

Do you have a question regarding Negative Exponents?

If none, let's finish the task!

Guide Card
21

Last day of the week. Grade 7 Violet will help Misty to review the fifth Law of Exponent!

Victoria National High School Map

Brgy. San Gavino, Victoria, Tarlac

Fifth destination:
GRADE 10!

You arrived! Now, answer the activity to get the 5th key!

Victoria National High School Map

Brgy. San Gavino, Victoria, Tarlac

Activity 5: Pick my PowerFruits!

Instruction: Pick a fruit that answers the algebraic expression in a basket.

1.

2.

3.

Fifth destination:
GRADE 10!

You arrived! Now, answer the activity to get the 5th key!

How did you find the activity?

EASY
 AVERAGE
 HARD

Victoria National High School Map

Brgy. San Gavino, Victoria, Tarlac

Final destination:
Principal's Office!

You arrived! Last key to find!

Victoria National High School Map

Brgy. San Gavino, Victoria, Tarlac

Assessment: "Complete my powers"!
Fill out the law used in every item and write its simplest form.

A. Given	B. Law of Exponent	C. Simplest form
Example: $\frac{3^5}{3^3}$	Quotient of Powers	$3^2 = 9$
1. $(m^{-7})^{11}$		
2. $(a^{-7})(a^6)$		
3. $(5x)^0$		
4. 5^{-2}		
5. 3000^0		
6. $(n^{-3})(n^2)(n^4)$		
7. $\frac{b^{10}}{b^5}$		
8. c^6d^{-3}		
9. $(b^{-2}c^3)^4$		
10. $\frac{c^6d^3}{c^4}$		

Final destination:
Principal's Office!

You arrived! Last key to find!



Victoria National High School Map

Brgy. San Gavino, Victoria, Tarlac



DANGAL, HUSAY at TAGUMPAY!

26

MATHEMATICS POLICE DEPARTMENT



Good to hear that, Misty! You may now continue learning the next lesson in Mathematics!

Good Morning, Math Police Officers! I am here to report that I reviewed the Laws of Exponents and I'm already an expert!

The following week, Misty visited in the Mathematics Police Department to talk with the officers.

27

Enrichment Activity.
Direction: Shade the answer to proceed on the next question until you reach the END of the maze.

START $(a^2)(a^4)$ a^6 $-(5x)^0$ 0 $(y^7)(y^7)$ y^{14} $2 - (49a)^0$

a^8 $\frac{1}{-32}$ -1 1 y^{49} 1 1

2^{-5} 32 z^{-4} $\frac{1}{z^4}$ $\frac{b^7}{b^2}$ b^5 $(u^4)^4$

$\frac{1}{32}$ z^4 $\frac{1}{z^{-4}}$ u^{14} b^9 u^8 u^{16}

$(yz^3)^5$ y^5z^{15} 6^{-2} u^{40} $(u^4)^{10}$ x^4 $(x)(x^3)$

yz^{15} 36 0 $\frac{1}{36}$ u^{41} x^2 x^3

END 1 $(49a)^0$ u $\frac{u^{21}}{u^{20}}$ x^{13} $\frac{x^8}{x^5}$

That's Great!

How did you find the activity?
EASY AVERAGE HARD

Enrichment Card 28

You may visit these Video Links:
<https://www.youtube.com/watch?v=LkhPRz7Hocg&list=PLUPEBWbAHUsym6gcZi7rfeysMRxIrnLrf&index=5>
<https://youtu.be/PDoevSsSDKE>
<https://youtu.be/xPTVkv6yfX0>
https://youtu.be/55dQ_aWJKX0

Books:
 Oronce, A.O., Mendoza, M.O. (2019), EMath Worktext in Mathematics 7, Manila: Rex Bookstore, Inc.
 Tuazon, R.A., Guray, S.B. (2017), iMath 7: K to 12 Curriculum Series, iBook Publishing Inc.

Reference Card 29

Activity 1 Color my Power!
 1. $(u^7)(u^5) = u^{12}$
 2. $(a^3b^2)(a^4b^5) = a^7b^7$
 3. $(c^4d^7e^2)(d^6) = c^4d^{13}e^2$

Activity 2 Wheel of Power!
 1. $(t^9)^3 = t^{27}$
 2. $(t^3u^2)^3 = t^9u^6$
 3. $t^3(u^5)^2 = t^3u^{10}$

Activity 3 The Power of Light!
 1. $\frac{b^{20}}{b^5} = b^{15}$
 2. $\frac{5^3}{5} = 25$
 3. $\frac{x^{12}}{x^8} = x^4y^4$

Activity 4 The Power of Zero!
 1. $(3x)^0 - 1 = 0$
 2. $200^0 = 1$
 3. $1 + (-5)^0 = 2$
 4. $-(25)^0 = -1$

Activity 5: Pick my PowerFruits!
 1. $a^{-5} = \frac{1}{a^5}$
 2. $3^{-2} = \frac{1}{9}$
 3. $xy^{-8} = \frac{x}{y^8}$

Assessment: "Complete my powers"!
 Fill out the law used in every item and write its simplest form.

A. Given	B. Law of Exponent	C. Simplest form
Example: $\frac{3^5}{3^3}$	Quotient of Powers	$3^2 = 9$
1. $(m^7)^{11}$	Power of a Power	m^{77}
2. $(a^7)(a^6)$	Product of Powers	a^{13}
3. $(5x)^0$	Zero Exponent	1
4. 5^{-2}	Negative Exponent	$\frac{1}{25}$
5. 3000^0	Zero Exponent	1
6. $(n^3)(n^2)(n^4)$	Product of Powers	n^9
7. $\frac{b^{10}}{b^5}$	Quotient of Powers	b^5
8. c^6d^{-3}	Negative Exponent	$\frac{c^6}{d^3}$
9. $(b^2c^3)^4$	Power of a Power	b^8c^{12}
10. $\frac{c^6d^2}{c^4}$	Quotient of Powers	c^2d^2

Answer Key 30

Enrichment Activity.
 Direction: Shade the answer to proceed on the next question until you reach the END of the maze.

START $(a^2)(a^4)$ a^6 $-(5x)^0$ 0 $(y^7)(y^7)$ y^{14} $2 - (49a)^0$

a^8 $\frac{1}{-32}$ -1 1 y^{49} 1

2^{-5} 32 z^{-4} $\frac{1}{z^4}$ $\frac{b^7}{b^2}$ b^5 $(u^4)^4$

$\frac{1}{32}$ z^4 $\frac{1}{z^{-4}}$ u^{14} b^9 u^8 u^{16}

$(yz^3)^5$ y^5z^{15} 6^{-2} u^{40} $(u^4)^{10}$ x^4 $(x)(x^3)$

yz^{15} 36 0 $\frac{1}{36}$ u^{41} x^2 x^3

END $(49a)^0$ 1 u $\frac{u^{21}}{u^{20}}$ x^{13} $\frac{x^8}{x^5}$ x^3

That's Great! **OK!** Answer Card 31

Activity No.	Name of the Activity	No. of Items	Score
1	Color my Power!	3	
2	Wheel of Power!	3	
3	The Power of Light!	3	
4	The Power of Zero!	4	
5	Pick my Power Fruits!	3	
6	Assessment: Complete my powers!	20	
7	Enhancement Activity	10	
Total			

Score Card 32

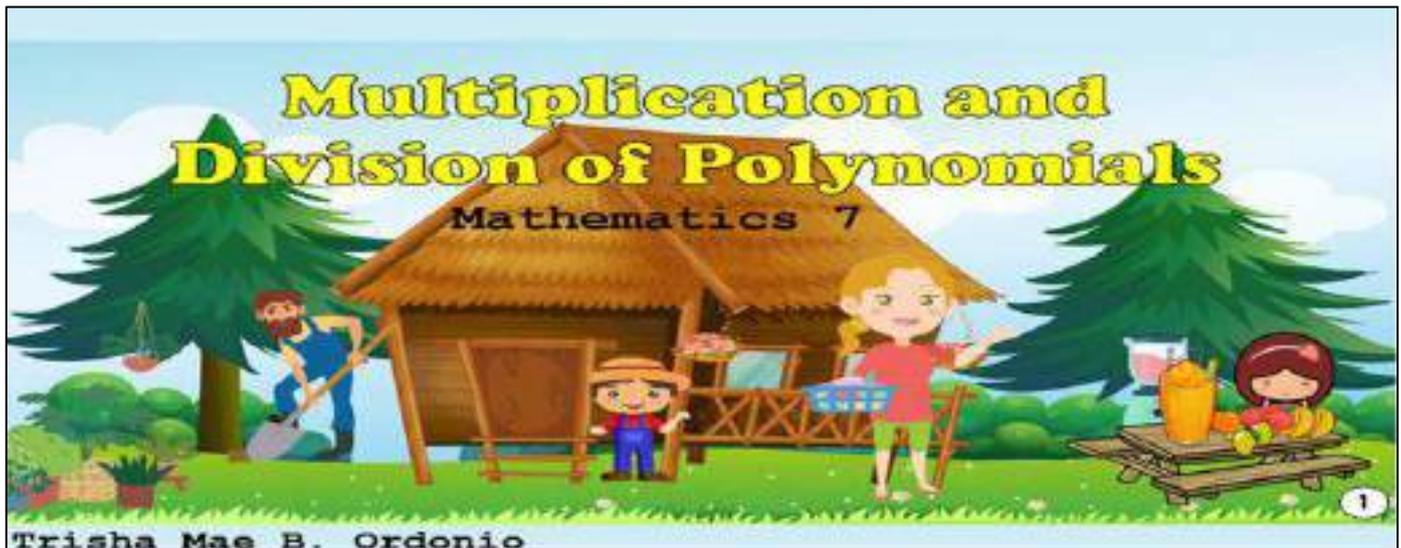


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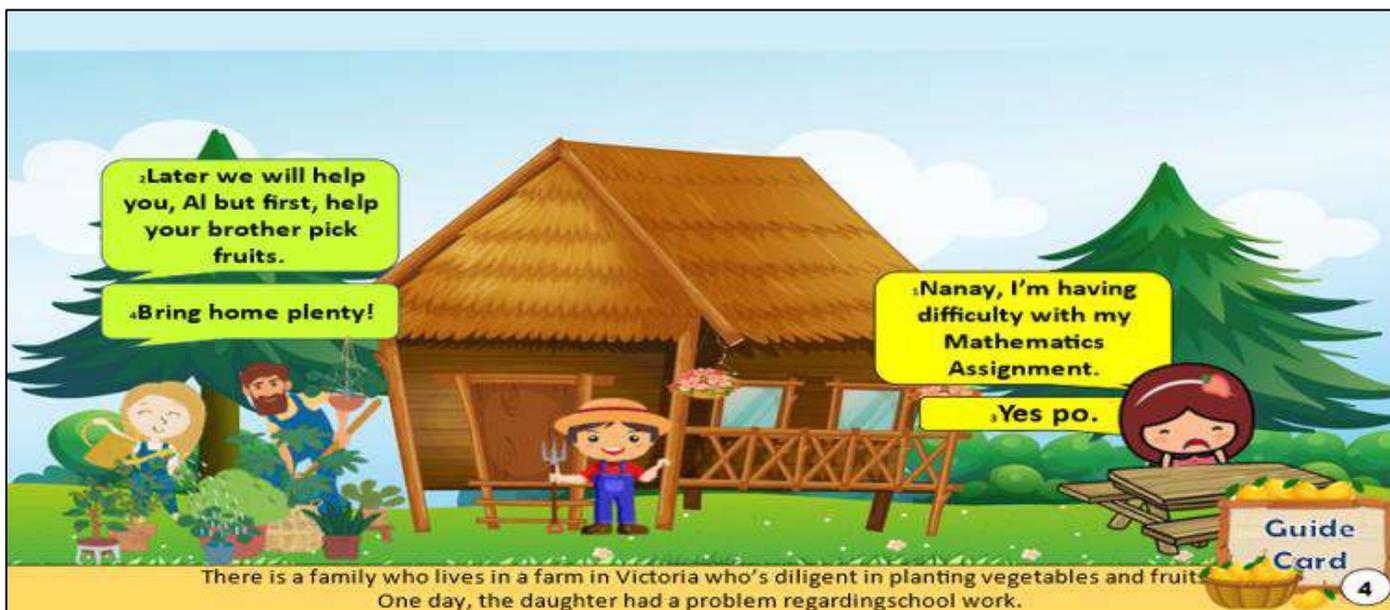
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Monomial to a Binomial	9
Monomial to a Trinomial	10
Binomial to a Binomial	13
Binomial to a Trinomial	15
Division of Polynomials:	
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Multiplying and Dividing Polynomials

Learning Competency:
Multiplies and divides polynomials.

Objectives:

1. Multiply polynomials using the distributive and FOIL method.
2. Divide polynomials by splitting terms method and long division.
3. Apply the concept of multiplication and division of polynomials in daily life situations.



What's the result?
That's right! It's the same with Multiplying polynomials.

Let's make fruit shake!
Put all the fruits on the table.
Let's try to shake mangoes and oranges!
Press the blender!
We are mixing polynomials to create a product.

Orange-Mango Shake!
How?

Now, the family will make something delicious out of the harvested fruits!

Multiplying Polynomials

Multiplication is one of the arithmetic operations which can be applied to polynomials. Polynomials can be easily multiplied with the use of rules and application of Laws of Exponents.

In polynomials, there are different ways of multiplying based on their types. The methods we will use in the discussion to solve for the product are

The Distributive Property, FOIL Method and Vertical Method.

Monomial to a Binomial

To find the **product of a monomial and a binomial** use **Distributive Property**. Multiply the monomial by each term in the binomial.

a. $5x(2x - 4)$

$5x(2x - 4) = 10x^2 - 20x$

Multiply $5x$ by $2x$.
Multiply $5x$ by -4 .

b. $2x^2(3x + 1)$

$2x^2(3x + 1) = 6x^3 + 2x^2$

Multiply $2x^2$ by $3x$.
Multiply $2x^2$ by 1 .

Monomial to a Trinomial

To find the **product of a monomial and a binomial**, use **Distributive Property**. Multiply the monomial by each term in the trinomial.

a. $6x(2x^2 - x + 5)$

$$6x(2x^2 - x + 5)$$

Multiply $6x$ by $2x^2$.
 Multiply $6x$ by $-x$.
 Multiply $6x$ by 5 .

$6x(2x^2 - x + 5)$ →

$12x^3 - 6x^2 + 30x$



10

Monomial to a Trinomial

b. $7b^2(4b^3 - 5b^2 - 1)$

$$7b^2(4b^3 - 5b^2 - 1)$$

Multiply $7b^2$ by $4b^3$.
 Multiply $7b^2$ by $-5b^2$.
 Multiply $7b^2$ by -1 .

$7b^2(4b^3 - 5b^2 - 1)$ →

$28b^5 - 25b^5 - 7b^2$

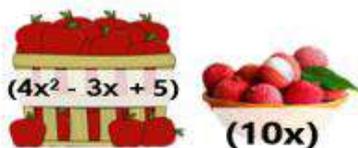
I Can... Assess Myself!

- I can do this! I'm ready to make an explanation to a friend!
- I'm almost there! I may need more practice or help!
- I don't understand. I need more work or help on this.

11

Activity 1: How many fruit shake can we make?

Shake A



1. How much apple-lychee shake can we make?



- a. $A = 40x^3 + 30x^2 + 50x$
- b. $A = 40x^3 + 30x^2 - 50x$
- c. $A = 40x^3 - 30x^2 + 50x$

Shake B



2. How much berry shake can we make?



- a. $B = -3x^4 - 15x^3 + 24x^2$
- b. $B = 3x^4 - 15x^3 + 24x^2$
- c. $B = 3x^4 + 15x^3 - 24x^2$

I found the activity...

Very Easy Easy Medium Hard Very Hard

Activity Card

12

Binomial to a Binomial

To find the **product of two binomials**, use the **FOIL Method**. It arises out of the distributive property.

In the two binomials, multiply the **First terms**, **Outer terms**, **Inner terms** and **Last terms**. For the last step, **combine like terms**.

a. $(6x+2)(x+2)$

$(6x+2)(x+2)$

Multiply the:

First terms: $(6x)(x) = 6x^2$
 Outer terms: $(6x)(2) = 12x$
 Inner terms: $(2)(x) = 2x$
 Last terms: $(2)(2) = 4$

$6x^2 + 12x + 2x + 4$ ← Combine like terms

$6x^2 + 14x + 4$



13

Binomial to a Binomial

b. $(3x^2-1)(x-3)$

$(3x^2-1)(x-3)$

Multiply the:

First terms: $(3x^2)(x) = 3x^3$
 Outer terms: $(3x^2)(-3) = -9x^2$
 Inner terms: $(-1)(x) = -x$
 Last terms: $(-1)(-3) = 3$

No Like terms, therefore,
 $(3x^2-1)(x-3) =$

$3x^3 - 9x^2 - x + 3$



14

Binomial to a Trinomial

Distributive Property. Distribute the first and second term of the binomial I to each term of the other polynomial.

a. $(5x + 3)(9x^2 - x + 3)$

First, multiply 5x to $9x^2 - x + 3$.

Next, multiply 3 to $9x^2 - x + 3$.

$5x(9x^2 - 3x + 3) + 3(9x^2 - 3x + 3)$

$45x^3 - 15x^2 + 15x + 27x^2 - 9x + 9$

Combine like terms

$45x^3 - 15x^2 + 15x + 27x^2 - 9x + 9$

$45x^3 + 12x^2 + 6x + 9$



15

Binomial to a Trinomial

Distributive Property. Distribute the first and second term of the binomial I to each term of the other polynomial.

$$b. (3x^2 - 4)(x^2 - 6x - 7)$$

First, multiply $3x^2$ to $x^2 - 6x - 7$.

$$3x^2(x^2 - 6x - 7)$$

$$3x^4 - 18x^3 - 21x^2$$

Next, multiply -4 to $x^2 - 6x - 7$.

$$-4(x^2 - 6x - 7)$$

$$-4x^2 + 24x + 28$$

Combine like terms

$$3x^4 - 18x^3 - 21x^2 - 4x^2 + 24x + 28$$

$$3x^4 - 18x^3 - 25x^2 + 24x + 28$$



Binomial to a Trinomial

Distributive Property. Distribute the first and second term of the binomial I to each term of the other polynomial.

$$b. (3x^2 - 4)(x^2 - 6x - 7)$$

First, multiply $3x^2$ to $x^2 - 6x - 7$.

$$3x^2(x^2 - 6x - 7)$$

$$3x^4 - 18x^3 - 21x^2$$

Next, multiply -4 to $x^2 - 6x - 7$.

$$-4(x^2 - 6x - 7)$$

$$-4x^2 + 24x + 28$$

Combine like terms

$$3x^4 - 18x^3 - 21x^2 - 4x^2 + 24x + 28$$

$$3x^4 - 18x^3 - 25x^2 + 24x + 28$$



To find the product of any two polynomials, use **Vertical Method**.

$$(x^3 + 4x^2 - 2x + 6)(2x + 7)$$

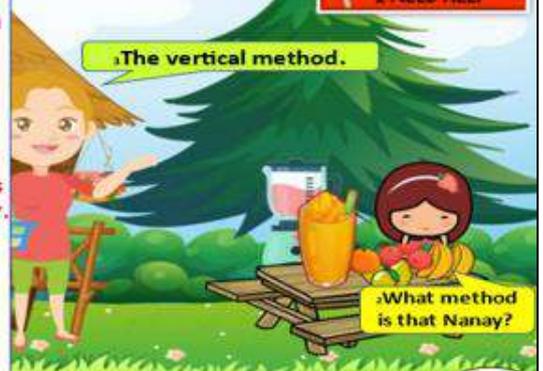
$$\begin{array}{r}
 x^3 + 4x^2 - 2x + 6 \\
 \times \quad \quad \quad 2x + 7 \\
 \hline
 +28x^2 - 14x + 42 \\
 + \quad +8x^3 - 4x^2 + 12x \\
 \hline
 +15x^3 + 24x^2 - 2x + 42
 \end{array}$$

Multiply each term in the top by 7.

Multiply each term in the top by 2x.

Combine like terms by adding vertically.

The vertical method.



What method is that Nanay?

Activity 2: Find the area of the farms.

Farm A
 $(3x + 3)$



$(2x - 1)$

1. Can you find the area of Farm A?

2. What is the area of Farm B?

Farm B
 $(2x - 3)$



$(4x + 2)$

3. If $x=3$, Which farm has the larger area?



Activity 2: Find the area of the farms.

