LESSON PLAN TEMPLATE

Lesson Title	Mastering Quadratic Inequalities in One Variable
Learning Area/s	Mathematics
Name of Teacher/s	DEPED TAMBAYAN PH (www.depedtambayanph.net)
Grade Level and Section	Grade 10
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:** Illustrate on the number line quadratic inequalities in one variable. Solve quadratic inequalities in one variable and express solutions in various notations. **Content Standards:** The learners should have knowledge and understanding of... • the laws of sines and the laws of cosines • translations, reflections, and rotations, in the Cartesian plane • quadratic inequalities in one variable and in two variables • absolute value equations and inequalities in one variable and their graphs • box - and - whisker plots, and cumulative frequency histograms and polygons • quartiles, deciles, and percentiles; interquartile range, and outliers **Performance Standards:** By the end of the term, the learners are able to... • find sides and angles in oblique triangles using the laws of sines and the laws of cosines. • describe translations, reflections, and rotations in the Cartesian plane. • solve and graph the solutions of quadratic inequalities in one variable and in two variables. • solve absolute value equations in one variable and absolute value inequalities in one variable, and graph the solutions. • construct and interpret box - and - whisker plots, and cumulative frequency histograms and polygons. • calculate quartiles, deciles, and percentiles; interquartile range, and outliers.

	Session 1	Session 2	Session 3	Session 4
Learning Objectives:	At the end of the session, the learners are expected to: ● Distinguish quadratic inequalities from quadratic equations. ● Determine the critical values of a quadratic inequality by solving the related quadratic equation. ● Plot critical values on a number line using appropriate circle markers (open or closed).	At the end of the session, the learners are expected to: ● Apply the test point method to determine the solution set of a quadratic inequality. ● Express the solution of a quadratic inequality using interval notation and set-builder notation. ● Illustrate the final solution set on a number line.	At the end of the session, the learners are expected to: ● Solve quadratic inequalities using the Sign Chart (Table of Signs) method. ● Compare the efficiency of the Sign Chart method versus the Test Point method.	At the end of the session, the learners are expected to: ● Solve real-world problems involving quadratic inequalities. ● Synthesize all learned notations (graphical, interval, and set-builder) in a final summative task.
Learner Context:	The learners are Grade 10 students with mixed mathematical readiness. While most can solve quadratic equations through factoring, some struggle with conceptualizing inequalities as ranges rather than single points. They are highly visual and respond well to color-coded representations on the chalkboard. A common barrier is	Learners have shown proficiency in finding critical values but require more practice in logical testing. They enjoy 'trial and error' activities but often make sign errors when multiplying two negative numbers. They show interest when math is framed as a 'detective' task of finding 'true' or 'false' zones.	The class prefers structured, tabular formats for organizing data. They sometimes get overwhelmed by the multiple steps in the test point method, so a table of signs offers a more systematic 'algorithm' that caters to their need for order. Some learners with lower reading comprehension may struggle with the transition from	Learners show high engagement when problems are contextualized within Filipino culture, such as business in a sari-sari store or dimensions of local crafts. They are motivated by practical applications but may find 'translating' word problems into mathematical symbols challenging.

	the confusion between the 'greater than' and 'less than' symbols when applied to negative numbers.		factors to signs.	
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:	**Flashcard Drill:** A quick mental math activity where students identify if a given mathematical sentence is an equation or an inequality. Examples include local contexts like *'The price of a kilo of rice is equal to 50 pesos'* vs *'The cost of snacks must be less than 100 pesos.'*	**Number Line Relay:** A quick game where students identify which integers fall within a given range (e.g., 'Give me a number between -5 and 2').	**Sign Rule Refresh:** A 2-minute drill on the product of signs (e.g., (-) x (-) = ?; (+) x (-) = ?). This is crucial for the success of the Sign Chart method.	**Real-world Scenario:** 'The area of a square plaza in our barangay must be at least 100 square meters but no more than 400 square meters. How can we express this?'
Flow:	**1. Introduction (Scaffolding):** Review factoring quadratic trinomials. Present the problem: $x^2 + 5x + 6 = 0$ vs $x^2 + 5x + 6 > 0$. Explain that the roots of the equation are 'critical values' that divide the number line into intervals. **2. Modeling (Checks for Understanding):** Demonstrate how to find roots for	**1. Active Retrieval:** Review the critical values from the previous session. Draw a large number line on the board representing three regions. **2. Exploration (Scaffolding):** Introduce the 'Test Point' method. Pick a number from each region (e.g., -10, 0, 10). Substitute these into the original	**1. Presentation:** Introduce the Table of Signs. Explain the columns (Intervals) and rows (Factors and Product). **2. Guided Practice (Scaffolding):** Solve $(x-5)(x+1) < 0$ together. Fill in the table step-by-step. Ask: 'If x is -10, is (x-5) positive or negative?' **3. Comparison**	**1. Situation Analysis:** Present a problem: 'A local craftsman wants to make a rectangular Banig (mat) where the length is 2 meters longer than the width, and the area must be at least 15 square meters.' **2. Modeling (Scaffolding):** Translate the word problem: $w(w+2) \geq 15$. Transform it into $w^2 + 2w - 15 \geq$

