LESSON PLAN TEMPLATE

Lesson Title	Real-World Applications of Special Products and Factoring of Polynomials
Learning Area/s	Mathematics
Name of Teacher/s	DEPED TAMBAYAN PH (Visit www.depedtambayanph.net for more downloads.)
Grade Level and Section	Grade 8
No. of Sessions	4 Sessions
References	None specified
Declaration of AI use	This lesson plan was co-created using Gemini AI to assist with unpacking competencies into a 4-session learning design, structuring activities, and assessment formulation.

Intentions. **Meaningful learning experiences are anchored in how we frame them. Start by deciding what you want learners to master by the end of the lesson – keep it clear and simple.**	
Learning Competency and Curriculum Standards:	**Learning Competency:** ● Solve problems involving special products and factors of polynomials. **Content Standards:** The learners should have knowledge and understanding of... ● measures of central tendency of ungrouped data ● algebraic expressions and operations with monomials, binomials, and multinomials ● special products for binomials, and factorization of polynomials ● rational algebraic expressions and equations ● rules for obtaining terms in sequences ● plotting points, and finding distance and the midpoint of line segments on the Cartesian coordinate plane **Performance Standards:** By the end of the term, the learners are able to... ● determine measures of central tendency of ungrouped data and use the measures to draw conclusions. ● add and subtract monomials, and multiply combinations of monomials, binomials, and multinomials. ● obtain special binomial products. ● factorize different types of polynomials. ● simplify, and operate with, rational algebraic expressions and solve simple rational algebraic equations. ● obtain the rule for finding the next term in a sequence. ● plot points, find the distance between two points, and find the midpoint of line segments, on the Cartesian coordinate plane.

	Session 1	Session 2	Session 3	Session 4
Learning Objectives:	By the end of the session, learners should be able to: ● Identify real-life scenarios that require the use of special products. ● Apply the patterns of Square of a Binomial and Sum and Difference of Two Terms to solve area-related problems in a community garden context.	By the end of the session, learners should be able to: ● Factorize polynomials using Greatest Common Monomial Factor (GCMF) and Difference of Two Squares. ● Determine the dimensions of rectangular objects in the classroom or community given their area expressions.	By the end of the session, learners should be able to: ● Factor general trinomials ($x^2 + bx + c$) and perfect square trinomials. ● Solve word problems involving the dimensions of community spaces like basketball courts or stages.	By the end of the session, learners should be able to: ● Synthesize special products and factoring to solve multi-step problems. ● Create a 'Math in the Community' poster showing a solved problem involving polynomial factoring/products.
Learner Context:	Learners show a strong preference for visual representations and hands-on activities. While they can perform basic algebraic operations, many struggle with the abstract nature of variables when not connected to physical objects. A significant number of students are highly engaged when problems involve local agricultural settings, reflecting the community's	The class exhibits mixed readiness levels; approximately one-third of the class can factor quickly, while others still struggle to find the GCF of large numbers. Learners are generally collaborative and enjoy peer-tutoring. A barrier identified is the difficulty in identifying 'perfect squares' beyond 100, necessitating the use of visual aids or multiplication	Learners respond well to gamified activities. Many enjoy solving puzzles but get frustrated when trial-and-error factoring takes too long. A common barrier is the sign convention (positive/negative) in trinomials. Their strength lies in their ability to relate mathematical 'balance' to daily life situations, such as budgeting or sharing resources.	At this stage, learners are becoming more confident but still show signs of 'formula fatigue.' They are most productive when given creative freedom. High-performing students are eager to help their peers. A persistent barrier is the linguistic complexity of multi-step word problems, requiring 'unpackaging' of sentences into mathematical symbols.

	farming background. However, some learners exhibit low confidence in mental multiplication, requiring scaffolding through visual area models.	charts.		
Learning Experience. **A learning experience is like a thoughtfully designed journey. Each activity and interaction builds towards meaningful understanding and growth. Identify activities and interactions to help learners gain knowledge, skills, or understanding in a purposeful way.**				
Pre-Lesson:	**"Halamanan Challenge":** Show a picture of a square garden plot in the community. If the side is increased by a certain measure 'x', how does the area change? Use paper cut-outs to represent the old and new areas.	**"Factor Hunt":** Distribute small cards with numbers and variables. Students must find their 'partners' to form a specific product displayed on the screen.	**"The X-Factor Game":** A mental math game where students must find two numbers that multiply to 'c' and add to 'b' based on a given trinomial $x^2 + bx + c$.	**"Real-World Gallery Walk":** Briefly display images of different local structures (bridges, windows, tiles) and ask students to identify geometric shapes that might involve polynomials.
Flow:	**1. Scaffolding:** Review the patterns $(a+b)^2$ and $(a-b)(a+b)$ using a square-grid visualization on the board. **2. Social Learning:** In pairs, learners solve a problem about expanding a 'bahay kubo' floor plan. **3. Active Retrieval:** Conduct a 'Think-Pair-Share' where students explain the	**1. Scaffolding:** Demonstrate factoring as the reverse of multiplication using 'Algebra Tiles' (drawn or physical). **2. Active Retrieval:** 'Flash Card Drill' on identifying perfect square numbers. **3. Social Learning:** 'Group Rotation' – each group is assigned a 'mural' (a large sheet of paper) with a	**1. Scaffolding:** Use the 'AC Method' or 'Cross Method' visually on the board to guide the factoring process. **2. Check for Understanding:** 'Whiteboard Showdown' – students solve a trinomial on mini-whiteboards and lift them up simultaneously. **3. Social Learning:** Small groups solve	**1. Active Retrieval:** A 'Speed Factoring' warm-up covering all types learned. **2. Social Learning:** 'Collaborative Problem Solving' – groups are given a complex problem (e.g., finding the area of a shaded region between two squares). **3. Scaffolding:** The teacher models the 'Problem-Solving