Farm C
 $(x^2 + 2x - 1)$

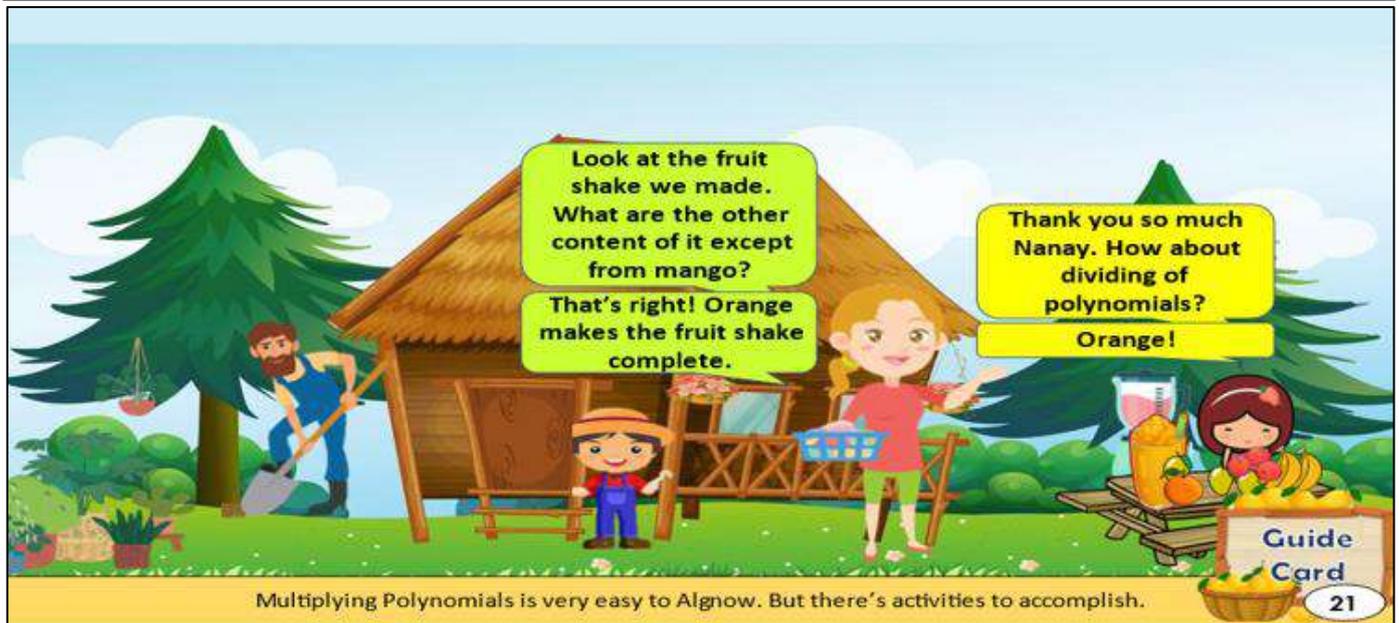


$(x + 2)$

4. Can you find the area of the Rice Field?

5. If $x=20$, what is the area in terms of square meters?





Look at the fruit shake we made. What are the other content of it except from mango?

That's right! Orange makes the fruit shake complete.

Thank you so much Nanay. How about dividing of polynomials?
Orange!

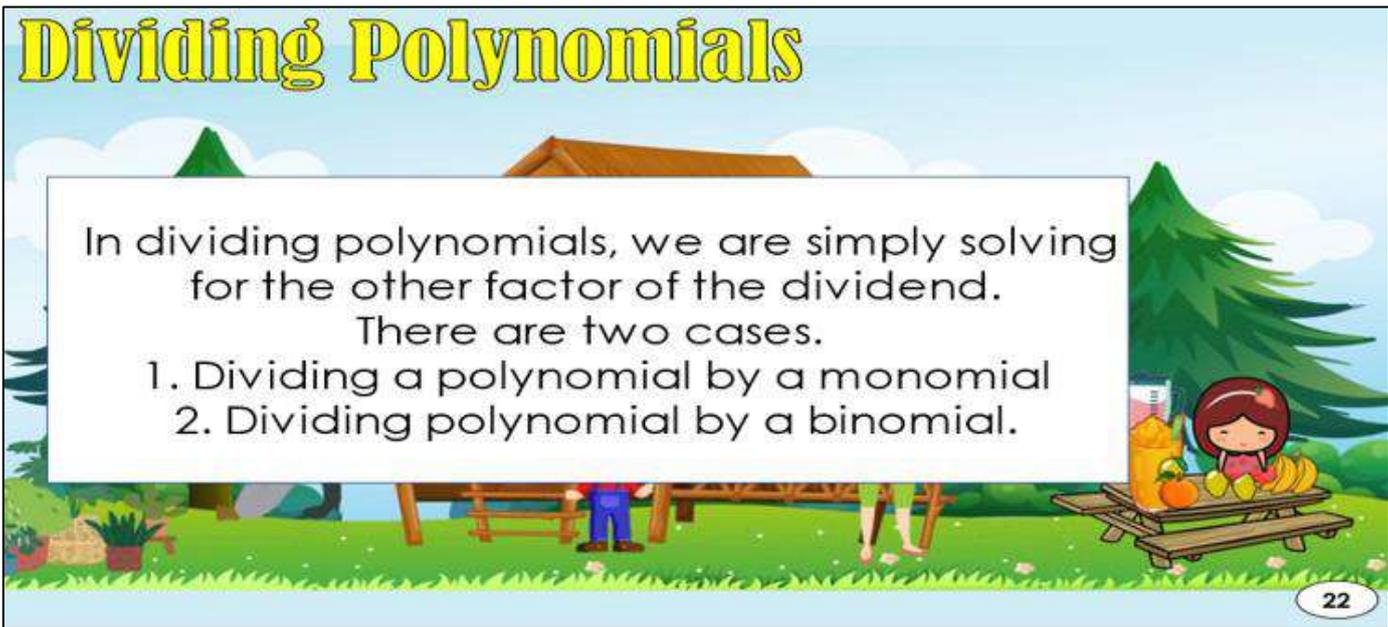


Multiplying Polynomials is very easy to Algnow. But there's activities to accomplish.

Dividing Polynomials

In dividing polynomials, we are simply solving for the other factor of the dividend.
There are two cases.

1. Dividing a polynomial by a monomial
2. Dividing polynomial by a binomial.



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Polynomial by a Monomial

If a polynomial is divided by a monomial, divide each term of the polynomial by the monomial.

a. $\frac{3y^5 + 12y^4 - 18y^2}{3y}$

Divide each term of the polynomial by 3y.

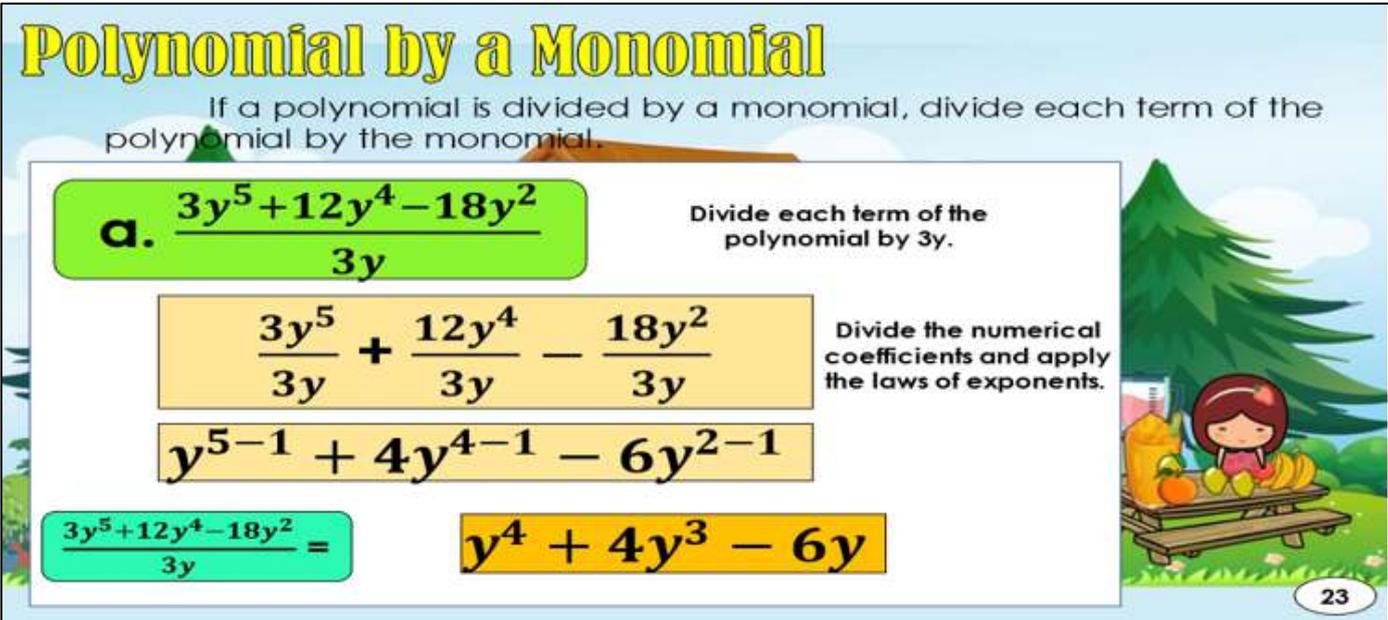
$$\frac{3y^5}{3y} + \frac{12y^4}{3y} - \frac{18y^2}{3y}$$

Divide the numerical coefficients and apply the laws of exponents.

$$y^{5-1} + 4y^{4-1} - 6y^{2-1}$$

$$\frac{3y^5 + 12y^4 - 18y^2}{3y} =$$

$$y^4 + 4y^3 - 6y$$



23

Polynomial by a Monomial

If a polynomial divided by a monomial, divide each term of the polynomial by the monomial.

b. $\frac{12a^9b^7 - 8a^8b^6 - 14a^5b^2}{-2a^2b^2}$

Divide each term of the polynomial by $-2a^2b^2$.

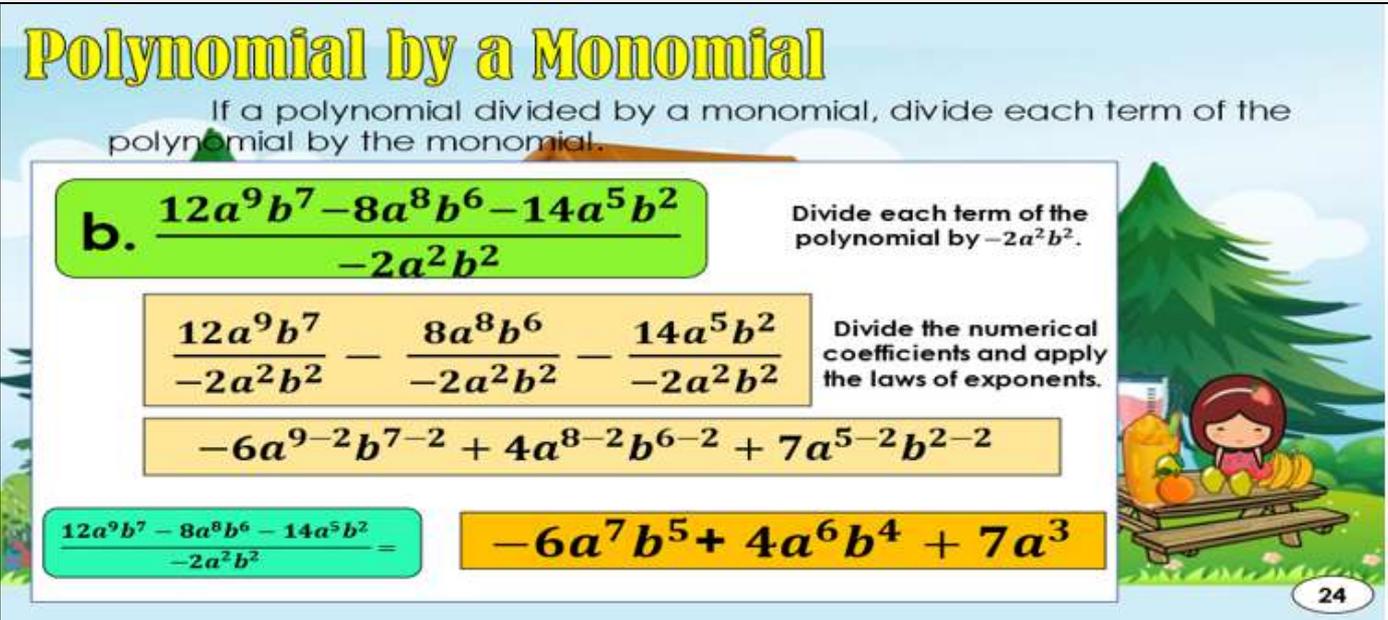
$$\frac{12a^9b^7}{-2a^2b^2} - \frac{8a^8b^6}{-2a^2b^2} - \frac{14a^5b^2}{-2a^2b^2}$$

Divide the numerical coefficients and apply the laws of exponents.

$$-6a^{9-2}b^{7-2} + 4a^{8-2}b^{6-2} + 7a^{5-2}b^{2-2}$$

$$\frac{12a^9b^7 - 8a^8b^6 - 14a^5b^2}{-2a^2b^2} =$$

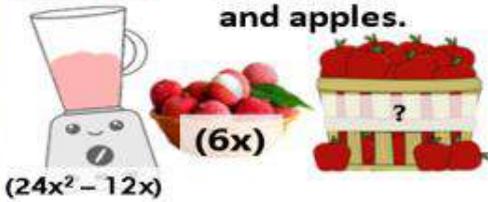
$$-6a^7b^5 + 4a^6b^4 + 7a^3$$



24

Activity 3: What is the amount of the fruit in the shake?

Shake A contains lychee and apples.



$(24x^2 - 12x)$

1. What is the amount of apple in the shake?

$(24x^2 - 12x) \div (6x)$

- a. $4x - 2$
- b. $4x^2 - 2x$
- c. $4x + 2$

Shake B contains berries.



$(6x^6 - 20x^5 - 12x^4)$

2. What is the amount of strawberry in the shake?

$(6x^6 - 20x^5 - 12x^4) \div (2x^2)$

- a. $3x^4 + 10x^3 - 6x^2$
- b. $3x^4 - 10x^3 + 6x^2$
- c. $3x^4 - 10x^3 - 6x^2$



Polynomial by a Binomial

If a polynomial is divided by a binomial, use the long division.

a. $(x^3 + 4x^2 - 2x - 12) \div (x + 2)$

Dividend

Divisor

1. Arrange all the terms of both dividend and divisor from highest degree to lowest degree. $x^3 + x^2 + x + x^0$

2. Set up using the long division.

$$x + 2 \overline{) x^3 + 4x^2 - 2x - 12}$$



Polynomial by a Binomial

3. Find the first term of the quotient by dividing the first term of the dividend by the first term of the divisor.

$$x + 2 \overline{) x^3 + 4x^2 - 2x - 12} \quad \text{Divide } x^3 \text{ by } x = x^2$$

4. Multiply every term in the divisor $(x + 2)$ by the first term of the quotient (x^2) .

$$\begin{array}{r} x^2 \\ x + 2 \overline{) x^3 + 4x^2 - 2x - 12} \\ \underline{x^3 + 2x^2} \end{array}$$

Multiply $x^2(x + 2) \longrightarrow x^3 + 2x^2$



Polynomial by a Binomial

5. Subtract the product from the dividend by changing the signs of every term of the product.

$$\begin{array}{r}
 x^2 \\
 x + 2 \overline{) x^3 + 4x^2 - 2x - 12} \\
 \underline{-x^3 + 2x^2} \\
 2x^2
 \end{array}$$

Change the signs of each term to its opposite. \rightarrow $-x^3 + 2x^2$

Add: $4x^2 + (-4x^2) = 2x^2$

6. Bring down the next term, write it next to $2x^2$

$$\begin{array}{r}
 x^2 \\
 x + 2 \overline{) x^3 + 4x^2 - 2x - 12} \\
 \underline{-x^3 + 2x^2} \\
 2x^2 - 2x
 \end{array}$$

Change the signs of each term to its opposite. \rightarrow $-x^3 + 2x^2$

Bring down the next term: $-2x$.



Polynomial by a Binomial

7. Use the last expression as the dividend, then repeat the process from step 1 until the remainder cannot be divided any further.

$$\begin{array}{r}
 x^2 + 2x - 6 \\
 x + 2 \overline{) x^3 + 4x^2 - 2x - 12} \\
 \underline{-x^3 + 2x^2} \\
 2x^2 - 2x \\
 \underline{-2x^2 + 4x} \\
 -6x - 12 \\
 \underline{\pm 6x \pm 12} \\
 X
 \end{array}$$

Divide $2x^2$ by $x = 2x$ \rightarrow $2x^2 - 2x$

Multiply $2x(x + 2)$ \rightarrow $-2x^2 + 4x$

Divide $-6x$ by $x = -6$ \rightarrow $-6x - 12$

Multiply $-6(x + 2)$ \rightarrow $\pm 6x \pm 12$

To subtract, change the signs. Bring down -12



Polynomial by a Binomial

a. $(x^3 + 4x^2 - 2x - 12) \div (x + 2) =$

$x^2 + 2x - 6$

$$\begin{array}{r}
 x^2 + 2x - 6 \\
 x + 2 \overline{) x^3 + 4x^2 - 2x - 12} \\
 \underline{-x^3 + 2x^2} \\
 2x^2 - 2x \\
 \underline{-2x^2 + 4x} \\
 -6x - 12 \\
 \underline{\pm 6x \pm 12} \\
 X
 \end{array}$$

Divide $2x^2$ by $x = 2x$ \rightarrow $2x^2 - 2x$

Multiply $2x(x + 2)$ \rightarrow $-2x^2 + 4x$

Divide $-6x$ by $x = -6$ \rightarrow $-6x - 12$

Multiply $-6(x + 2)$ \rightarrow $\pm 6x \pm 12$

To subtract, change the signs. Bring down -12



Polynomial by a Binomial

b. $(5x^2 + 11x - 12) \div (x + 3) =$

$5x - 4$

$$\begin{array}{r}
 - 4 \\
 x + 3 \overline{) 5x^2 + 11x - 12} \\
 \underline{-5x^2 + 15x} \\
 4x - 12 \\
 \underline{-4x + 12} \\
 0
 \end{array}$$

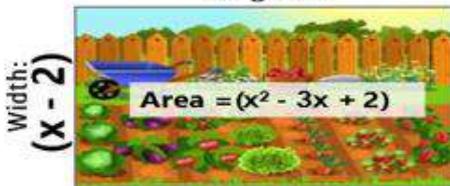
To subtract, change the signs.
Bring down -12
 To subtract, change the signs.



Activity 4: Find the lengths of the farms

Farm A

Length: ?

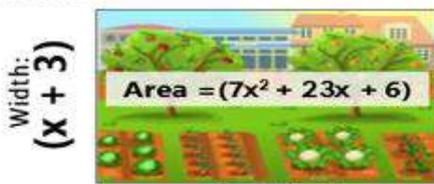


1. Can you solve for the length of Farm A?

length = $(x^2 - 3x + 2) \div (x - 2)$

- a. $(x - 4)$ b. $(x - 1)$ c. $(x - 5)$

Farm B



Length: ?

2. What is the length of Farm B?

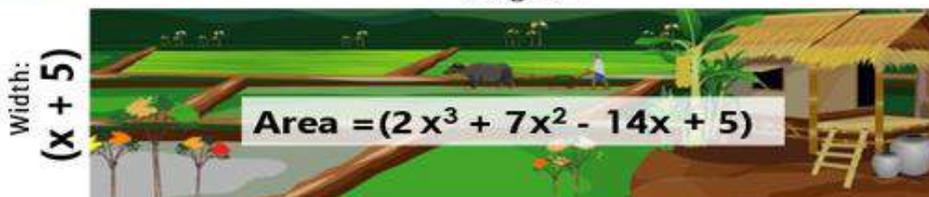
length = $(7x^2 + 23x + 6) \div (x + 3)$

- a. $(7x + 2)$ b. $(7x - 2)$ c. $(7x - 1)$

Activity 4: Find the lengths of the farms

Farm C

Length: ?



3. Can you find the area of the Rice Field?

length = $(2x^3 + 7x^2 - 14x + 5) \div (x + 5)$

- a. $2x^2 + 3x + 1$
 b. $2x^2 - 3x - 1$
 c. $2x^2 - 3x + 1$

4. If $x = 10$, what is the length in terms of meters?

- a. 261 meters
 b. 271 meters
 c. 281 meters





34

“BULL’S EYE MULTIPLY!”

Direction: Target the zone which corresponds to the product of the polynomials. Choices are the same color with the box.

1. $10a(-2a^2 - a + 4)$
2. $-3b^2(7b^5 - b^3 - b)$
3. $-20c^5(c^2 - 2c - 1)$
4. $(m-5)(m-2)$
5. $(5x-4)(2x+3)$

I Can Assess Myself

I can do this! I'm ready to move on or explain to a friend.

