

9-12 Honors Algebra II Curriculum

July 6, 2017 St. Charles R6 School District



CONTENT AREA: Mathematics COURSE TITLE: Honors Algebra 2	UNIT: Piecewise Functions UNIT DURATION: 3 Weeks
MATERIALS / INSTRUCTIONAL RESOURCES FOR THIS UNIT: • Graphing Calculator, Textbook, Supplemental Handouts	 BIG IDEA(S): Solve absolute value equations and inequalities Graph piecewise functions Apply piecewise functions
 ENDURING UNDERSTANDINGS: Recognize that the absolute value function is a piecewise function Equations can have multiple solutions. Equations can have extraneous solutions. Students will recognize that graphs can be disconnected. Real world applications can be represented mathematically 	 ESSENTIAL QUESTIONS: What are the solutions to an absolute value equation? How do you graph a piecewise function? How do you write a piecewise equation from a graph? How do you write a piecewise equation from an application problem?

WHAT SHOULD STUDENTS KNOW, UNDERSTAND, AND BE ABLE TO DO AT THE END OF THIS UNIT?			
	Standards, Concepts, Content, Skills, Products, Vocabulary		
REFERENCE/STANDARD STANDARDS: Content specific standards that will be MAJOR STANDARD SUPPORTING i.e. GLE/CLE/MLS/NGSS addressed in this unit. STANDARD STANDARD			
A2.REI.A.1	Create & solve equations and inequalities, including those that involve absolute value	x	
A2.IF.A.1	Identify and interpret key characteristics of functions represented graphically, with tables and with algebraic symbolism to solve problems	x	
A2.BF.A.3	Describe the effects of transformations algebraically and graphicallyfor absolute value functions	x	



The City of St. Charles School District Honors Algebra 2 Curriculum **OBJECTIVE #1** Solve and Apply Absolute Value Equations and Inequalities **REFERENCES/STANDARDS** • A2.REI.A.1 : Create & solve equations and inequalities, including those that involve *i.e. GLE/CLE/MLS/NGSS* absolute value WHAT SHOULD STUDENTS... **UNDERSTAND?** KNOW? **BE ABLE TO DO?** *Concepts; essential truths that give meaning to the topic;* Facts, Names, Dates, Places, Information, Skills: Products ideas that transfer across situations. ACADEMIC VOCABULARY How to solve an absolute value equation Absolute Value Solve an absolute value equation • • How to solve an absolute value inequality No Solution (empty set) Solve an absolute value inequality • ٠ • How to apply absolute value equations and **Extraneous Solution** Solve an application problem using ٠ • ٠ inequalities absolute value Compound Inequality Intersection • Union . Set Notation • FACILITATING ACTIVITIES – STRATEGIES AND METHODS FOR TEACHING AND LEARNING TEACHER INSTRUCTIONAL ACTIVITY DOK TARGET STUDENT LEARNING TASK (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking) Academic vocabulary/language Summarizing and note taking • 1-4 ٠ Practice solving absolute value Model solving absolute value equations & • ٠ inequalities equation and inequalities Effective questioning Practice solving an application problem ٠ • Targeted feedback using absolute value . Connect material to a real world application • Self-assessment • INTERDISCIPLINARY CONNECTION PRIOR KNOWLEDGE CONNECTIONS **INQUIRY CONNECTIONS Computer Technology** Solve a linear equation • Why do we model with absolute ٠ • value? Science Solve a linear inequality • •



HOW DO WE KNOW WHAT STUDENTS HAVE LEARNED?			
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)	
 Daily homework checks Quizzes Comprehensive assessment 	FormativeFormativeSummative	1-3 Solve multi-step absolute value equations 1-3 1-4	
HOW WILL V	VE RESPOND IF STUDENTS HAVE NOT LEARNED?		
	Possible Interventions		
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)	
Provide additional instruction	Additional Practice Watch video lessons	1-3 Practice solving absolute value equations	
HOW WILL WE	RESPOND IF STUDENTS HAVE ALREADY LEARNED?		
	Possible Extensions/Enrichments		
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)	
Self-guided assignment	Student presentation on the information	3-4: Applications of absolute value equations & inequalities	