	shortcut for squaring a binomial without doing long multiplication. **4. Check for Understanding:** Use a 'Thumbs Up/Down' technique after presenting a solved area problem with a deliberate error in the middle term.	polynomial area; they must determine the length and width by factoring GCMF or Difference of Squares. **4. Check for Understanding:** 'Exit Ticket' where students must identify if $16x^2 - 9$ is factorable and why.	a scenario about a 'Pista' (festival) stage area where they must find the dimensions to fit specific props. **4. Active Retrieval:** Students explain to their seatmate the difference between a Perfect Square Trinomial and a General Trinomial.	Cycle' (Understand, Plan, Solve, Look Back) for a multi-step problem. **4. Check for Understanding:** Peer-assessment of the posters created during the session using a simplified rubric.
Learning Resources:	• PowerPoint presentation showing local garden layouts • Graph paper and colored markers • Worksheets with area-based word problems	• Algebra Tiles (cardboard or plastic) • Multiplication and Perfect Square charts • Manila paper for group murals	• Mini-whiteboards/markers • Projector for 'The X-Factor Game' • Word problem cards based on local festivals	• Art materials (crayons, markers, cartolina) • Calculators for checking products • Rubric for the 'Math in the Community' poster
Opportunities for integration:	**TLE (Agriculture):** Planning and measuring garden plots for efficient crop spacing.	**Arts:** Discussing proportions and dimensions in traditional Filipino mural painting or weaving (Banig).	**Physical Education:** Measuring and calculating the area of local sports courts (volleyball/basketball).	**English/Literacy:** Translating complex Filipino/English word problems into algebraic expressions. **Values Education:** Teamwork and helping classmates through peer-tutoring.
Assessment. **Assessments reveal what learners have gained and what they still need help with. These are helpful in providing you with information to guide your future instruction throughout the entire session.**				
Formative	**"Plot the Area":** A	**"The Dimension**	**"Factoring**	**"The Master**

Assessment:	short activity where students are given a binomial representing the side of a square plaza and must write the trinomial expression for its area, illustrating the parts of the trinomial on a diagram.	**Detective":** Provide 3 expressions of area from 'local blueprints' (e.g., a barangay hall room). Students must write the factored form representing the length and width.	**Bingo":** Students fill a 3x3 grid with possible factors. The teacher calls out trinomials, and students mark the corresponding factors.	**Builder":** A performance task where students must design a 'mini-park' layout on paper, labeling regions with polynomial expressions and providing the factored dimensions.
Ways Forward. **Meaningful learning can also happen beyond the classroom – for both the learners and the teacher. Pause and reflect on what happened today.**				
Extended learning opportunities:	For learners needing support: Provide a 'cheat sheet' showing the visual area model of $(a+b)^2$. For advanced learners: Challenge them to find the area of a border surrounding a rectangular pool using (a-b)(a+b).	Provide a 'Perfect Square' reference table for learners who struggle with number sense. Advanced students can explore factoring expressions with higher even exponents (e.g., x^4 - 16).	Learners struggling with signs will receive a 'Sign Rule' flowchart. Advanced learners will be given trinomials where 'a' is greater than 1 (e.g., $2x^2 + 7x + 3$).	Students who finish early can create a 'tutorial video' or a short comic strip explaining a factoring method. Struggling learners will have a guided session focused on translating words to symbols.
Reflections:	Reflect on whether the visual area models helped learners understand the middle term (2ab) in the square of a binomial, which is a common point of confusion.	Assess if the physical movement in the 'Group Rotation' improved engagement for the kinesthetic learners in the class.	Did the 'X-Factor Game' effectively reduce the time spent on trial-and-error during the main activity?	Reflect on the effectiveness of the 'Master Builder' task in providing tangible evidence of the learners' ability to apply abstract math to concrete design.