I'm almost there! I may need more practice or help.

I don't understand. I need more work or help on this.

Assessment Card

35

“BULL’S EYE DIVIDE!”

Direction: Target the zone which corresponds to the quotient of the polynomials. Choices are the same color with the box.

1. $\frac{-12a^6 + 15a^4 + 21a^2}{3a^2}$
2. $\frac{8b^5 - 24b^4 + 48b^3 - 16b^2}{8b^2}$
3. $\frac{-10c^3 - 25c^2 + 45c}{-5c}$
4. $(3m^3 - 6m^2 - 4m + 2) \div (m + 1)$
5. $(2x^2 + 9x - 35) \div (x + 7)$

Assessment Card

36

Enrichment Activity 1: Spin the wheel five times and perform multiplication on the polynomials which the arrow stops.

1 Can Assess Myself

- I can do this! I'm ready to move on or explain to a friend.
- I'm almost there! I may need more practice or help.
- I don't understand. I need more work or help on this.

Enrichment Card 37

Enrichment Activity 2: Spin the wheel five times and perform division on the polynomials which the arrow stops.

Enrichment Card 38

You may visit these Video Links:

- <https://youtu.be/mxfk1OWueFk>
- <https://youtu.be/goL6H8Ui6yI>
- <https://youtu.be/fd0J7wQ9pk0>

Books:

- Oronce, A.O., Mendoza, M.O.(2019), EMath Worktext in Mathematics 7, Manila: Rex Bookstore, Inc.
- Tuazon, R.A., Guray, S.B.(2017), iMath 7: K to 12 Curriculum Series, iBook Publishing Inc.

Reference Card 39

Activity 1: "How many fruit shake can we make?"

1. $c.A = 40x^3 - 30x^2 + 50x$

2. $b.B = 3x^4 - 15x^3 + 24x^2$

Activity 2: "Find the area of the farms!"

1. $A = 6x^2 + 3x - 3$

2. $B = 8x^2 - 8x - 6$

3. **Farm A has the larger area.**

4. $C = x^3 + 4x^2 + 3x - 2$

5. $C = 9\ 658\ m^2$

Activity 3: What is the amount of the fruit in the shake?

1. $a. 4x - 2$

2. $c. 3x^4 - 10x^3 - 6x^2$

Activity 4: Find the lengths of the farms.

1. $b. (x - 1)$

2. $a. (7x + 2)$

3. $c. 2x^2 - 3x + 1$

4. $b. 271\ meters$

Assessment:

Multiplication of Polynomials

1. $-20a^3 + 10a^2 + 40a$

2. $-21b^7 + 3b^5 + 3b^3$

3. $-20c^7 + 40c^6 + 20c^5$

4. $m^2 - 7a + 10$

5. $10x^2 + 7x - 12$

Division of Polynomials

1. $-4a^4 + 5a^2 + 7$

2. $b^3 - 3b^2 + 6b - 2$

3. $2c^2 + 5c - 9$

4. $3m^2 - 6m + 2$

5. $2x - 5$



Answer Key

40

Enrichment Activity A:

Multiplication of Polynomials

1. $-25a^5 + 15a^3 - 35a^2$

2. $b^3 - 16b^2 + 8b$

3. $20x^2 - 58x + 48$

4. $a^3 - 5a^2 + 5a - 1$

5. $56y^2 + 12y - 20$

6. $35x^9 - 35x^6$

7. $25u^3 - 10u^2$

8. $u^3 - u^2 - u + 1$

9. $2c^3 + 12c^2 + 14c$

10. $-5x^2 + 13x - 6$

Enrichment Activity B:

Division of Polynomials

1. $2x^4y^5 - 9x^3y^4 - \frac{9x^2y^2}{2}$

2. $x^2 + 2x + 1$

3. $-5a^2 - 4a + 8$

4. $x^2 - 55x + \frac{144}{x+3}$

5. $7x^4 + 2x^2 + x$

6. $3x - 5$

7. $-7v^5 + 2v^4 - 10v^2$

8. $x^2 + 2x - 1$

9. $-u^8v^4 + u^6v^2 - v$

10. $9x - 4$



Answer Card

41

Activity No.	Name of the Activity	No. of Items	Score
1	How many fruit shake can we make?"	2	
2	"Find the area of the farms!"	5	
3	What is the amount of the fruit in the shake?	2	
4	Find the lengths of the farms.	4	
5	Assessment	10	
6	Enrichment Activity 1	10	
7	Enrichment Activity 2	10	
Total			



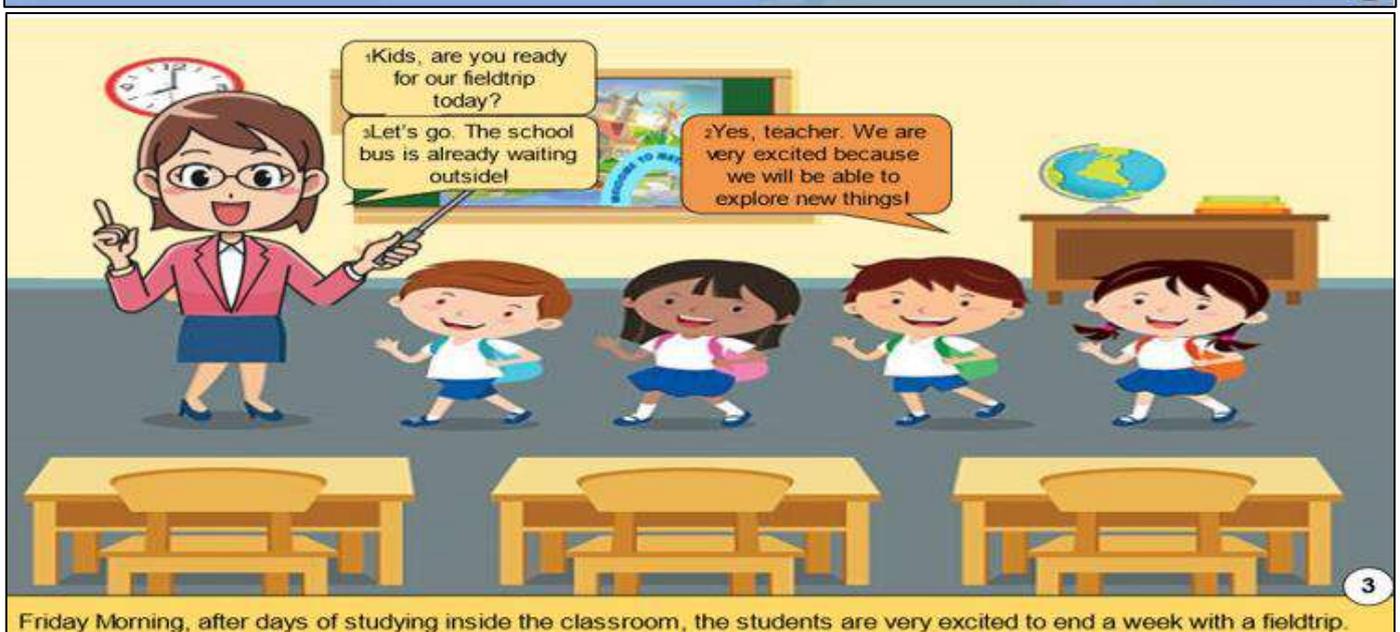
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Trisha Mae B. Ordonio

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Introduction of the lesson	3
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Friday Morning, after days of studying inside the classroom, the students are very excited to end a week with a fieldtrip.



SPECIAL PRODUCTS

Learning Competency:

Uses models and algebraic methods to find the: (a) product of two binomials; (b) product of the sum and difference of two terms; (c) square of a binomial; (d) cube of a binomial; (e) product of a binomial and a trinomial.

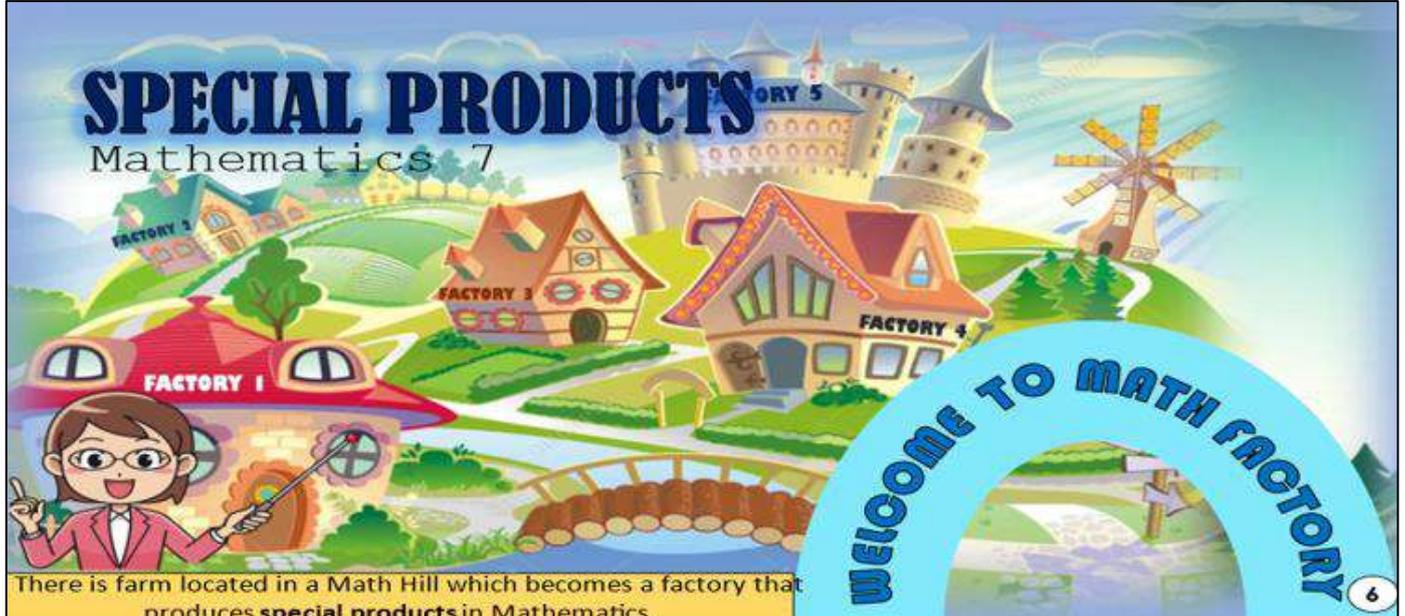
Objectives:

1. Identify polynomials which have special products.
2. Find special products of the given polynomials.
3. Develop cooperation in every activity.

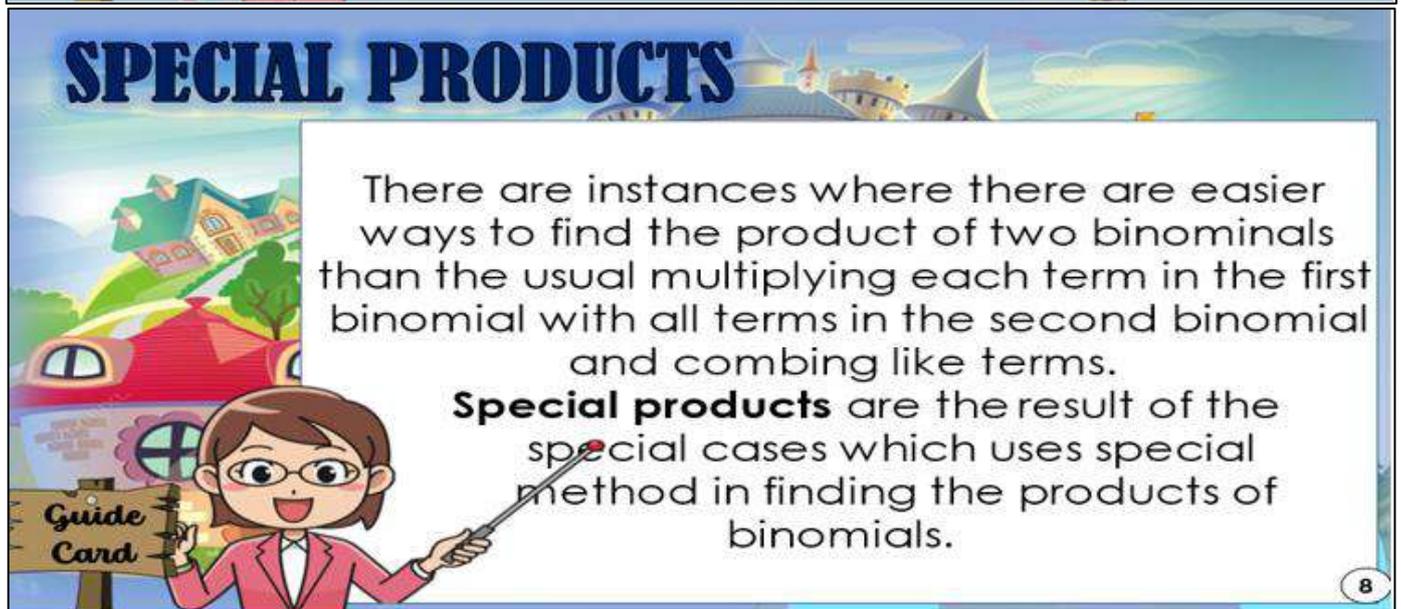
5

SPECIAL PRODUCTS

Mathematics 7



There is farm located in a Math Hill which becomes a factory that produces **special products** in Mathematics.



Five buildings of factory produces different kinds of Special Product. Each factory uses different processes to produce product.

SPECIAL PRODUCTS

The First factory produces the **product of Two Binomials!**
Let's us see the process!
ENTER THE FACTORY 11

PRODUCT OF TWO BINOMIALS

10

SPECIAL PRODUCTS

Process 1

To find the **product of two binomials**, use the **FOIL Method**.
In the two binomials, multiply the **First terms**, **Outer terms**, **Outer terms** and **Last terms**. For the last step, **combine like terms**.

a. $(x+5)(x+3)$

First terms:	$(x)(x)$	$= x^2$	$(x + 5)(x + 3)$
Outer terms:	$(x)(3)$	$= 3x$	
Inner terms:	$(5)(x)$	$= 5x$	
Last terms:	$(5)(3)$	$= 15$	

$x^2 + \underline{3x} + \underline{5x} + 15$ ← **Combine like terms**

$x^2 + 8x + 15$

PRODUCT OF TWO BINOMIALS

11

SPECIAL PRODUCTS

Process 1

b. $(x-8)(x+2)$

			$(x - 8)(x + 2)$
First terms:	$(x)(x)$	$= x^2$	
Outer terms:	$(x)(2)$	$= 2x$	
Inner terms:	$(-8)(x)$	$= -8x$	
Last terms:	$(-8)(2)$	$= -16$	

$x^2 + \underline{2x} - \underline{8x} - 16$ ← **Combine like terms**

$x^2 - 6x - 16$

PRODUCT OF TWO BINOMIALS

12

SPECIAL PRODUCTS

Process 1

c. $(x-7)(x-4)$

$$(x - 7)(x - 4)$$

First terms: $(x)(x) = x^2$
Outer terms: $(x)(-4) = -4x$
Inner terms: $(-7)(x) = -7x$
Last terms: $(-7)(-4) = 28$

$x^2 - 4x - 7x + 28$ ← Combine like terms

$$x^2 - 11x + 28$$

PRODUCT OF TWO BINOMIALS 13

SPECIAL PRODUCTS

Process 2

To find the **product of two binomials**, use the **VERTICAL** Method. It works on all kinds of multiplying polynomials.

a. $(3x+2)(2x-3)$

$$\begin{array}{r}
 3x + 2 \\
 \times 2x - 3 \\
 \hline
 -9x + 6 \\
 6x^2 + 4x \\
 \hline
 6x^2 - 5x + 6
 \end{array}$$

$(-3)(2) = 6$
 $(-3)(3x) = 9x$
 $(2x)(2) = 4x$
 $(2x)(3x) = 6x^2$

PRODUCT OF TWO BINOMIALS 14

Since you learn the process in producing a product of two binomials, you need to try also to check if you can apply the processes!

Yes, teacher! We are ready.

PRODUCT OF TWO BINOMIALS 15

Activity 1: "What product I produce?"
 Direction: Identify and connect the cow on which product it produce.

Children, it's your time to create products of two binomials!
 How do you find the activity?
 Easy Medium Hard

Activity Card 1

PRODUCT OF TWO BINOMIALS 16

SPECIAL PRODUCTS

The Second factory produces **SQUARE OF A BINOMIAL!**
 Let's us see the process!
 ENTER THE FACTORY 21

SQUARE OF A BINOMIAL 17

SPECIAL PRODUCTS

Process 1 → Square a Bino

The square of a binomial is the sum of the square of the first term , twice the product of the two terms, and the square of the last term .

$$(a + b)^2 = a^2 + 2ab + b^2$$

a. $(x+6)^2$

$= (x)^2 + 2(x)(6) + (6)^2$

$x^2 + 12x + 36$

SQUARE OF A BINOMIAL 18

SPECIAL PRODUCTS

Process 1

$(a + b)^2 = a^2 + 2ab + b^2$ $(a - b)^2 = a^2 - 2ab + b^2$

b. $(x-8)^2$

$$= (x)^2 + 2(x)(-8) + (-8)^2$$

$$\boxed{x^2 - 16x + 64}$$

c. $(2x+3)^2$

$$= (2x)^2 + 2(2x)(3) + (3)^2$$

$$\boxed{4x^2 + 12x + 9}$$

SQUARE OF A BINOMIAL 19

SPECIAL PRODUCTS

Process 2

Vertical Method

a. $(2x-3)(2x-3) = 4x^2 - 12x - 9$

$$\begin{array}{r} 2x - 3 \\ \times 2x - 3 \\ \hline -6x + 9 \\ 4x^2 - 6x \\ \hline 4x^2 - 12x - 9 \end{array}$$

$(-3)(-3) = 9$
 $(-3)(2x) = 6x$
 $(2x)(-3) = -6x$
 $(2x)(2x) = 4x^2$

SQUARE OF A BINOMIAL 20

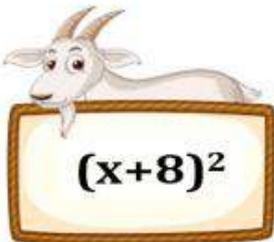
Thank you, Teacher. We can do this!

Now, do your best to produce the square of a binomial. Good Luck, students!

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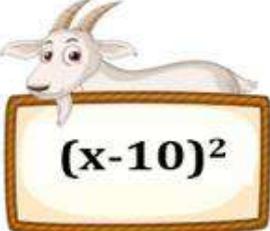
On this time, the students will try to exit Factory 2 by applying processes multiply on producing square of a binomial.

Activity 2: "Which is my square?"



$(x+8)^2$

a.) $x^2 + 16x - 64$
 b.) $x^2 - 16x + 64$
 c.) $x^2 + 16x + 64$



$(x-10)^2$

a.) $x^2 + 20x - 100$
 b.) $x^2 - 20x + 100$
 c.) $x^2 - 20x - 100$

Children, it's your time to find the square of a binomial!

How do you find the activity?

EASY
MEDIUM
HARD



Activity Card 2

SQUARE OF A BINOMIAL

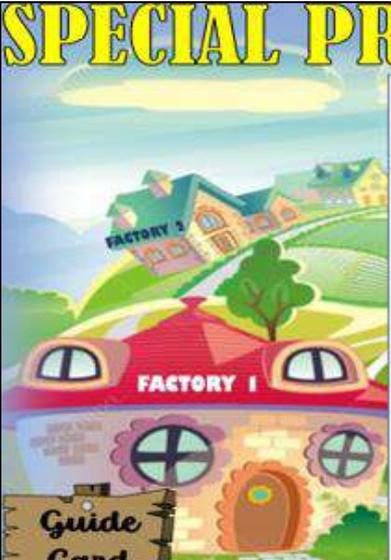
SPECIAL PRODUCTS



The Third factory produces **cube of a Binomial!**
 Let's us see the process!
ENTER THE FACTORY 3!

CUBE OF A BINOMIAL

SPECIAL PRODUCTS



CUBE OF A BINOMIAL

The **cube of a binomial** is equal to:

- cube of the first term,
- Plus, three times the square of the first term by the second term,
- Plus, three times the first term by the square of the second term,
- Plus, the cube of the second term.