	(x+2)(x+3) > 0. Show the plotting of -2 and -3 on the number line. Ask: 'Should the circles be shaded or hollow?' based on the inequality symbol. **3. Guided Practice (Social Learning):** In pairs, students find the critical values for three different inequalities and sketch their initial number lines on mini-whiteboards or activity sheets. **4. Independent Practice:** Students work on a worksheet identifying critical values for equations involving local area measurements (e.g., dimensions of a community garden).	inequality to see if they make the statement TRUE or FALSE. **3. Elaboration (Checks for Understanding):** Demonstrate how to write the 'True' regions in Interval Notation (e.g., (-∞, -3) U (-2, ∞)). Use the analogy of 'exclusive clubs' for open parentheses and 'inclusive groups' for brackets. **4. Pair Work (Social Learning):** Students test regions for $x^2 - 4 > 0$ and compare their findings with their seatmates. They must agree on the final interval notation.	**(Checks for Understanding):** Discuss which method (Test Point vs. Sign Chart) feels faster or more reliable. Encourage students to choose the method they are most comfortable with for the next task. **4. Group Activity (Social Learning):** Groups of 4 are given different 'Scrambled Tables.' They must correctly place the signs and intervals to find the solution set of a given inequality.	0. **3. Application (Active Retrieval):** Students solve the inequality using their preferred method (Sign Chart or Test Point). Emphasize that in real life, dimensions cannot be negative (contextual filtering of the solution set). **4. Summative Task:** A short assessment featuring three problems: one purely mathematical, one involving a number line graph, and one real-world application (e.g., profit margins of a local product).
Learning Resources:	● Chalkboard and colored chalks ● Printed Activity Sheets ● PowerPoint Slide showing different inequality symbols	● Projector/Smart TV for digital number line visualization ● Worksheets with pre-drawn number lines	● Large Table of Signs posters ● Marker pens and manila paper	● Word problem worksheets ● Calculators ● Pictures of local crafts (Banig, Rice fields) for context
Opportunities for integration:	**Social Studies:** Discussion on 'thresholds' or limits, such as the carrying capacity of a local ecological	**English Language Arts:** Precision in language—discussing the difference between 'between' and 'inclusive' in	**ICT:** Brief mention of how logic gates (True/False, 1/0) in computers relate to testing conditions in inequalities.	**Entrepreneurship/ TLE:** Calculating minimum production levels to ensure a business does not lose

	site or community hall.	word problems.		money (Profit > 0).
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 Assessment:	**Exit Ticket:** Students must write down the critical values for the inequality $x^2 - 9 < 0$ and state whether the circles on the number line would be open or closed.	**Think-Pair-Share:** Give an inequality and ask students to test one specific point. If the point results in 'True', they raise a green card; if 'False', a red card. Check for accuracy across the room.	**Board Work:** Randomly call students to fill in one cell of a Sign Chart on the board for the inequality $x^2 + 2x - 8 \geq 0$.	**Problem Solving Rubric:** Assessment of the final task based on: Correctness of Inequality, Identification of Critical Values, Correct Test/Sign Chart, and Accuracy of the Interval/Graph.
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:	Provide a supplementary video link or a simplified reading material for students who struggled with factoring to review basic quadratic solutions at home.	For advanced learners: Introduce an inequality where the quadratic is not factorable by sight, requiring the quadratic formula to find decimal critical values.	Homework: Students create their own Sign Chart for a given inequality and write a one-sentence reflection on why they chose that specific method.	Interview a local sari-sari store owner or a farmer about any 'minimum' or 'maximum' limits they face in their daily work and try to draft an inequality for it for extra credit.
Reflections:	Reflect on: How many students correctly identified the open/closed circle distinction? Did the use of colored chalk help visual learners differentiate the intervals?	Reflect on: Were students able to transition from the visual number line to the abstract interval notation? Which notation format caused the most confusion?	Reflect on: Did the Sign Chart reduce the number of arithmetic errors? Are students still struggling with the 'greater than zero means positive' concept?	Reflect on: Was the 'Banig' problem relatable? How well did they handle the 'impossible' negative solutions in the real-world context?