1 Exploring Patterns in Linear and Quadratic Relationships

Topic 3: Applications of Quadratics

ELPS: 1.A, 1.C, 1.D, 1.E, 1.F, 1.G, 2.C, 2.D, 2.E, 2.G, 2.H, .2I, 3.A, 3.B, 3.C, 3.D, 3.E, 3.F, 4.A, 4.B, 4.C, 4.G, 4.K, 5.B, 5.E, 5.F, 5.G

Topic Pacing: 15 Days

Lesson	Lesson Title	Highlights	TEKS*	Pacing**
1	**Ahead of the Curve** Solving Quadratic Inequalities	Students analyze a Worked Example to calculate the solution set of a quadratic inequality by first solving for the roots of its related quadratic equation, then determining which interval(s) created by the roots satisfy the inequality. They use both a number line and coordinate plane to select the correct intervals and then make connections between those methods. Students solve a problem in context requiring the use of a quadratic inequality, and they also use a transformation to make comparisons within a context. Throughout this lesson, students use the Quadratic Formula, technology, and inequality or interval notation.	2A.4H	1
2	**All Systems Go!** Systems of Quadratic Equations	Students solve a problem in context that can be modeled by a system of equations involving a linear equation and a quadratic equation. They solve this first question graphically and discuss the number of solutions to the system and the number of solutions that make sense for the context. Students are then guided to solve a system of a linear equation and a quadratic equation algebraically, and then verify their results graphically. Students solve additional systems algebraically and graphically. They also discuss the number of possible solutions for each type of system and sketch graphs demonstrating those solutions.	**2A.3A** 2A.3C 2A.3D	1
Suggested Placement of Learning Individually with Skills Practice or MATHia				1
3	**The Ol' Switcharoo** Inverses of Linear and Quadratic Functions	*Inverses of functions* are introduced in this lesson. A Worked Example highlights how to determine the inverse of a linear function algebraically. Students use this example to determine other inverses of functions. They then create the graph of the inverse of a linear function by reflecting the original function across the line $y = x$ using patty paper. This process is repeated for quadratic functions. The term *one-to-one function* is defined, and students determine whether the inverse of a function is also a function. A graphic organizer is completed to summarize the definition and representations of inverses functions.	2A.2B **2A.2C**	3
Suggested Placement of Learning Individually with Skills Practice or MATHia				1
Mid-Topic Assessment				1
4	**Modeling Behavior** Using Quadratic Functions to Model Data	Students begin the lesson by determining a quadratic regression equation to model a set of data and use the regression equation to make predictions. Next, they are given a quadratic equation that models a context, but this time students see the need for an inverse equation because they must solve for the independent variable when the dependent variable is provided. Throughout the lesson, students identify the independent and dependent quantities and domain and range of functions in order to make sense of an inverse of function.	**2A.2C** 2A.4E 2A.7I 2A.8A 2A.8B **2A.8C**	1
Suggested Placement of Learning Individually with Skills Practice or MATHia				1

Lesson	Lesson Title	Highlights	TEKS*	Pacing**
5	**Going the Equidistance** Equation of a Parabola	The focus and directrix of a parabola are introduced through an exploratory activity. Students use concentric circles to plot points that are equidistant from both a line and a point not on the line, then connect these equidistant points to form a parabola. A parabola is described as a conic section, and the terms *locus of points*, *parabola*, *focus*, and *directrix* are given. Students construct a *directrix* and a focus above the directrix on patty paper and complete multiple folds of the focus onto the line to create a parabola. *Concavity* and the *vertex of a parabola* are defined. Through investigations students conclude that any point on a parabola is equidistant from the focus and the directrix. The focus and directrix are then used to write the equation of a parabola, and the general and standard form of a parabola are given. Students derive the standard form of a parabola algebraically to make sense of the constant ρ in the equation and use this constant to graph parabolas. The Distance Formula is used to determine the equation of points that are equidistant from a given focus and a given directrix where the vertex is a point other than the origin. Students apply characteristics of parabolas to solve real-world problem situations.	**2A.4B**	3
Suggested Placement of Learning Individually with Skills Practice or MATHia				1
End of Topic Assessment				1

Texas Algebra II: Module 1, Topic 3 Pacing Guide

150-Day Pacing

TEXAS MATH SOLUTION

1 Day Pacing = 45-minute Session

✱ This activity highlights a key term or concept that is essential to the learning goals of the lesson.

Day 1	Day 2	Day 3	Day 4	Day 5
TEKS: 2A.4H	TEKS: **2A.3A**, 2A.3C, 2A.3D	LEARNING INDIVIDUALLY	TEKS: 2A.2B, **2A.2C**	LESSON 3 continued
LESSON 1 Ahead of the Curve GETTING STARTED ✱ ACTIVITY 1 ✱ ACTIVITY 2 TALK THE TALK ✱	LESSON 2 All Systems Go! GETTING STARTED ✱ ACTIVITY 1 ✱ ACTIVITY 2 ✱ TALK THE TALK ✱	Skills Practice OR MATHia	LESSON 3 The Ol' Switcharoo GETTING STARTED ACTIVITY 1 ✱ ACTIVITY 2 ✱	ACTIVITY 3 ✱ ACTIVITY 4 ✱

Day 6	Day 7	Day 8	Day 9	Day 10
LESSON 3 continued ACTIVITY 5 ✱ TALK THE TALK	LEARNING INDIVIDUALLY Skills Practice OR MATHia	MID-TOPIC ASSESSMENT	TEKS: **2A.2C**, 2A.4E, 2A.7I, 2A.8A, 2A.8B, **2A.8C** LESSON 4 Modeling Behavior GETTING STARTED ✱ ACTIVITY 1 ✱ ACTIVITY 2 ✱ TALK THE TALK ✱	LEARNING INDIVIDUALLY Skills Practice OR MATHia

Day 11	Day 12	Day 13	Day 14	Day 15
TEKS: **2A.4B** LESSON 5 Going the Equidistance GETTING STARTED ✱ ACTIVITY 1 ✱ ACTIVITY 2 ✱	LESSON 5 continued ACTIVITY 3 ✱ ACTIVITY 4 ✱	LESSON 5 continued ACTIVITY 5 ✱ ACTIVITY 6 TALK THE TALK ✱	LEARNING INDIVIDUALLY Skills Practice OR MATHia	END OF TOPIC ASSESSMENT