Cube of a Binomial : $(a + b)^3 = a^3 + 3a^2 b + 3ab^2 + b^3$
 $(a - b)^3 = a^3 - 3a^2 b + 3ab^2 - b^3$

SPECIAL PRODUCTS

Cube of a Binomial : $(a + b)^3 = a^3 + 3a^2 b + 3ab^2 + b^3$
 $(a - b)^3 = a^3 - 3a^2 b + 3ab^2 - b^3$

a. $(x+3)^2$

$$= (x)^3 + (3)(x)^2(3) + (3)(x)(3)^2 + (3)^3$$

$$= x^3 + 9x^2 + (3)(x)(9) + (3)(3)(3)$$

$$= x^3 + 9x^2 + 27x + 27$$

b. $(x-4)^2$

$$= (x)^3 + (3)(x)^2(-4) + (3)(x)(-4)^2 + (-4)^3$$

$$= x^3 - 12x^2 + (3)(x)(-4)(-4) + (-4)(-4)(-4)$$

$$= x^3 - 12x^2 + 48x - 64$$



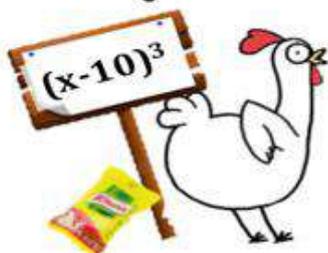
CUBE OF A BINOMIAL

Teacher, we can still do it, but please guide us when we are having difficulties.
 Thank you, teacher.

How far can you go? Are you having difficulty on a cube of a binomial?
 I am always here, I am cheering for all of you, I know you can do it! Fighting!

The third factory produces a product which needs a lot of patience. Will the students be able to do the task?

Activity 3: "Where's the chicken cube?"



a.) $x^3 + 30x^2 + 300x - 1000$

a.) $x^3 + 6x^2 + 12x + 8$

b.) $x^3 - 30x^2 + 300x - 1000$

b.) $x^3 - 6x^2 + 12x - 8$

c.) $x^3 - 30x^2 - 300x - 1000$

c.) $x^3 + 6x^2 + 12x - 8$

Children, it's your time to create cube of a binomial!

How do you find the activity?



CUBE OF A BINOMIAL

SPECIAL PRODUCTS

The Fourth factory produces **product of a sum and difference of binomials!**
Let's us see the process!
ENTER THE FACTORY 4!

Sum and Difference of a Binomial

SUM AND DIFFERENCE OF BINOMIALS

28

SPECIAL PRODUCTS

Process 1

Guide Card

The product of the **sum and difference of binomials** of the same two terms is the **square the first term** minus the **square of the second term** .

Sum and Difference of two Binomials: $(a + b)(a - b) = a^2 - b^2$

a. $(x-9)(x+9)$

$$= (x)^2 - (9)^2$$

$$= x^2 - 81$$

square of
the 1stterm

square of
the 2ndterm

Therefore,
 $(x-9)(x+9) = x^2 - 81$

SUM AND DIFFERENCE OF BINOMIALS

29

SPECIAL PRODUCTS

Process 1

Guide Card

b. $(x+5)(x-5)$

$$= (x)^2 - (5)^2$$

$$= x^2 - 25$$

square of
the 1stterm

square of
the 2ndterm

Therefore,
 $(x+5)(x-5) = x^2 - 25$

c. $(5x+2)(5x-2)$

$$= (5x)^2 - (2)^2$$

$$= (5x)(5x) - (2)^2$$

$$= 25x^2 - 4$$

square of
the 1stterm

square of
the 2ndterm

Therefore,
 $(x+5)(x-5) = x^2 - 25$

SUM AND DIFFERENCE OF BINOMIALS

30

SPECIAL PRODUCTS

Process 2




Guide Card

Vertical Method

a. $(5x-1)(5x+1) = 25x^2 - 1$

$$\begin{array}{r}
 5x - 1 \\
 \times 5x + 1 \\
 \hline
 5x - 1 \\
 25x^2 - 5x \\
 \hline
 25x^2 - 1
 \end{array}$$

$(1)(-1) = 1$
 $(1)(5x) = 5x$
 $(5x)(-1) = -5x$
 $(5x)(5x) = 25x^2$

SUM AND DIFFERENCE OF BINOMIALS

31



How's the experience in Factory 4? Did you enjoy it? I know the process you've learned is just a piece of cake for you.

Teacher, this factory is cool! We are ready to apply the processes we've learned.

Sum and Difference of a Binomial

SUM AND DIFFERENCE OF BINOMIALS

32

SPECIAL PRODUCTS

Process 2




Guide Card

Vertical Method

a. $(5x-1)(5x+1) = 25x^2 - 1$

$$\begin{array}{r}
 5x - 1 \\
 \times 5x + 1 \\
 \hline
 5x - 1 \\
 25x^2 - 5x \\
 \hline
 25x^2 - 1
 \end{array}$$

$(1)(-1) = 1$
 $(1)(5x) = 5x$
 $(5x)(-1) = -5x$
 $(5x)(5x) = 25x^2$

SUM AND DIFFERENCE OF BINOMIALS

33

SPECIAL PRODUCTS

PRODUCT OF A BINOMIAL AND TRINOMIAL

34

SPECIAL PRODUCTS

Process 1

The **product of binomial and trinomial**,

- Cube the first term of binomial factor, and
- Cube the last term of the binomial factor.

Product of a Binomial and Trinomial

1) $(a+b)(a^2 - ab + b^2) = a^3 + b^3$

2) $(a-b)(a^2 + ab + b^2) = a^3 - b^3$

a. $(x+6)(x^2 - 6x + 36)$

$$= (x)^3 + (6)^3$$

$$= (x)^3 + (6)(6)(6)$$

$$= x^3 + 216$$

Therefore,
 $(x+6)(x^2 - 6x + 36) = x^3 + 216$

SPECIAL PRODUCTS

Process 1

Product of a Binomial and Trinomial

1) $(a+b)(a^2 - ab + b^2) = a^3 + b^3$

2) $(a-b)(a^2 - ab + b^2) = a^3 - b^3$

b. $(x-4)(x^2 + 4x + 16)$

$$= (x)^3 + (-4)^3$$

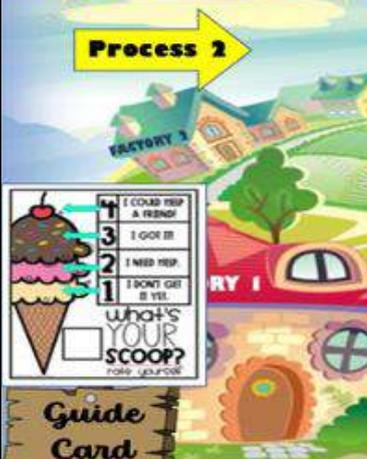
$$= (x)^3 + (-4)(-4)(-4)$$

$$= x^3 - 64$$

Therefore,
 $(x-4)(x^2 - 4x + 36) = x^3 - 64$

SPECIAL PRODUCTS

Process 2



Guide Card

4 I COULD TRIP A FRIEND
3 I GOT IT
2 I NEED HELP
1 I DON'T GET IT YET

What's YOUR SCOOP?
role yourself

Vertical Method

a. $(x+5)(x^2 - 5x + 25) = x^3 + 125$

$$\begin{array}{r}
 x^2 - 5x + 25 \\
 \times \quad x + 5 \\
 \hline
 5x^2 - 25x + 125 \\
 x^3 - 5x^2 + 25x \\
 \hline
 x^3 \qquad \qquad + 125
 \end{array}$$

$(5)(25) = 125$
 $(5)(-5x) = -25x$
 $(5)(x^2) = 5x^2$

$(x)(25) = 25x$
 $(x)(-5x) = -5x^2$
 $(x)(x^2) = x^3$

PRODUCT OF A BINOMIAL AND TRINOMIAL 37



Binomial and Trinomial

How are you there in Factory 5?
Can someone say Hi and describe your experience there.

Now, let's proceed to last task!

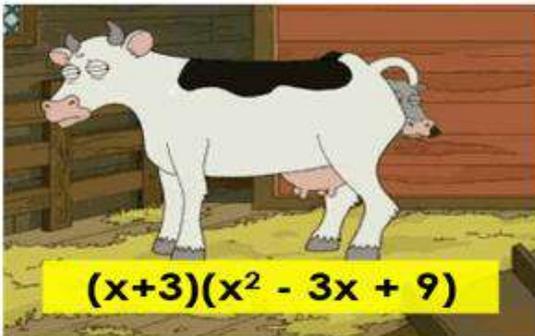
We are lucky to discover these Math Factories. Even the last factory is amazing. The process is easy to create a product!

The last factory made the students amazed. The products it produce are indeed special.

38

Activity 5: "Process my product!"

1.



$(x+3)(x^2 - 3x + 9)$

$x^3 - 27$

$x^2 - 27$

$x^3 + 27$

Children, it's your time to create product of sum and difference of binomials!



Activity Card 5

PRODUCT OF A BINOMIAL AND TRINOMIAL 39

Activity 5: "Process my product!"

2.



$x^3 - 343$

$x^2 - 343$

$x^3 + 343$

$(x-7)(x^2 + 7x + 49)$

Children, it's your time to create product of sum and difference of binomials!

How do you find the activity?

EASY
MEDIUM
HARD



PRODUCT OF A BINOMIAL AND TRINOMIAL 40

SPECIAL PRODUCTS



How was your experience kids? Did you learn something from the Math Factory?

That's great! Now, let's play a game on the farm! Make our fieldtrip a memorable one!

FACTORY 1: Two Binomials

FACTORY 2: Square of a Binomial

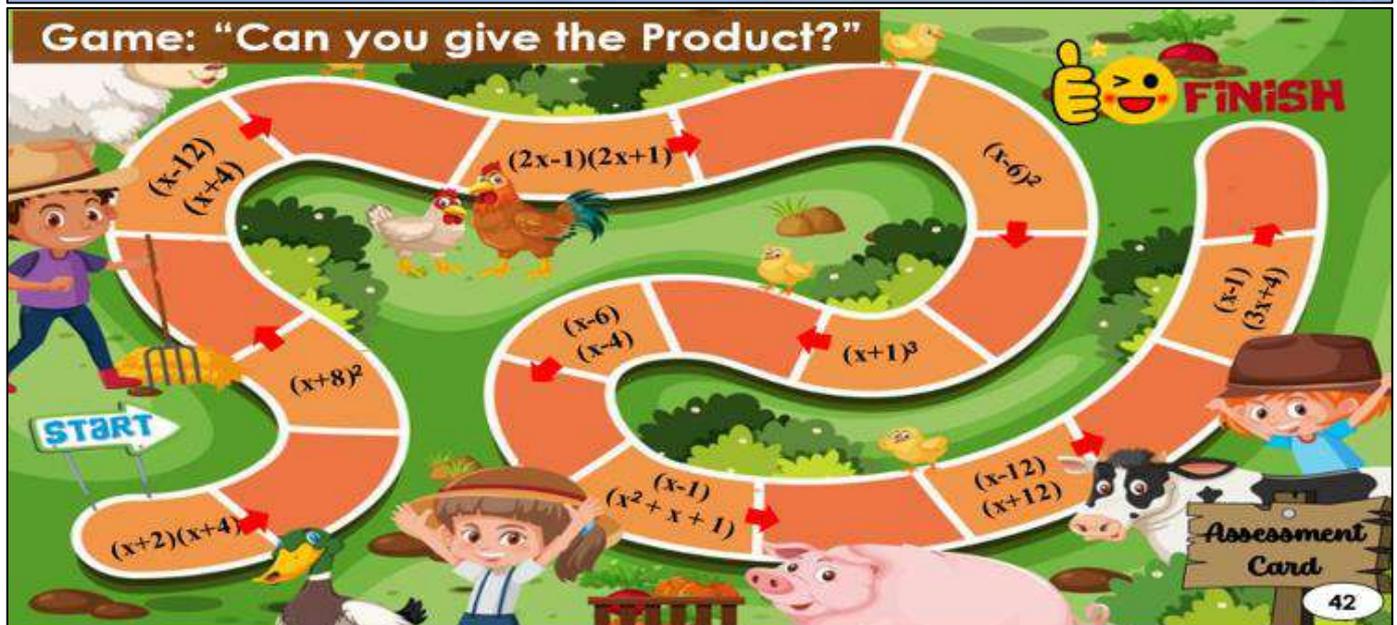
FACTORY 3: Cube of a Binomial

FACTORY 4: Sum and Difference of Binomials

FACTORY 5: Binomial and Trinomial

41

Game: "Can you give the Product?"



FINISH

Assessment Card 42

**For the enrichment activity,
Help Benji to collect all the bananas by
answering each number!**

Enrichment Card
43

You may visit these Video Links:
<https://youtu.be/1EL6LIoK6uI>
<https://youtu.be/Mdwdfo06MOw>
<https://youtu.be/-Ff0NYtoYa4>

Books:
 Oronce, A.O., Mendoza, M.O.(2019), EMath Worktext in Mathematics 7, Manila: Rex Bookstore, Inc.
 Tuazon, R.A.,Guray, S.B.(2017),iMath 7: K to 12 Curriculum Series, iBook Publishing Inc.

Reference Card
44

Activity 1: "What product I produce?"

- $(x+5)(x+9) = x^2 + 14x + 45$
- $(x-7)(x-5) = x^2 - 12x + 35$
- $(x+8)(x-4) = x^2 + 4x - 32$

Activity 2: "Which is my square?"

- $(x+8)^2$ c.) $x^2 + 16x + 64$
- $(x-10)^2$ c.) $x^2 - 20x + 100$

Activity 3: "Where's the chicken cube?"

- $(x-10)^3$ b. $x^3 - 30x^2 + 300x - 1000$
- $(x+2)^2$ a. $x^3 + 6x^2 + 12x + 8$

Activity 4: "What's the product?"

- $(x+11)(x-11) =$ b. $x^2 - 121$
- $(3x-5)(3x+5) =$ a. $9x^2 - 25$

Activity 5: "Process my product!"

- $(x+3)(x^2 - 3x + 9) = x^3 + 27$
- $(x-7)(x^2 + 7x + 49) = x^3 - 343$

Enrichment Activity:

- $x^2 - 16x + 28$
- $x^3 + \frac{1}{2}x^2 + \frac{1}{4}x + \frac{1}{8}$
- $4x^2 - 19x + 12$
- $x^3 + 20x^2 + 400x + 8000$
- $x^3 - \frac{1}{27}$
- $x^2 + 28x + 196$
- $x^2 - 13x + 42$
- $x^2 + \frac{2}{5}x + \frac{1}{25}$
- $x^2 + 17x + 16$
- $x^3 + \frac{1}{125}$

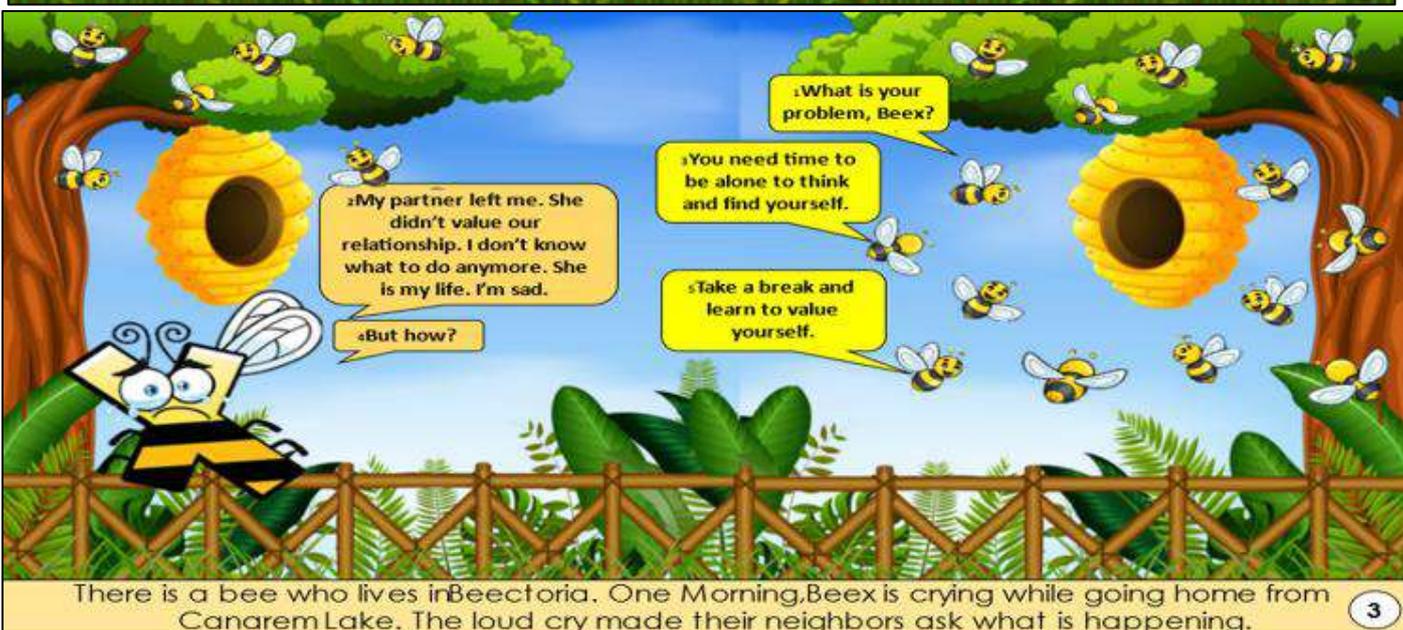
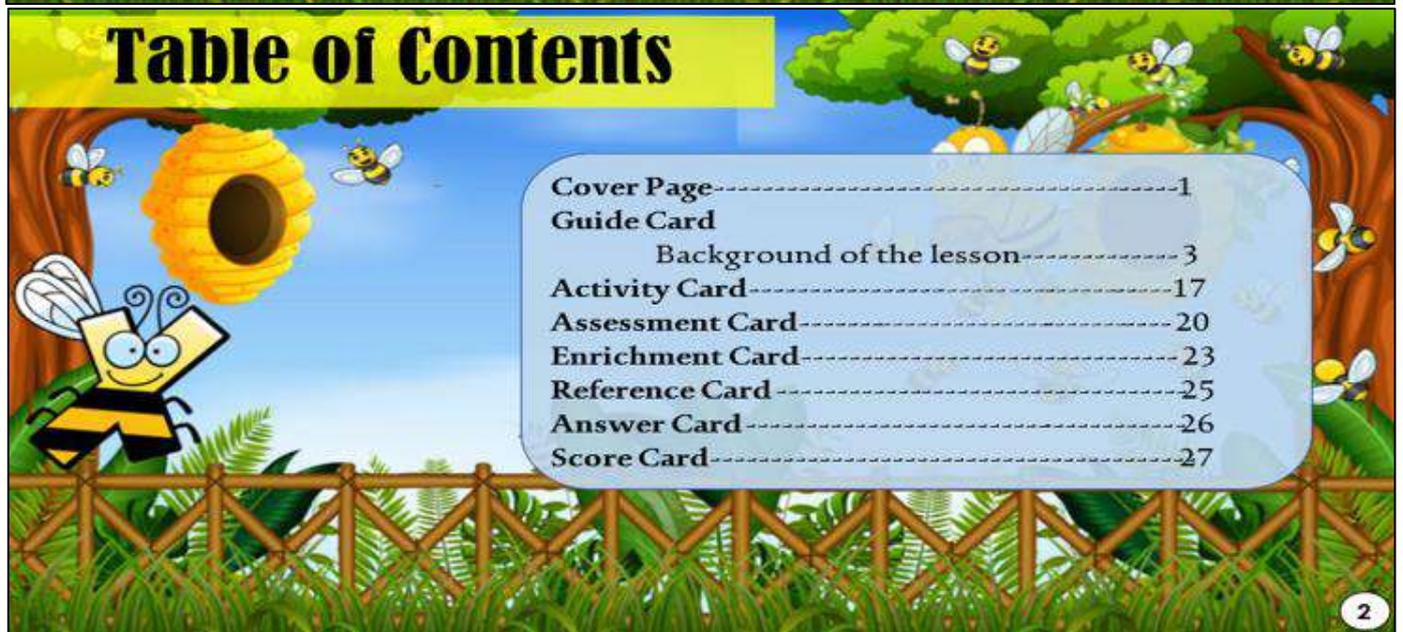
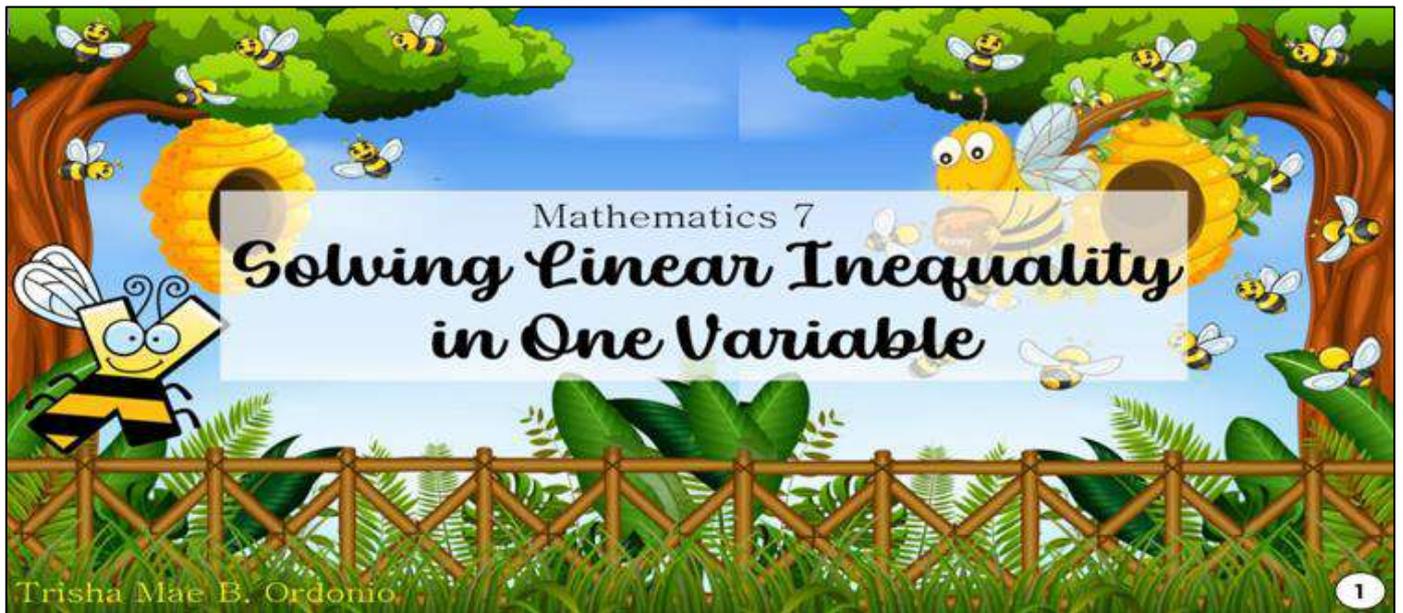
Answer Card
45

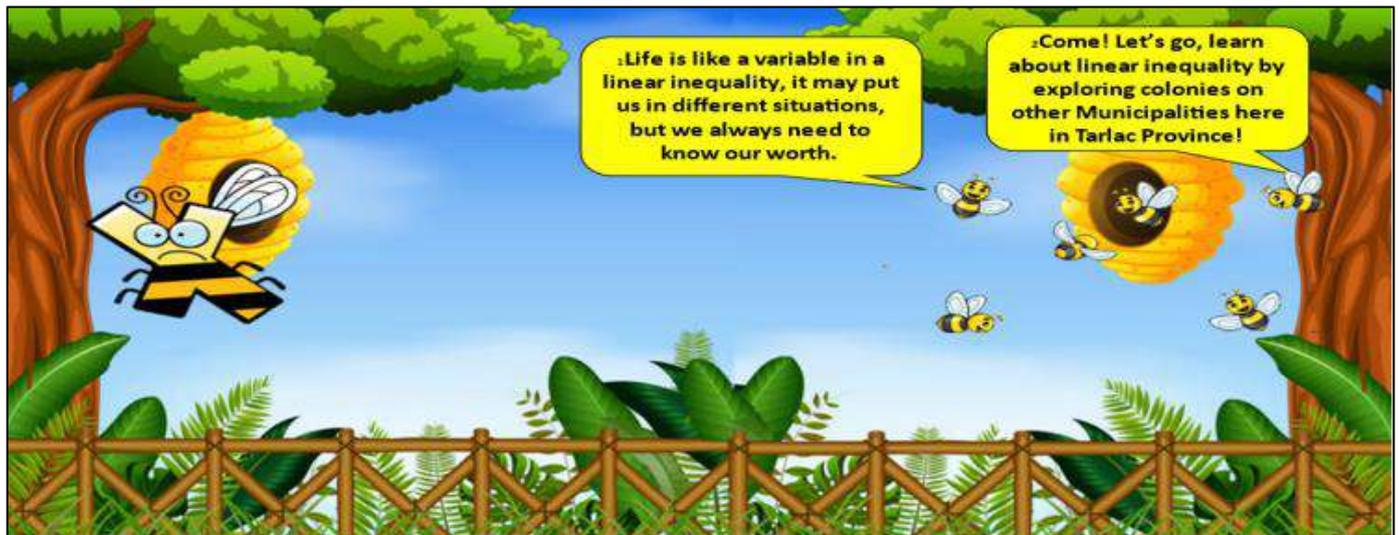
Game: "Can you give the Product?"

SPECIAL PRODUCTS

Activity No.	Name of the Activity	No. of Items	Score
1	What product I produce?"	3	
2	Which is my square?"	2	
3	Where's the chicken cube?"	2	
4	What's the product?"	2	
5	Process my product!"	2	
6	Assessment	10	
7	Enrichment Activity	10	
Total			

Score Card
47





The following day, Beexis still sad. The concerned neighbors gave him pieces of advice **4**

Solving Linear Inequality in One Variable

Learning Competency:
Finds the solution of linear inequality in one variable.

Objectives:

1. Solve linear inequality.
2. Determine whether the given value is the solution of the linear inequality.
3. Develop patience and cooperation by participating in classroom activities.

Guide Card

Here is our Map! A guide in our adventure for today.

Province of Tarlac Official Seal

Provincial capital

San Clemente

San Manuel

Anao

Ramos

Pura

Victoria

Gerona

Santa Ignacia

Camiling

Mayantoc

San Jose

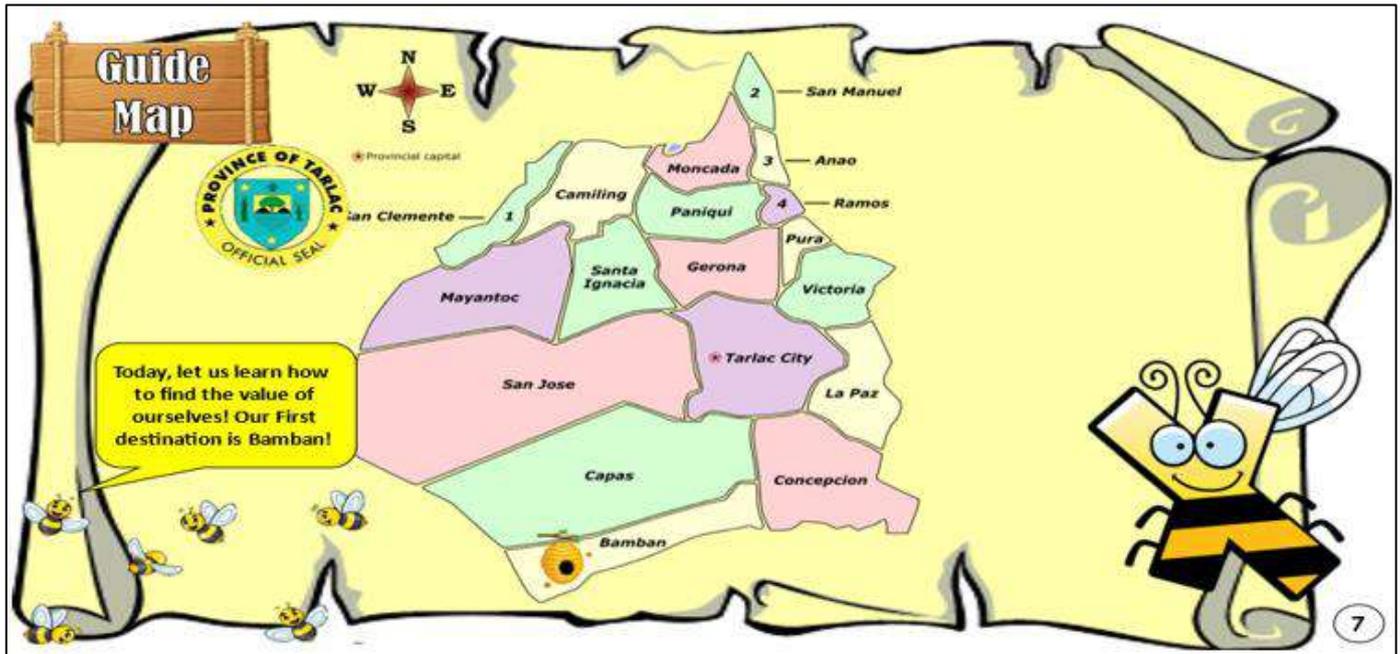
Tarlac City

La Paz

Cabas

Concepcion

Bamban



Solving Linear Inequality in One Variable

Problem 1. Solve for x.

$$5x + 3 > 13$$

$$5x + 3 \rightarrow (13) \quad + (-3)$$

$$5x > 10 \rightarrow \frac{5x}{5} > \frac{10}{5}$$

$x > 2$ ✓

ISOLATE the variable by adding (~~6~~) from both sides of the inequality. (Addition Property of Inequality)

DIVIDE Both sides of the inequality by ~~5~~ to express the variable with coefficient 1.

Checking:

$5x + 3 > 13 ; x > 2$

Substitute x by numbers greater than 2.

$5(3) + 3 > 13$

$15 + 3 > 13$

$18 > 13$ ✓

8

Solving Linear Inequality in One Variable

Problem 2. Solve for x.

$$2x + 18 \leq 26$$

$$2x + 18 \rightarrow (-18) \leq 26 \rightarrow (-18)$$

$$2x \leq 8 \rightarrow \frac{2x}{2} \leq \frac{8}{2}$$

$x \leq 4$ ✓

ISOLATE the variable by adding (~~8~~) from both sides of the inequality. (Addition Property of Inequality)

DIVIDE Both sides of the inequality by ~~2~~ to express the variable with coefficient 1.

Checking:

$2x + 18 \leq 26 ; x \leq 4$

Substitute x by numbers less than or equal to 4.

$2(4) + 18 \leq 26$	$2(2) + 18 \leq 26$
$8 + 18 \leq 26$	$4 + 18 \leq 26$
$26 \leq 26$ ✓	$22 \leq 26$ ✓

9

Solving Linear Inequality in One Variable

Problem 3. Solve for x.

$$6x - 4 < -22$$

$6x - 4 \cancel{-4} < -22 + \cancel{4}$
ISOLATE the variable by adding from both sides of the inequality. (Addition Property of Inequality)

$6x < -18 \rightarrow \frac{6x}{6} < \frac{-18}{6}$
DIVIDE both sides of the inequality by express the variable with coefficient

$x < -3$ ✓

Checking:
 $6x - 4 < -22 ; x < -3$
 Substitute x by numbers less than -3.
 $6(-4) - 4 < -22$
 $-24 - 4 < -22$
 $-28 < -22$ ✓

What kind of bee are you?

DRONE BEE WORKER BEE

BUSY BEE QUIRKY BEE

Guide Card

10

Activity Card

Now, let's discover other case and process to the Municipality of Capas!

Province of Tarlac Official Seal

11

.Zzz. zzzz.
My neighbors said, here in Capas, I will find the value of myself.

.Listen carefully!
Zzz. Zzz.

Guide Card

12

Solving Linear Inequality in One Variable

Problem 4. Solve for x.

$$-3x - 11 > -29$$

~~$-3x - 11 > -29$~~ $-29 + 11$

$-3x > -18$ \rightarrow ~~$\frac{-3x}{-3}$~~ $> \frac{-18}{-3}$

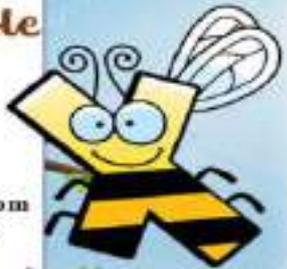
$x < 6$ ✓

ISOLATE the variable by adding from both sides of the inequality.

DIVIDE both sides of the inequality by to express the variable with coefficient 1.

Dividing in negative number results in reversing the inequality sign.

Checking:
 $-3x - 11 > -29 ; x < 6$
 Substitute x by numbers less than 6.
 $-3(5) - 11 > -29$
 $-15 - 11 > -29$
 $-26 > -29$ ✓





13

Solving Linear Inequality in One Variable

Problem 5. Solve for x.

$$-8x - 22 \geq 26$$

~~$-8x - 22 \geq 26$~~ $+ (22)$

$-8x \geq 48$ \rightarrow ~~$\frac{-8x}{-8}$~~ $\geq \frac{48}{-8}$

$x \leq -6$ ✓

ISOLATE the variable by adding from both sides of the inequality.

DIVIDE both sides of the inequality by to express the variable with coefficient 1.

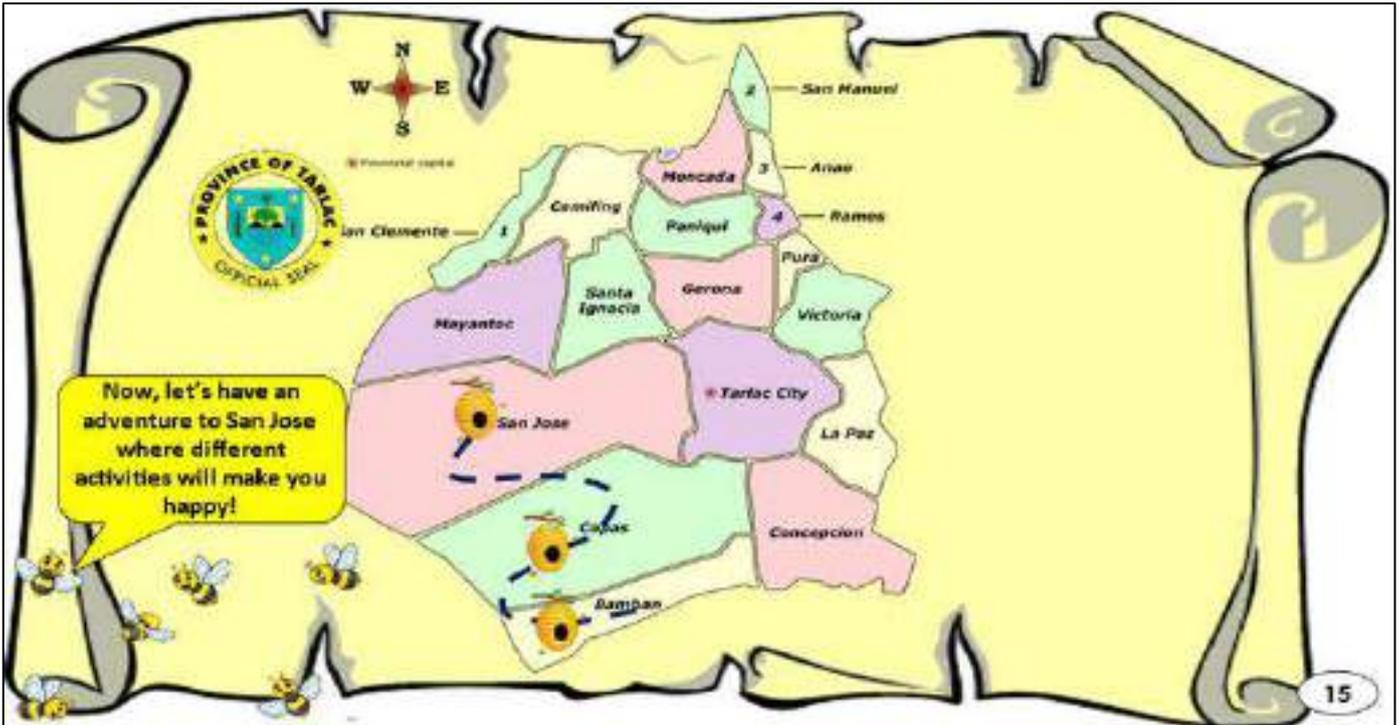
Dividing in negative number results in reversing the inequality sign.

Checking:
 $-8x - 22 \geq 26 ; x \leq -6$
 Substitute x by numbers less than or equal to -6.
 $-8(-7) - 22 \geq 26$
 $56 - 22 \geq 26$
 $34 \geq 26$ ✓



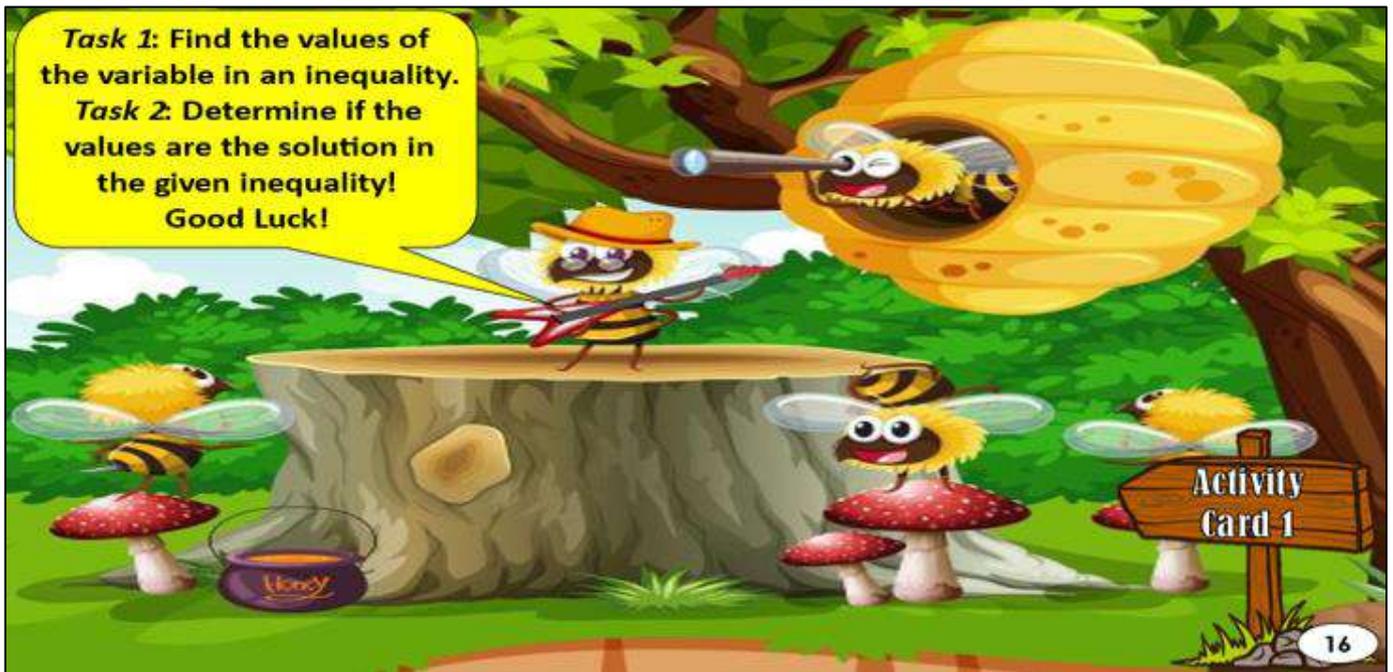


14



Now, let's have an adventure to San Jose where different activities will make you happy!

15



Activity 1: "Find my Bee-lue!"
 Connect the bee to its correct beehive

a. $x + 3 > 5$	
b. $-5x + 1 < 16$	
c. $8x \geq 40$	
d. $4x + 7 < -9$	
e. $-9x \leq 45$	

$x \geq -5$
 $x > -3$
 $x > 2$
 $x < -3$
 $x < -4$
 $x \geq 5$

17

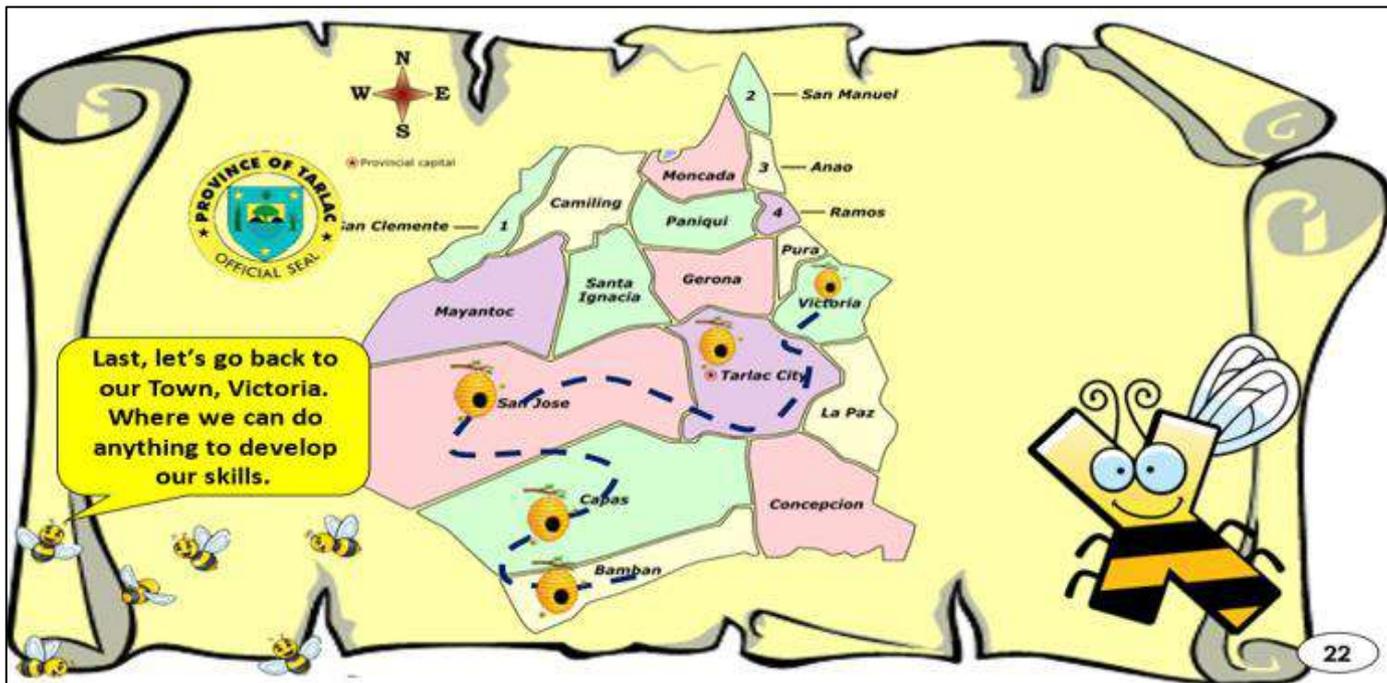
Activity 2: "Is it my Bee-lue or not?"
 Identify the number if it is the solution of the inequality.

a. $-9x < 72; x > -8$	
b. $-3x+6 > 15; x > -3$	
c. $10x+1 \leq 41; x \leq 4$	
d. $5x-4 \geq 1; x < -1$	
e. $-2x+7 > -3; x < 5$	

YES
 NO

Activity Card 2

18



Enrichment Activity! Find the solution of the following linear inequality.

a. $4x + 3 < -5$	e. $-x + 5 \geq 5$
b. $x - 7 < 6$	f. $-6x + 4 < 16$
c. $7x - 4 \geq 31$	g. $-5x \geq -70$
d. $9x + 1 < -8$	h. $-2x - 7 < -9$
e. $2x \leq 32$	i. $-9x \leq 18$

Enrichment Card

Speech bubble: Welcome Back Bees! We hope you enjoyed your trip. Now let us enhance more your skills.



You may visit these Video Links:
<https://youtu.be/hPtd4DSGZ0>
<https://youtu.be/h2YMbYz9aW0>

Books:
 Oronce, A.O., Mendoza, M.O.(2019), EMath Worktext in Mathematics 7, Manila: Rex Bookstore, Inc.
 Tuazon, R.A.,Guray, S.B.(2017),iMath 7: K to 12 Curriculum Series, iBook Publishing Inc.

25

<p>Activity 1: "Find my Bee-lue"</p> <ol style="list-style-type: none"> $a. x + 3 > 5; x > 2$ $-5x + 1 < 16; x > -3$ $8x \geq 40; x \geq 5$ $4x + 7 < -9; x < -4$ $-9x \leq 45; x \geq -9$ <p>Activity 2: "Is it my Bee-lue or not?"</p> <ol style="list-style-type: none"> $-9x < 72; x > -8$ YES $-3x + 6 > 15; x > -3$ NO $10x + 1 \leq 41; x \leq 4$ YES $5x - 4 \geq 1; x < -1$ NO $-2x + 7 > -3; x < 5$ YES 	<p>Assessment:</p> <ol style="list-style-type: none"> A B C A B A C B A C 	<p>Enrichment Activity:</p> <ol style="list-style-type: none"> $x < -2$ $x < 13$ $x \geq 5$ $x < -1$ $x \leq 16$ $x \leq 0$ $x > -2$ $x \leq 7$ $x > 1$ $x \geq -2$
--	--	---

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Activity No.	Activity Name	No. of Items	Score
1	Find My Bee-lue.	5	
2	Is it my Bee-lue or Not?	5	
3	Assessment	10	
4	Enrichment Activity	10	
Total			

27

➤ *Validation of Strategic Intervention Materials by*

• *Mathematics Specialists*

The Strategic Intervention Material (SIM) was evaluated by five (5) chosen specialists in Mathematics from different schools in Tarlac Province: 3 Master teachers, 1 Teacher III and, 1 Learning Resource Management and Development System (LRMDS) school coordinator.

The following tables below present the mean of each criterion validated by 5 Mathematics specialists and its equivalent qualitative rating.

✓ *Objectives*

Table 1 Ratings of SIM in Evaluating Objectives by the Mathematics Specialists

Objectives of the Strategic Intervention Material (SIM)	Mean	Description
1. The objectives of the SIM are clearly stated in behavioral form.	4.8	Very Evident
2. The objectives of the SIM are well-planned, formulated, and organized.	4.8	Very Evident
3. The objectives of the SIM are specific, measurable, and attainable.	5	Very Evident
4. The objectives are relevant to the topics of each lesson of the SIMs.	5	Very Evident
5. The objectives of the SIM take into account the needs of the students.	5	Very Evident
Average	4.92	Very Evident

It can be seen from Table 1 that “The objectives of story and adventure-based SIM stated are specific, measurable, and attainable”; “The objectives are relevant to the topics of each lesson of the SIMs”; and “The objectives consider the needs of the students” obtained the highest mean of 5 which is equivalent to verbal description of Very Evident. Meanwhile, “The objectives of the SIM are clearly stated in behavioral form and the objectives are well-planned, formulated, and organized” got a 4.8 mean score which is still equivalent to verbal description of Very Evident.

The objectives of the SIM shown above were computed and gained a mean score of 4.92 with a verbal description of Very Evident. This implies that the objectives of the SIM are clear, well-planned, relevant, parallel to the needs of the participants and SMART (Specific, Measurable, Attainable, Result-Oriented and Time-bound).

According to Garcia (2015), a list of objectives is significant in every task. This set the goals of every activity. Same with starting a lesson, SIM needs objectives since these learning objectives give teachers ideas of what to measure at the end of the lesson.

✓ *Contents*

Table 2 Ratings of SIM in Evaluating Contents by the Mathematics Specialists

Content of the Strategic Intervention Material (SIM)	Mean	Description
1. The content of each lesson in the SIM is directly relevant to the defined objectives.	5	Very Evident
2. The content of each lesson is simple and easy to understand.	5	Very Evident
3. The topics of each lesson are fully discussed, and each topic is given equal emphasis in the lesson.	4.6	Very Evident
The topics are supported by illustrative examples, and the practice tasks are suited to the level of the students.	5	Very Evident
5. The assessments are adequate and suitable to the topics in the SIM.	4.8	Very Evident
Average	4.88	Very Evident

It can be seen in Table 2 that first statement, “The content of each lesson in the SIM is directly relevant to the defined”; the second statement, “The content of each lesson is simple and easy to understand”; and the fourth statement, “The topics are supported by illustrative examples, and the practice tasks are suited to the level of the students” obtained the highest mean score of 5 which is equivalent to a verbal description of Very Evident. In addition, the fifth statement, “The assessment is adequate and suitable to the topics in the SIM” got the second to the highest mean score of 4.8 with an equivalent of Very Evident verbal description. Meanwhile the third statement, “The topics of each lesson are fully discussed, and each topic is given equal emphasis in the lesson” gained the lowest mean score of 4.6 but still with a verbal description of Very Evident.

The Mathematics specialists’ rating on content of SIM accumulated a mean score of 4.88 and has a descriptive rating of very evident. This shows that the SIM contains relevant topics to the objectives that are easy to grasp by the students with the help of ample illustrative examples and tasks that suit their level.

According to Rodrigo (2015) in his action research titled “Importance of Strategic Materials”, Strategic Intervention Materials are conceptualized and designed to aid teachers in providing the learners the needed support for them to make a progress in their learning process. SIM gives the opportunities to explore various ideas and concepts that would enrich their understanding of varied subject matter therefore the content should be accessible, understandable, and relevant to the topics being addressed.

✓ *Format and Layout*

Table 3 Ratings of SIM in Format and Layout Evaluated by the Mathematics Specialists

Format and Layout of the Strategic Intervention Material (SIM)	Mean	Description
1. The format and layout of the SIM is well-organized, which makes the lessons more interesting.	5	Very Evident
2. The language is easy to understand.	4.8	Very Evident
3. The language used is clear, concise, and motivating.	4.8	Very Evident
4. The instructions in the SIMs are concise and easy to follow.	4.8	Very Evident
Illustrations, pictures and other graphics are simple and easily recognizable, clarity and supplement text, properly labelled or captioned and attractive and appealing.	5	Very Evident
Average	4.88	Very Evident

It can be gleaned from Table 3 that “The format and layout of SIM is well-organized, which makes the lessons more interesting” and “Illustrations, pictures and other graphics are simple and easily recognizable, clarity and supplement text, properly labelled or captioned and attractive and appealing” obtained the highest mean score of 5 with a verbal description of Very Evident. On the other hand, “The language is easy to understand”; “The language used is clear, concise, and motivating”; and “The instructions in the SIMs are concise and easy to follow” obtained a mean score of 4.8 with a verbal description of very evident.

The statements under format and layout of the SIM were rated very evident with a mean score of 4.88. This shows that the developed SIMs are well-organized and present clear illustrations which are easy to grasp by choosing words that are suited and appropriate to the level of the students for them to learn a lesson.

Strategic Intervention Material is an instructional material prescribed by the Department of Education to improve students’ performance in different subject areas and to promote successful learning in both elementary and secondary among public schools. According to Salviejo, et. al (2014), format and layout are fundamental branches of graphic design that concerns the arrangement of text and visuals. The effectiveness of every type of design in every intervention material, from print to web, is largely influenced by these. An effective format and layout not only look attractive, but also help the learners understand the lesson that the design conveys.

✓ *Presentation*

Table 4 Ratings of SIM in Presentation Evaluated by the Mathematics Specialists

Presentation of the Strategic Intervention Material (SIM)	Mean	Description
1. The topics on the SIM are presented in a logical and sequential order.	5	Very Evident
2. The lessons on SIMs are presented in a unique and original form.	5	Very Evident
3. The learning activities are presented clearly.	5	Very Evident
4. The presentation of each lesson is attractive and interesting to the students.	5	Very Evident
Average	5.00	Very Evident

The table above shows that all the indicators for the presentation obtained a mean score of 5 which has verbal description of Very Evident. The criteria under presentation were rated very evident as the specialists observed a unique delivery of the lesson that catches the interest of the students using attractive features. Moreover, the sequence of the lesson in the SIM is clear and easy to follow.

According to Turner (2020), a good presentation of intervention material will do one of two things: it will teach the learners something or it will inspire them to take actions. However, neither of these things will happen if the learners are not engaged. The presentation is the story. Whether it is presented online or in print, what is laid out is important. Teachers need the learners to focus. The effectiveness of a presentation determines how many students will engage. It represents how much of the information they will take with them when they are done. Moreover, it can help the teacher understand what he/she can do better next time.

✓ *Instructional Characteristics*

Table 5 Ratings of SIM in Instructional Characteristics Evaluated by the Mathematics Specialists

Instructional Characteristics of the Story and Adventure-based Strategic Intervention Material (SIM)	Mean	Description
1. The SIMs will motivate the students to study Mathematics 7 -Algebra.	5	Very Evident
2. The SIMs will help the students master the topics at their own pace.	4.6	Very Evident
3. The SIMs will allow the students to use their time more efficiently.	5	Very Evident
4. The SIMs will develop the analytical thinking and reasoning skills of the students in Algebra.	4.6	Very Evident
5. The SIMs will serve as a supplementary material that can cater to the needs of the students.	5	Very Evident
Average	4.84	Very Evident

Table 5 shows that SIM will surely motivate the students to study Mathematics 7 – Algebra because the SIM allows the students to use their time more efficiently and SIM serves as a supplementary material that caters to the needs of the students since the three statements gained a mean of 5 which is Very evident. In addition, the SIM got a mean of 4.6 which is very evident in the indicators. It will help the students to master the topic at their own pace and it will develop analytical thinking and reasoning skills of the students in Mathematics 7 – Algebra. In the instructional characteristics, the SIM gathered 4.84 mean rating. It is manifested that the material will not only motivate the students to learn, but also it will help to develop the critical thinking skills of each student.

Table 6 Summary of Rating of Strategic Intervention Material (SIM) Evaluated by Mathematics Specialist

Criteria	Mean Rating	Description
1. Objectives	4.92	Very Evident
2. Content	4.88	Very Evident
3. Format and layout	4.88	Very Evident
4. Presentation	5	Very Evident
5. Instructional Characteristics	4.84	Very Evident
Total Mean Rating	4.9	Very Evident

The total mean of 4.9 was computed in evaluating the Strategic Intervention Material (SIM) and considered as “Very Evident” in terms of the indicators on Objectives; Content; Format and Layout; Presentation; and Instructional Characteristics. Very Evident means the statements and expectations in each criterion were met by the SIM and were observed by the specialists; therefore, it is valid. The SIM is valid and acceptable to use as a material in teaching and learning in remediation on different least learned competencies in Mathematics 7 - Algebra.

One of the learning tools that are used during the learning process includes instructional materials or textbooks. Instructional materials become a determining factor for learners to participate in the learning and create interest in the material to be taught. Setiawan & Trapsilasiwi (2014) states that to produce active learning, easy to understand, and fun for students require a learning model that makes students actively participate in the learning process, the learning process which makes the students active participation during the learning process and students interested in learning that can be created by using the device.

- Users

- ✓ The Performance of Control and Experimental Group in the Pretest

Table 7 Independent Samples T-Test between the Pretest of the Control and Experimental Group

Group	Mean	N	sd	Mean Difference	α	Interval of the		p	Decision
						Lower	Upper		
Control	10.7647	17	3.0726	0.0588	0.05	-1.7588	1.8765	0.948	Accept H_0
Experimental	10.7059	17	2.0238						

The pretest scores of the control and experimental group were tested for significant difference using the independent samples t-test. The computed mean score of the control group is 10.76 with a standard deviation of 3.073 while the experimental group is 10.71 with a standard deviation of 2.025. Based on the result, the computed p – value is 0.948 which is greater than the alpha level, which is 0.05 with 32 as degrees of freedom, thus, the decision is to accept the null hypothesis. In addition, the 95% confidence interval of the difference of the scores in the lower and upper is in the range of -1.7588 and 1.8765 which observed that 0 was included. Thus, it implies that there was no significant difference between the pretest scores of the control and experimental group. In this manner, the performance of both groups before the treatment period are at the same level.

Table 8 Paired Samples T-Test between the Pretest and Posttest of the Control Group

Control Group	Mean	N	sd	Mean Difference	α	Interval of the		p	Decision
						Lower	Upper		
Pretest	10.7647	17	3.0726	14.2353	0.05	12.2814	16.1892	0.00	Reject H_0
Posttest	25	17	5.9477						

The pretest and posttest scores of the control group were tested for significant difference using the paired samples t-test. The computed mean score in the pretest is 10.7647 with a standard deviation of 3.0726 while in the posttest, mean is 25 with a standard deviation of 5.9477. Based on the result, the computed p – value is 0 which is less than the alpha level 0.05 with 32 as degrees of freedom, thus, the decision is to reject the null hypothesis. In addition, the 95% confidence interval of the difference of the scores in the lower and upper is in the range of 12.2814 and 16.1892 which observed that 0 was not included. Thus, it implies that there is a significant difference between the pretest and posttest scores of the control group. In this manner, the level of performance before and after the intervention period are not at the same level, having a significant improvement in scores in the posttest.

Table 9 Paired Samples T-Test between the Pretest and Posttest of the Experimental Group

Experimental Group	Mean	N	sd	Mean Difference	α	Interval of the		p	Decision
						Lower	Upper		
Pretest	10.7059	17	3.0726	18.1176	0.05	15.273	20.9623	0.00	Reject H_0
Posttest	28.8235	17	5.9477						

Using the paired samples t-test, the pretest and posttest scores of the experimental group were tested for significant difference. The accumulated mean score in the pretest is 10.71 having a standard deviation of 2.024 while on the posttest, the mean increases to 28.82 with a standard deviation of 4.864. Based on the result, the computed p – value is 0 is less than the alpha level 0.05 with 32 as degrees of freedom, thus, the decision is to reject the null hypothesis which implies that there is significant difference between the pretest and posttest scores of the experimental group. In addition, the 95% confidence interval of the difference of the scores in the lower and upper is in the range of 15.2730 and 20.9623 which observed that 0 was not included. Thus, it denotes that there is a significant difference between the pretest and posttest scores of the control group. In this manner, the level of performance before and after the intervention period are not at the same level, having a significant improvement in scores in the posttest.

Table 10 Independent Samples T-Test between the Posttest of the Control and Experimental Group

Group	Mean	N	sd	Mean Difference	α	Interval of the		p	Decision
						Lower	Upper		
Control	25	17	5.9477	3.8235	0.05	0.0279	7.6192	0.048	Reject H_0
Experimental	28.8235	17	4.8636						

The posttest scores of the control and experimental group were tested for significant difference using the independent samples t-test. The computed mean score of the control group in the posttest is 25 with a standard deviation of 5.9477 while the experimental group is 28.82 with a standard deviation of 4.8636. Based on the result, the computed p – value is 0.048 which is less than the alpha level 0.05 with 32 as degrees of freedom, thus, there was enough evidence to reject the null hypothesis. In addition, the 95% confidence interval of the difference of the scores in the lower and upper is in the range of 0.0279 and 7.6192 which observed that 0 was not included. Thus, it implies that there is a significant difference between the posttest scores of the control and experimental group. As a result, the performance levels of the two groups after the intervention period were not equal, and the experimental group's performance on the posttest was better.

➤ *Implications of the Study in Teaching Mathematics*

According to Brian (2010), Algebra is the branch of mathematics which is concerned with structure, relation, and quantity. In addition to the usefulness of Mathematics generally, Algebra is a major branch of mathematics. It is important for the cognitive, critical, and analytical skills of the brain. It sharpens the critical thinking skills of the students and enables them to solve real life problems logically as well. Also, studying Algebra creates mental discipline. It teaches people to think and reach solutions to various problems in a well-structured and logical way. Furthermore, it helps students to learn how to sustain reflection. Studying mathematics in general, as well as algebraic concepts, variables, processes, and equations, has many advantages.

On the other hand, it is also one of the branches that many secondary school students find difficult to learn (Martin, 2000). Many secondary school students are observed to have problems with mathematics, especially in the area of Algebra (Amoo, 2001).

The common difficulty of the students in Mathematics can be found in the branch Algebra which make them struggle in the higher Mathematics. The study aims to aid the difficulty on least mastered competencies of the students in Mathematics 7 - Algebra in order to bridge learning gaps to build strong foundation for the next level of Mathematics. The development and validation of Strategic Intervention Material (SIM) revealed that it helps the students master the skills needed for higher Mathematics. Students who used SIMs showed interest in participating in classroom activities which engage them to learn. Activities were enjoyed by the students which makes them active during the intervention period. The achievement of the students was reflected not only in during the treatment period, but also in the posttest. In conclusion, the least learned competencies of the students in Algebra were improved and aided with the use SIM. Mathematics teachers could use this material, SIM (Strategic Intervention Material) in helping students to aid the difficulties in Algebra with the topics: laws of exponents, multiplying and dividing polynomials, finding special products, and solving linear inequality in one variable.

In addition, the school administrators could use this study as the basis for conducting department-based trainings and webinars in helping Mathematics teachers to create relevant intervention materials to make students improve their skills in every branch of Mathematics. In which integration of story and adventure-type flow in teaching captures interest of students which makes them participate in the whole instruction.

For the improvement of Mathematical competence of students, teachers could integrate research-based materials for interactive Mathematics instruction. If all these things happen, the least learned skills of students in Mathematics will improve to mastery.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of results of the study. The conclusion and recommendations were drawn based on the findings of the study.

➤ *Summary of Findings*

• The four competencies which are least mastered by the students in Mathematics 7 - Algebra during the distance learning on the school year 2020-2021 and 2021-2022 are the following:

- ✓ Derives Laws of Exponents
- ✓ Multiplies and Divides Polynomials
- ✓ Uses models and algebraic methods to find the special products:

- Product of two binomials;
- Product of the sum and difference of two terms;
- Square of a binomial;
- Cube of a binomial;
- Product of a binomial and a trinomial.

✓ Solves Linear Inequality in One Variable

- The Strategic Intervention Materials (SIM) in story and adventure-based was developed to help the students to improve skills to bridge the learning gaps in Mathematics 7 - Algebra with the competencies and topics they had difficulties.
- Five Mathematics specialists were chosen to evaluate the SIM in terms of the objectives, content, format and layout, presentation, and instructional characteristics. The accumulated mean rating of the material is 4.9 and has a word description of “Very Evident” in terms of the objectives, content, format and layout, presentation, and instructional characteristics which considered as valid.
- The results of pretest and posttest of control and experimental were compared to determine the effectiveness of the Strategic Intervention Material.

✓ The results of pretest from control group obtained the highest score of 17 and lowest score of 5, on the other side, experimental group got score 13 as the highest and 6 as the lowest score. The performance of the control group in pretest accumulated a mean of 10.76 while the experimental group registered a mean of 10.71. The means of the two groups are not equal, however, using the t-test independent samples, the computed p-value 0.948 was greater than the alpha level of 0.05. This implies that the performance between two groups have no significant difference before the intervention period.

✓ The pretest and posttest of control group after employing paired samples t-test, it was revealed that there is a significant difference from the performance before and after the intervention using traditional method of teaching. The computed p-value 0 is less than the critical value 0.05. The increase in scores is very evident, from the lowest score 5 in pretest, it became 16 in the posttest and on the other hand, from the highest score 17, it became 37. From the mean in pretest of 10.76 it increased to 25 in the posttest. The mean gain score is 14.24.

✓ The comparison of pretest and posttest of experimental group using t-test independent samples indicates that there is a significant difference from the performance of the students before and after the intervention using SIM. The computed p-value 0 is less than the alpha 0.05. The increase in scores is very evident, from the lowest score 8 in pretest, it became 23 in the posttest. On the other hand, from the highest score 13, it became 37. From the accumulated pretest score mean of 10.71, to 28.82 in the posttest. Which summarizes the mean gain score to 18.12.

✓ The posttest mean score of control and experimental group were 25 and 28.82 respectively. The control group obtained the lowest score of 16 and highest score of 37 while the experimental group acquired 23 as the lowest and 37 as the highest. The results on t-test independent samples revealed “there is significant difference between the performance of two groups” having a computed p-value of .048 less than the critical-value of 0.05, therefore, the null hypothesis was rejected.

➤ *Limitations of the Study*

Limited numbers of students were able to participate in this study since the IATF (Inter-Agency Task Force) for the management of emerging infectious disease – COVID 19 released a policy regarding the conducting of limited face-to-face classes of the Department of Education, a maximum number of 20 student per classroom can only be entertained which prioritized the low performing students in modular distance learning. Two sections from Grade 7 students were used since the number of students complied with the required number of participants in a control and experimental group design.

➤ *Conclusion*

The researcher draws conclusions based on the findings throughout the study:

- The chosen five Mathematics specialists validated the developed SIM, it earned a mean rating of 4.9 with the description of “Very Evident” after considering several indicators in objectives, content, format and layout, presentation, and instructional characteristics. It is inferred that the SIM is valid. The material can help the students to improve their Mathematic competence.
- The results of pretest of the control and experimental don’t have significant difference. On the posttest, the performance of control and experimental group was improved through remediation using traditional methods and with the use of Strategic Intervention Material (SIM).
- The results of posttest from both groups, control and experimental manifest a significant difference using t-test independent samples. The experimental group obtained higher scores than the control group. This attests that the use of Strategic Intervention Material (SIM) is more effective for remediation than traditional methods of teaching.
- Interventions with the use of Strategic Intervention Material (SIM) can help students to bridge the learning gaps in Mathematics 7 – Algebra of the Grade 7 students of Victoria National High School.

➤ *Recommendations*

The summary of findings and conclusions come up with the following recommendations:

- The school administrators may use the developed SIM in providing intervention programs in aiding the least learned competencies in Mathematics 7 of their learners.
- The Mathematics Department heads may consider this study as the basis for conducting department-based trainings and webinars to equip the Mathematics teachers with knowledge in creating SIM innovations to bridge the gaps on least learned competencies.
- Mathematics Teachers on Grade 7 level may use the developed SIM as a tool in remediation which purpose is to catch the interest of the students as an important part in making interactive discussion to aid the difficulties of the learners in a lesson and to enrich and develop the skills and knowledge to different Mathematics lessons which are prerequisites in the next level of learning Mathematics.
- The Grade 8 teachers may use the developed SIM in related lessons as a review material before proceeding to the main discussion. The materials consist of lessons that related to the present topic since our curriculum is spiral.
- The story and adventure-type flow were integrated to the SIM which supports and caters the needs, learning styles, level and interest of the 21st century learners, therefore it may prescribe as a method in creating SIM covering the least learned competencies on different grade levels in Mathematics as well as in other subject areas.
- Future researchers could use this study as a guide to develop other SIMs that are technology-based which caters the needs, level, and interest of the students that are needed for the intervention on the least learned competencies to be successful.

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APPENDICES**APPENDIX A****K to 12 BASIC EDUCATION CURRICULUM MATHEMATICS 7 CURRICULUM GUIDE MOST ESSENTIAL LEARNING COMPETENCIES(MELCs) GRADE 7 ALGEBRA**

Grade: 7

Quarter: Second Quarter

No. of Weeks: 9

Content	Content Standard The learner...	Performance Standard The learner...	Learning Competencies The learner...	Duration	Code
Measurements	demonstrates understanding of the key concepts of measurement.	is able to formulate real - life problems involving measurements and solve these using a variety of strategies.	approximates the measures of quantities particularly length , weight/mass, volume, time, angle and temperature and rate.	Week 1	M7ME - IIa - 3
			converts measurements from one unit to another in both Metric and English systems .	Week 2	M7ME - IIb - 1
			solves problems involving conversion of units of measurement.		M7ME - IIb - 1
Algebra	The learner demonstrates understanding of key concepts of algebraic expressions, the properties of real numbers as applied in linear equations, and inequalities in one variable.	is able to model situations using oral, written, graphical, and algebraic methods in solving problems involving algebraic expressions, linear equations, and inequalities in one variable.	translates English phrases to mathematical phrases and English sentences to mathematics sentences, and vice versa.	Week 3	
			Illustrates and differentiates related terms in algebra: a. where is a positive integer b. constants and variables c. literal coefficients and numerical coefficients d. algebraic expressions, terms and polynomials e. number of terms, degree of the term and degree of the polynomial.		
			evaluates algebraic expressions for given values of the variables.	Week 4	M7ALIIc-4
			adds and subtracts polynomials.		M7ALIIId-2
			derives the laws of exponent.	Week 5	M7ALIIId-e-1
			multiplies and divides polynomials.		M7ALIIe-2
			uses models and algebraic methods to find the: (a) product of two binomials; (b) product of the sum and difference of two terms; (c) square of a binomial; (d) cube of a binomial; (e) product of a binomial and a trinomial.	Week 6	M7ALIIe-g-1
			solves problems involving algebraic expressions.	Week 7 to 8	M7ALIIg-2
			differentiates algebraic expressions, equations and inequalities.		M7ALIIg-2
			illustrates linear equation and inequality in one variable.		M7ALIIh-4
finds the solution of linear equation or inequality in one variable.	Week 9	M7ALIIi-1			
solves linear equation or inequality in one variable involving absolute value by: (a) graphing; and (b) algebraic methods.		M7ALIIi-j-1			

APPENDIX B**VICTORIA NATIONAL HIGH SCHOOL SCHOOL YEAR 2021-2022 GRADE 7 MATHEMATICS SECOND QUARTER**

Least Learned Competencies

Rank	Learning Competency	Item No.
1	uses models and algebraic methods to find the: (a) product of two binomials; (b) product of the sum and difference of two terms; (c) square of a binomial; (d) cube of a binomial; (e) product of a binomial and a trinomial	36
2	Derives laws of exponents	25
3	finds the solution of linear inequality in one variable	53
4	multiplies and divides polynomials.	29
5	uses models and algebraic methods to find the: (a) product of two binomials; (b) product of the sum and difference of two terms; (c) square of a binomial; (d) cube of a binomial; (e) product of a binomial and a trinomial	34

Prepared by:
Grade 7 Mathematics Teachers

Checked by:
SSHT – III Mathematics Department

**VICTORIA NATIONAL HIGH SCHOOL GRADE 7 MATHEMATICS SECOND QUARTER SUMMATIVE TEST S.Y.
2020-2021**

Least Learned Competencies

Rank	Learning Competency	Item No.
1	Derives laws of exponents	18
2	uses models and algebraic methods to find the: (a) product of two binomials; (b) product of the sum and difference of two terms; (c) square of a binomial; (d) cube of a binomial; (e) product of a binomial and a trinomial	42
3	finds the solution of linear equation and inequality in one variable	49
4	multiplies and divides polynomials.	19
5	multiplies and divides polynomials.	24

Prepared by:
Grade 7 Mathematics Teachers

Checked by:
SSHT – III Mathematics Department

APPENDIX C**TABLE OF SPECIFICATIONS (GRADE 7 MATHEMATICS – ALGEBRA) PRETEST/POSTTEST**

Learning Competencies The learner...	Percentage	No. of items	Level of Objectives					Item Placement
			k	c	ap	an	s	
derives the laws of exponent.	25%	10			1,3,4, 8, 9,	2, 5, 6, 7, 10		1-10
multiplies and divides polynomials.	25%	10			11-20			11-20
uses models and algebraic methods to find the: (a) product of two binomials; (b) product of the sum and difference of two terms; (c) square of a binomial; (d) cube of a binomial; (e) product of a binomial and a trinomial.	25%	10			21-30			21-30
Solves linear inequality in one variable	25%	10			31,32,33, 40	34, 35,36, 37, 38, 39		31-40
Total	100%	40			29	11		40

APPENDIX D

PRETEST/POST-TEST IN MATHEMATICS 7 - ALGEBRA

Name(Optional): _____

Date: _____

Grade & Section: _____

Score: _____

Direction: Write the letter of the correct answer on the space provided.

LAWS ON EXPONENTS

_____ 1. Express $7c^{-8}$ in positive exponent

a. $\frac{7}{c^8}$

b. $\frac{7}{c^{-8}}$

c. $\frac{1}{7c^8}$

d. $\frac{1}{7c^{-8}}$

_____ 2. If $h^2/h^2 = 1$, then $(s + 1)^0$ is

a. -1

b. 0

c. 1

d. infinite

_____ 3. Simplify $\left(\frac{-4c^4d^2}{8c^2d}\right)^2$

a. $\frac{c^4d^2}{4}$

b. $-\frac{c^4d^2}{4}$

c. $\frac{c^4d^2}{2}$

d. $-\frac{c^4d^2}{2}$

_____ 4. Simplify the expression $(-2a^3b^3c^4)^3$.

a. $-8a^6b^6c^7$

b. $8a^9b^9c^{12}$

c. $-8a^9b^9c^{12}$

d. $8a^6b^6c^7$

_____ 5. Which expression simplifies to x^3 ?

a. $\frac{x^{-2}}{x^5}$

b. $\frac{x^2}{x^5}$

c. $\frac{x^5}{x^{-2}}$

d. $\frac{x^5}{x^2}$

_____ 6. Simplify: $\frac{1}{4x^4y^{-2}}$.

a. $\frac{y^2}{4x^4}$

b. $\frac{1}{4x^4y^2}$

c. $\frac{4y^2}{x^4}$

d. $\frac{4x^2}{y^4}$

_____ 7. $-(18a^9)^0$

a. 1

b. 0

c. -1

d. -18

_____ 8. $(x^2)(x^2)(x^5)$

a. $9x$

b. x^9

c. $20x$

d. x^{20}

_____ 9. $(-2b^2)(b^5)(b^8)$

a. $-2b^{15}$

b. $-2b^{18}$

c. $-2b^{-15}$

d. $-2b^{-18}$

_____ 10. $\frac{2x^3y^{-3}}{3x^4}$

a. $\frac{2x^2}{3x^4y^3}$

b. $\frac{2y^3}{3x^2y^3}$

c. $\frac{2y^3}{3x}$

d. $\frac{2}{3xy^3}$

MULTIPLICATION and DIVISION OF POLYNOMIALS

____ 11. Find the product of $4a^3 + 6a$ and $2a$.

- a. $8a^4 + 12a^2$ b. $2a^2 + 3a$ c. $8a^3 + 12a$ d. $6a^4 + 8a^2$

____ 12. Simplify $-3(3m^4 - 9m^3 + 9m^2 - 3m)$

- a. $-9m^4 + 27m^3 - 27m^2 + 9m$ c. $9m^4 - 27m^3 + 27m^2 - 9m$
 b. $9m^4 + 27m^3 + 27m^2 + 9m$ d. $-9m^4 - 27m^3 - 27m^2 - 9m$

____ 13. What is the product of the expression $5 - 2x$ and $3 - 2x$?

- a. $4x^2 + 16x + 15$ b. $4x^2 + 16x - 15$
 c. $4x^2 - 16x - 15$ d. $4x^2 - 16x + 15$

____ 14. Expand the expression $(2x^2)(3x^2 + 2x - 1)$

- a. $6x^4 - 4x^3 - 2x^2$ c. $6x^4 + 4x^3 + 2x^2$
 b. $6x^4 + 4x^3 - 2x^2$ d. $6x^4 - 4x^3 + 2x^2$

____ 15. $4x \cdot 3x \cdot (-2x)$ is equal to _____.

- a. $24x^3$ b. $9x^3$ c. x^3 d. $-24x^3$

____ 16. $\frac{36c^3 + 18c^5 - 24c^8}{6c^2}$

- a. $6c - 3c^3 - 4c^6$ b. $6c + 3c^3 - 4c^6$
 c. $-6c + 3c^3 - 4c^6$ d. $-6c + 3c^3 - 4c^6$

____ 17. $\frac{15b^7 - 30a^3b^5 - 9a^3b^8 - 30b^9}{3b^3}$

- a. $5b^4 + 10a^3b^2 - 3a^3b^5 + 10b^6$ b. $5b^4 - 10a^3b^2 - 3a^3b^5 - 10b^6$
 c. $5b^4 - 10a^3b^2 - 3a^3b^5 + 10b^6$ d. $5b^4 + 10a^3b^2 - 3a^3b^5 - 10b^6$

____ 18. Find the quotient of $(6a^3b^2c - 8a^2b^4c^3 + 12ab^3c^2) \div (2ab^2c)$.

- a. $3a^2 - 4ab^2c^2 + 6bc$ b. $3a^2 - 4ab^2$
 c. $12a^2 - 16ab^2c^2 + 24bc$ d. $3a^2 + 6bc$

____ 19. Divide $(x^2 + 8x + 12)$ by $x + 2$.

- a. $x - 6$ b. $x + 6$ c. $x^2 - 6$ d. $x^2 + 6$

____ 20. If the dividend is $3x^3 - 5x^2 - 17x + 15$ and the divisor is $x - 3$, what is the quotient?

- a. $3x^2 + 14x - 5$ b. $3x^2 + 14x$
 c. $3x^2 - 4x - 5$ d. $3x^2 + 4x - 5$

SPECIAL PRODUCTS

_____21. What is the product of $(x - 5)$ and $(x^2 + 5x + 25)$?

- a. $x^3 - 125$ b. $x^3 + 125$ c. $x^3 - 25$ d. $x^3 + 25$

_____22. $(p - 6)(p + 10)$

- a. $p^2 + 4p - 60$ b. $p^2 + 16p - 60$
c. $p^2 - 4p + 60$ d. $p^2 - 16p + 60$

_____23. $(a - 11)(a + 11)$

- a. $a^2 + 22a + 121$ b. $a^2 - 121$
c. $a^2 - 22a + 121$ d. $a^2 + 121$

_____24. $(n + 9)(n + 9)$

- a. $n^2 + 18n + 81$ b. $n^2 - 18n + 81$
c. $n^2 + 18n - 81$ d. $n^2 + 18n + 18$

_____25. $(b^2 - 14)^2$

- a. $b^4 + 28b^2 + 196$ b. $b^4 - 28b^2 + 196$
c. $b^2 - 28b + 196$ d. $b^2 + 28b + 196$

_____26. Expand $(2s + 3)^3$

- a. $8s^3 + 36s^2 + 54s + 27$ b. $8s^3 - 36s^2 + 54s + 27$
c. $8s^3 + 36s^2 - 54s + 27$ d. $-8s^3 + 36s^2 + 54s + 27$

_____27. What is the equivalent of $r^2 - 49$?

- a. $(r - 7)(r + 7)$ b. $(r - 7)(r - 7)$
c. $(r + 7)(r + 7)$ d. $(r - 7)(r + 9)$

_____28. What is the product of $(a + 3)$ and $(a^2 - 3a + 9)$?

- a. $a^3 - 27$ b. $a^3 + 27$ c. $a^3 - 9$ d. $a^3 + 9$

_____29. Expand $(a + 2)^3$

- a. $a^3 - 6a^2 - 12a + 8$ b. $a^3 + 6a^2 - 12a + 8$
c. $a^3 - 6a^2 + 12a - 8$ d. $a^3 + 6a^2 + 12a + 8$

_____30. Simplify: $(n+3)(n-8)$

- a. $n^2 + 5n + 24$ b. $n^2 + 5n - 24$
c. $n^2 - 5n + 24$ d. $n^2 - 5n - 24$

LINEAR INEQUALITY IN ONE VARIABLE

____31. Solve the inequality $2x + 8 < -10$.

- a. $x < -5$ b. $x < 5$ c. $x < -9$ d. $x < 9$

____32. Find the solution set: $3a + 1 \geq 4$

- a. $a \geq 3$ b. $a \geq 1$ c. $a \leq 3$ d. $a \leq 1$

____33. What is the solution set of the inequality $3x - 12 < 15$?

- a. $x > 9$ b. $x < 9$ c. $x < -9$ d. $x > -9$

____34. Solve the inequality $-2x + 4 < -10$.

- a. $x < -7$ b. $x < 7$ c. $x > -7$ d. $x > 7$

____35. Which of the following will satisfy the inequality: $5x < 40$?

- a. $x > 8$ b. $x \geq 8$ c. $x < 8$ d. $x \leq 8$

____36. What is the solution set of the inequality $-5u > -25$?

- a. $u > -5$ b. $u > 5$ c. $u < 5$ d. $u < -5$

____37. What is the solution set of the inequality $-b + 4 \leq -6$

- a. $b \geq -10$ b. $b \geq 10$ c. $b \leq -10$ d. $b \leq -2$

____38. Solve the inequality: $-10y + 10 \leq 50$

- a. $y \leq -4$ b. $y \leq 4$ c. $y \geq 4$ d. $y \geq -4$

____39. What inequality will satisfy the solution $y < -6$?

- a. $4y > -24$ b. $-4y > 24$ c. $-4y > -24$ d. $-4y < 24$

____40. Find the solution set of the inequality $b + 4 > 6$.

- a. $b > 10$ b. $b > -10$ c. $b > 2$ d. $b > -2$

APPENDIX E

DIFFICULTY AND DISCRIMINATION INDEX FORMULA AND TABLE

Formula:

For discrimination index:

$$\text{Discrimination Index} = \frac{R_u + R_l}{N}$$

For difficulty index:

$$\text{Difficulty Index} = \frac{R_u - R_l}{\frac{1}{2}N}$$

Where:

R_u – number of correct responses in the upper group

R_l – number of correct responses in the lower group

N – Total number of students in the upper group and lower group

DIFFICULTY	DISCRIMINATION									
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Very Hard 19.50 and Below										
Hard 19.60-44.50										
Moderate 44.60-74.50			<i>Optimum Region</i>							
Easy 74.60-89.50										
Very easy 89.60 and above										

APPENDIX F

SUMMARY OF CORRECT ANSWERS OF UPPER AND LOWER GROUP

Item No.	Upper Group												Lower Group											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	0	1	1	0	1	0	1	1	0	1	0	1	0	0	1	1	0	0	1	1	0
2	1	1	1	1	1	0	1	1	1	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0
3	1	1	1	1	1	1	1	1	0	1	1	1	0	0	1	0	1	1	0	0	0	0	0	0
4	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	0	0	0	1	0	1	0	0
5	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
6	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	0	0	1	0	0
7	1	1	1	1	1	0	1	1	1	0	0	1	0	0	0	0	0	1	0	0	0	1	1	0
8	1	0	1	1	1	1	1	1	1	1	0	1	1	0	1	0	1	0	0	1	1	0	0	1
9	1	1	1	1	1	0	1	1	0	1	1	1	0	1	1	0	1	1	0	0	0	0	0	1
10	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0
11	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0
12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0
13	1	1	1	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
14	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	1
15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	1	0
16	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	0	0	0	0	1	0	1
17	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	1	0	1	1	0	0	1
18	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	1	1	0
19	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	0	0	0	0	1
20	1	1	1	1	1	1	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	1	0
21	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1	0	0	0	0	0	0	0	1	1
22	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	0	0	0
23	1	1	1	0	1	1	1	1	1	1	1	1	0	1	0	1	1	1	0	0	0	0	0	0
24	1	1	0	0	1	0	1	0	1	0	1	0	0	1	1	0	0	0	0	1	0	1	0	0
25	1	1	1	1	0	1	1	1	0	1	1	1	0	1	0	0	1	0	1	1	0	0	0	0
26	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
27	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	0	1	0	1	0	0
28	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	0	0	0	1	0	0	0
29	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	0	0	0	1	0	0	1	1
30	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0
31	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	1	0	1	1	0	0	0	0	0
32	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	1	0	1	0	0	0
33	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	0	1	0	0	0	0	0	0	1
34	1	1	1	1	0	1	1	1	1	1	1	1	0	0	0	1	0	0	1	0	1	0	0	0
35	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	1	1
36	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0
37	1	1	0	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	1	0	0	0	0	0
38	1	1	1	1	0	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0
39	1	1	1	1	0	1	0	1	1	1	1	1	0	0	0	0	1	0	0	1	1	0	1	0
40	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	1	0	0	0

APPENDIX G
ITEM ANALYSIS

Item No.	Group	Response				Difficulty Index	Description	Discrimination Index	Decision
		A	B	C	D				
1	Upper	8	0	4	0	0.58	AVERAGE	0.17	Revise
	Lower	6	4	0	2				
2	Upper	0	1	10	1	0.50	AVERAGE	0.67	Retain
	Lower	3	4	2	3				
3	Upper	11	0	0	1	0.58	AVERAGE	0.67	Retain
	Lower	3	3	1	5				
4	Upper	0	2	10	0	0.67	AVERAGE	0.33	Retain
	Lower	0	6	6	0				
5	Upper	1	1	0	10	0.46	AVERAGE	0.75	Retain
	Lower	3	4	4	1				
6	Upper	12	0	0	0	0.67	AVERAGE	0.67	Retain
	Lower	4	3	2	3				
7	Upper	2	9	0	1	0.50	AVERAGE	0.50	Retain
	Lower	4	3	2	3				
8	Upper	0	10	0	2	0.67	AVERAGE	0.33	Retain
	Lower	2	6	0	4				
9	Upper	10	1	1	0	0.63	AVERAGE	0.42	Retain
	Lower	5	2	2	3				
10	Upper	0	0	1	11	0.54	AVERAGE	0.75	Retain
	Lower	4	4	2	2				
11	Upper	9	2	1	0	0.50	AVERAGE	0.50	Retain
	Lower	3	2	4	3				
12	Upper	12	0	0	0	0.67	AVERAGE	0.67	Retain
	Lower	4	2	5	1				
13	Upper	1	2	4	5	0.25	HARD	0.33	Revise
	Lower	1	4	6	1				
14	Upper	1	11	0	0	0.71	AVERAGE	0.42	Retain
	Lower	3	6	1	2				
15	Upper	0	0	0	12	0.83	EASY	0.33	Revise
	Lower	2	2	0	8				
16	Upper	0	12	0	0	0.71	AVERAGE	0.58	Retain
	Lower	3	5	2	2				
17	Upper	0	11	1	0	0.63	AVERAGE	0.58	Retain
	Lower	4	4	3	1				
18	Upper	11	0	0	1	0.79	EASY	0.25	Revise
	Lower	8	2	1	1				
19	Upper	1	11	0	0	0.71	AVERAGE	0.42	Retain
	Lower	2	6	1	3				
20	Upper	1	1	1	9	0.46	AVERAGE	0.58	Retain
	Lower	4	2	4	2				
21	Upper	11	0	1	0	0.58	AVERAGE	0.67	Retain
	Lower	3	8	0	1				
22	Upper	12	0	0	0	0.79	EASY	0.42	Revise
	Lower	7	2	2	1				
23	Upper	0	11	1	0	0.63	AVERAGE	0.58	Retain
	Lower	4	4	3	1				
24	Upper	6	2	0	4	0.42	DIFFICULT	0.17	Revise
	Lower	4	1	4	3				
25	Upper	0	10	2	0	0.58	AVERAGE	0.50	Retain
	Lower	2	4	4	2				
26	Upper	11	1	0	0	0.50	AVERAGE	0.83	Retain

	Lower	1	4	4	3				
27	Upper	12	0	0	0	0.67	AVERAGE	0.67	Retain
	Lower	4	3	2	3				
28	Upper	0	11	1	0	0.67	AVERAGE	0.50	Retain
	Lower	4	5	3	0				
29	Upper	0	1	0	11	0.71	AVERAGE	0.42	Retain
	Lower	0	2	4	6				
30	Upper	1	0	0	11	0.58	AVERAGE	0.67	Retain
	Lower	1	3	5	3				
31	Upper	0	0	11	1	0.63	AVERAGE	0.58	Retain
	Lower	5	3	4	0				
32	Upper	0	12	0	0	0.71	AVERAGE	0.58	Retain
	Lower	1	5	6	0				
33	Upper	1	11	0	0	0.63	AVERAGE	0.58	Retain
	Lower	2	4	3	3				
34	Upper	0	1	0	11	0.58	AVERAGE	0.67	Retain
	Lower	6	2	1	3				
35	Upper	0	0	11	1	0.75	EASY	0.33	Revise
	Lower	0	3	7	2				
36	Upper	0	0	12	0	0.54	AVERAGE	0.92	Retain
	Lower	3	4	1	4				
37	Upper	0	11	1	0	0.54	AVERAGE	0.75	Retain
	Lower	4	2	3	3				
38	Upper	2	0	0	10	0.54	AVERAGE	0.58	Retain
	Lower	4	4	1	3				
39	Upper	2	10	0	0	0.58	AVERAGE	0.50	Retain
	Lower	3	4	4	1				
40	Upper	0	0	12	0	0.67	AVERAGE	0.67	Retain
	Lower	7	0	4	1				

APPENDIX H

RELIABILITY OF PRETEST/POSTTEST IN MATHEMATICS 7 – ALGEBRA KUDER-RICHARDSON 20

Item No.	UG	LG	p	q	pq
1	8	6	0.58	0.42	0.24
2	10	2	0.50	0.50	0.25
3	11	3	0.58	0.42	0.24
4	10	6	0.67	0.33	0.22
5	10	1	0.46	0.54	0.25
6	12	4	0.67	0.33	0.22
7	9	3	0.50	0.50	0.25
8	10	6	0.67	0.33	0.22
9	10	5	0.63	0.38	0.23
10	11	2	0.54	0.46	0.25
11	9	3	0.50	0.50	0.25
12	12	4	0.67	0.33	0.22
13	5	1	0.25	0.75	0.19
14	11	6	0.71	0.29	0.21
15	12	8	0.83	0.17	0.14
16	12	5	0.71	0.29	0.21
17	11	4	0.63	0.38	0.23
18	11	8	0.79	0.21	0.16
19	11	6	0.71	0.29	0.21
20	9	2	0.46	0.54	0.25
21	11	3	0.58	0.42	0.24
22	12	7	0.79	0.21	0.16
23	11	4	0.63	0.38	0.23
24	6	4	0.42	0.58	0.24
25	10	4	0.58	0.42	0.24
26	11	1	0.50	0.50	0.25
27	12	4	0.67	0.33	0.22
28	11	5	0.67	0.33	0.22
29	11	6	0.71	0.29	0.21
30	11	3	0.58	0.42	0.24
31	11	4	0.63	0.38	0.23
32	12	5	0.71	0.29	0.21
33	11	4	0.63	0.38	0.23
34	11	3	0.58	0.42	0.24
35	11	7	0.75	0.25	0.19
36	12	1	0.54	0.46	0.25
37	11	2	0.54	0.46	0.25
38	10	3	0.54	0.46	0.25
39	10	4	0.58	0.42	0.24
40	12	4	0.67	0.33	0.22

$k =$	40
$\sum pq =$	9.03
$\sigma_x^2 =$	125.89
$KR_{20} =$	0.95

Interpretation:

- 0.0 = Zero Reliability
 0.1 – 0.40 = Negligible
 0.41 – 0.70 = Moderate
 0.71 – 0.90 = High
 0.91 - 0.99 = Very High

The computed KR_{20} is 0.95, it implies that the teacher made a test with Very High reliability.

APPENDIX I

PRETEST AND POSTTEST OF CONTROL AND EXPERIMENTAL GROUP

Control Group	Pretest	Posttest	Gain Scores
A	17	37	20
B	17	35	18
C	13	33	20
D	12	29	17
E	12	24	12
F	11	28	17
G	11	23	12
H	11	22	11
I	11	21	10
J	10	28	18
K	10	25	15
L	10	20	10
M	10	19	9
N	8	25	17
O	8	21	13
P	7	16	9
Q	5	19	14
Mean	10.76	25	14.24

Experimental Group	Pretest	Posttest	Gain Scores
A	14	37	23
B	13	27	14
C	13	24	11
D	12	29	17
E	12	26	14
F	12	24	12
G	11	37	26
H	11	33	22
I	11	30	19
J	11	24	13
K	10	28	18
L	10	28	18
M	10	24	14
N	10	23	13
O	8	36	28
P	8	26	18
Q	6	34	28
Mean	10.71	28.82	18.12

APPENDIX J**MATHEMATICS SPECIALISTS' PERSONAL PROFILE**

Math Specialists	School	Address of School	Position	Subject Taught	No. of Years in Teaching	Highest Educational Attainment
Specialist 1	Tarlac National High School	San Roque, Tarlac City	Master Teacher II	Mathematics	29	Masters' Degree
Specialist 2	Central Azucarera Tarlac High School	Central, Tarlac City	Teacher I	Mathematics	4	Bachelor's Degree
Specialist 3	Victoria National High School	San Gavino, Victoria, Tarlac	Master Teacher II	Mathematics	18	Doctorate Degree
Specialist 4	Victoria National High School	San Gavino, Victoria, Tarlac	Master Teacher I	Mathematics	9	Masters' Degree
Specialist 5	Victoria National High School	San Gavino, Victoria, Tarlac	Teacher III	Mathematics	15	Masters' Degree

APPENDIX K

EVALUATION FORM FOR REVIEWING THE STRATEGIC INTERVENTION MATERIALS

Direction: Please review the intervention material based on a set of criteria formulated to evaluate the Strategic Intervention Materials (SIMs) in aiding Difficulties in Algebra. Please evaluate the SIMs based on the criteria outlined below by checking the appropriate space in the questionnaire.

Be guided of the following scale in evaluating the objectives, content, format and layout, presentation, and instructional characteristics of the SIMs.

- 5 – Very Evident
- 4 – Evident
- 3 – Satisfactory
- 2 – Fair
- 1 – Poor

ITEMS	5	4	3	2	1
Objectives of the Material					
1. The objectives are clearly stated in behavioral form.					
2. The objectives are well-planned, formulated, and organized.					
3. The objectives stated are specific, measurable, and attainable.					
4. The objectives are relevant to the topics of each lesson of the SIMs.					
5. The objectives take into account the needs of the students.					
Content					
1. The content of each lesson is directly relevant to the defined objectives.	5	4	3	2	1
2. The content of each lesson is simple and easy to understand.					
The topics of each lesson are fully discussed and each topic is given equal emphasis in the lesson.					
The topics are supported by illustrative examples, and the practice tasks are suited to the level of the students.					
5. The assessments are adequate and suitable to the topics.					
Format and Layout of the Learning Material					
1. The format/layout is well-organized, which makes the lessons more interesting.	5	4	3	2	1
2. The language is easy to understand.					
3. The language used is clear, concise, and motivating.					
4. The instructions in the SIMs are concise and easy to follow.					
Illustrations, pictures and other graphics are simple and easily recognizable, clarity and supplement text, properly labelled or captioned and attractive and appealing.					
Presentation					
1. The topics are presented in a logical and sequential order.	5	4	3	2	1
2. The lessons on SIMs are presented in a unique and original form.					
3. The learning activities are presented clearly.					
4. The presentation of each lesson is attractive and interesting to the students.					
5. Adequate examples are given to each topic.					
Instructional Characteristics					
6. The SIMs will motivate the students to study Algebra.	5	4	3	2	1
7. The SIMs will help the students master the topics at their own pace.					
8. The SIMs will allow the students to use their time more efficiently.					
9. The SIMs will develop the analytical thinking and reasoning skills of the students in Algebra.					
10. The SIMs will serve as a supplementary material that can cater to the needs of the students.					

Over-all Comments/Suggestions

 Evaluator's signature over printed name

APPENDIX L

The Summary of Comments and Suggestions of 5 Mathematics Specialists on the Strategic Intervention Material

1. I enjoyed viewing your SIMs.
2. Excellent materials.
3. I hope these SIMs will be used by as many learners as possible because it will certainly be a big help to them.
4. The material is aligned with the curriculum and standards, and is current, valid and reliable, with real-world materials. It is free from bias.
5. The content and directions are clear and understandable. Materials are easy to navigate through.
6. The materials are interactive and provide high quality sensory experiences for all users.
7. To meet the full requirements of contextualization and localization it is applicable to use creatures from Filipino folklore, such as kapre, tikbalang, tiyanak etc. as your visual character.
8. Restate the behavioral objectives.
9. Add objective for Affective domain in the SIMs.
10. Lessons were presented systematically.
11. Graphics and animations were very commendable.
12. Examples used are easy to understand.
13. Learning activities will surely motivate the students to answer.
14. The SIMs are very impressive.
15. Corrections on using words on Solving Linear Inequality SIM.
16. I appreciated the materials, they are excellent works.

APPENDIX M

LETTER TO CONDUCT STUDY

Dr. Angel M. Villamin
Principal III
Victoria National High School

Sir:

Greetings!

The undersigned is presently working on a thesis entitled “**STRATEGIC INTERVENTION MATERIAL (SIM) IN AIDING DIFFICULTIES ON DISTANCE LEARNING IN MATHEMATICS 7**”. It is expected that the result of this research will be of great help in improving the instruction of Mathematics Education.

In this regard, I am requesting your good office to allow the undersigned to conduct the study among seventy-eight (34) Grade 7 learners at Victoria National High School. Rest assured that the data gathered will be treated with utmost confidentiality and shall observe research ethics.

Your kind consideration and approval are highly appreciated.

Very truly yours,

(SGD) TRISHA MAE B. ORDONIO
Researcher

Noted:

(SGD) GLENDA P. BLANCO, Ph.D.
Thesis Adviser

Approved:

(SGD) ANGEL M. VILLAMIN, Ed.D.
Principal III

APPENDIX N

LETTER FOR VALIDATION

Elvira C. Dupitas

Master Teacher II

Tarlac National High School

Ma'am:

The undersigned is presently conducting a research study entitled “**STRATEGIC INTERVENTION MATERIAL (SIM) IN AIDING DIFFICULTIES ON DISTANCE LEARNING IN MATHEMATICS 7**” as partial fulfillment of the requirements to the degree of Master of Arts in Education major in Mathematics at Tarlac State University.

Being aware of your competence and expertise in field of Mathematics I would like to request for your time and expertise by being one of my evaluators in validating the objectives, content, format and layout, presentation, and instructional characteristics of Strategic Intervention Materials (SIMs). Your responses to each item may lead to the improvement of the SIMs, making it possible to achieve its goal.

Very truly yours,

(SGD)TRISHA MAE B. ORDONIO

Researcher

Noted:

(SGD) GLENDA P. BLANCO, Ph.D.

Thesis Adviser

Approved:

(SGD) ELVIRA C. DUPITAS

Master Teacher II

LETTER FOR VALIDATION

Art M. Policarpio

LRDMS Coordinator

Central Azucarera Tarlac High School

Sir:

The undersigned is presently conducting a research study entitled “**STRATEGIC INTERVENTION MATERIAL (SIM) IN AIDING DIFFICULTIES ON DISTANCE LEARNING IN MATHEMATICS 7**” as partial fulfillment of the requirements to the degree of Master of Arts in Education major in Mathematics at Tarlac State University.

Being aware of your competence and expertise in field of Mathematics and being LRDMS(Learning Resource Management and Development System) Coordinator of your school, I would like to request for your time and expertise by being one of my evaluators in validating the objectives, content, format and layout, presentation, and instructional characteristics of Strategic Intervention Materials (SIMs). Your responses to each item may lead to the improvement of the Strategic Intervention Materials (SIMs), making it possible to achieve its goal.

Very truly yours,

(SGD)TRISHA MAE B. ORDONIO

Researcher

Noted:

(SGD) GLENDA P. BLANCO, Ph.D.

Thesis Adviser

Approved:

(SGD)ART M. POLICARPIO

LRDMS Coordinator – CATHS

LETTER FOR VALIDATION

Catherine V. Galotera

Teacher III

Victoria National High School

Ma'am:

The undersigned is presently conducting a research study entitled “**STRATEGIC INTERVENTION MATERIAL (SIM) IN AIDING DIFFICULTIES ON DISTANCE LEARNING IN MATHEMATICS 7**” as partial fulfillment of the requirements to the degree of Master of Arts in Education major in Mathematics at Tarlac State University.

Being aware of your competence and expertise in field of Mathematics I would like to request for your time and expertise by being one of my evaluators in validating the objectives, content, format and layout, presentation, and instructional characteristics of Strategic Intervention Materials (SIMs). Your responses to each item may lead to the improvement of the Strategic Intervention Materials (SIMs), making it possible to achieve its goal.

Very truly yours,

(SGD)TRISHA MAE B. ORDONIO

Researcher

Noted:

(SGD)GLENDA P. BLANCO, Ph.D.

Thesis Adviser

Approved:

(SGD)CATHERINE V. GALOTERA

Teacher III

LETTER FOR VALIDATION

Dr. Julieanne Marie Y. Flores

Master Teacher II

Victoria National High School

Ma'am:

The undersigned is presently conducting a research study entitled “**STRATEGIC INTERVENTION MATERIAL (SIM) IN AIDING DIFFICULTIES ON DISTANCE LEARNING IN MATHEMATICS 7**” as partial fulfillment of the requirements to the degree of Master of Arts in Education major in Mathematics at Tarlac State University.

Being aware of your competence and expertise in field of Mathematics I would like to request for your time and expertise by being one of my evaluators in validating the objectives, content, format and layout, presentation, and instructional characteristics of Strategic Intervention Materials (SIMs). Your responses to each item may lead to the improvement of the interactive e-book, making it possible to achieve its goal.

Very truly yours,

(SGD)TRISHA MAE B. ORDONIO

Researcher

Noted:

(SGD)GLENDA P. BLANCO, Ph.D.

Thesis Adviser

Approved:

(SGD) JULIANNE MARIE Y. FLORES, Ph.D.

Master Teacher II

LETTER FOR VALIDATION

Ferdinand S. Azuela

Master Teacher I

Victoria National High School

Sir:

The undersigned is presently conducting a research study entitled “**STRATEGIC INTERVENTION MATERIAL (SIM) IN AIDING DIFFICULTIES ON DISTANCE LEARNING IN MATHEMATICS 7**” as partial fulfillment of the requirements to the degree of Master of Arts in Education major in Mathematics at Tarlac State University.

Being aware of your competence and expertise in field of Mathematics I would like to request for your time and expertise by being one of my evaluators in validating the objectives, content, format and layout, presentation, and instructional characteristics of Strategic Intervention Materials (SIMs). Your responses to each item may lead to the improvement of the SIMs, making it possible to achieve its goal.

Very truly yours,

(SGD) TRISHA MAE B. ORDONIO

Researcher

Noted:

(SGD) GLENDA P. BLANCO, Ph.D.

Thesis Adviser

Approved:

(SGD) FERDINAND S. AZUELA

Master Teacher I

CERTIFICATION BY THE MATHEMATICS SPECIALISTS

To Whom It May Concern

This is to certify that the undersigned served as pool of specialists in validating the of objectives, content, format and layout, presentation, and instructional characteristics and other findings like conceptual errors, factual errors, grammatical errors/ or typographical errors and other errors that they may find in the material **“STRATEGIC INTERVENTION MATERIAL (SIM) IN AIDING DIFFICULTIES ON DISTANCE LEARNING IN MATHEMATICS”**.

This certification is issued upon request of **Trisha Mae B. Ordonio** for whatever legal purpose it may serve her.

(SGD)JULIANNE MARIE Y. FLORES, Ph.D.
Master Teacher II

(SGD)ELVIRA C. DUPITAS
Master Teacher II

(SGD)FERDINAND S. AZUELA
Master Teacher I

(SGD)CATHERINE V. GALOTERA
Teacher III

(SGD)ART M. POLICARPIO
LRDMS Coordinator – CATHS