The City of St. Charles School District Honors Algebra 2 Curriculum **PROFICIENCY SCALES FOR THIS STANDARD**

STANDA	RD: Solve and Apply Absolute Value Equations and Inequalities	
SCORE	DESCRIPTION	SAMPLE TASKS
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was	
	taught.	
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.	
3.0	The student:	
	 Solve a multi-step absolute value equation 	
	 Solve a multi-step absolute value inequality and graph the solution on a number line 	
	 Solve an absolute value equation/inequality with no solution or infinitely many 	
	solutions.	
	The student exhibits no major errors or omissions.	
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content	
2.0	There are no major errors or omissions regarding the simpler details and processes as the	
	student:	
	 Evaluates an expression with absolute value 	
	 Solves absolute value equations of the form ax+b =c 	
	 Solves absolute value inequalities of the form ax+b ≤c or ax+b ≥c 	
	However, the student exhibits major errors or omissions regarding the more complex ideas	
	and processes.	
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content	
1.0	With help, a partial understanding of some of the simpler details and processes and some of	
	the more complex ideas and processes.	
LND	Even with help, no understanding or skill demonstrated.	



	Honors Algebra 2 Curriculum	
OBJECTIVE # 1	Solve and Apply Absolute Value Equations and Inequalities	
REFERENCES/STANDARDS <i>i.e.</i> GLE/CLE/MLS/NGSS	A2.REI.A.1 : Create & solve equations and inequalities, including those that involve absolute value	
	WHAT SHOULD STUDENTS	
UNDERSTAND? Concepts; essential truths that give meaning to the topic; ideas that transfer across situations. • How to solve an absolute value equation • How to solve an absolute value inequality • How to apply absolute value equations and inequalities	KNOW? Facts, Names, Dates, Places, Information, ACADEMIC VOCABULARY • Absolute Value • No Solution (empty set) • Extraneous Solution • Compound Inequality • Intersection • Union • Set Notation	 BE ABLE TO DO? Skills; Products Solve an absolute value equation Solve an absolute value inequality Solve an application problem using absolute value
FACILITATING ACTIVITIES	- STRATEGIES AND METHODS FOR TEACHING AND	LEARNING
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)
 Academic vocabulary/language Model solving absolute value equations & inequalities Effective questioning Targeted feedback Connect material to a real world application 	 Summarizing and note taking Practice solving absolute value equation and inequalities Practice solving an application problem using absolute value Self-assessment 	• 1-4
INTERDISCIPLINARY CONNECTION Computer Technology Science 	 PRIOR KNOWLEDGE CONNECTIONS Solve a linear equation Solve a linear inequality 	 INQUIRY CONNECTIONS Why do we model with absolute value?



HOW DO WE KNOW WHAT STUDENTS HAVE LEARNED?			
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)	
Daily homework checks	Formative	1-3 Solve multi-step absolute value	
Quizzes	Formative	equations	
Comprehensive assessment	Summative	1-3 1-4	
HOW WILL V	VE RESPOND IF STUDENTS HAVE NOT LEARNED?		
	Possible Interventions		
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)	
Provide additional instruction	Additional practice Watch video lessons	1-3 Practice solving absolute value equations	
HOW WILL WE	RESPOND IF STUDENTS HAVE ALREADY LEARNED?		
	Possible Extensions/Enrichments		
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)	
Self-guided assignment	Student presentation on the information	3-4: Applications of absolute value equations & inequalities	



The City of St. Charles School District Honors Algebra 2 Curriculum **PROFICIENCY SCALES FOR THIS STANDARD**

SCORE	DESCRIPTION	SAMPLE TASKS
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.	
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.	
3.0	 The student: Solve a multi-step absolute value equation Solve a multi-step absolute value inequality and graph the solution on a number line Solve an absolute value equation/inequality with no solution or infinitely many solutions. 	
2.5	The student exhibits no major errors or omissions.	
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content	
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Evaluates an expression with absolute value Solves absolute value equations of the form ax+b =c Solves absolute value inequalities of the form ax+b ≤c or ax+b ≥c 	
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.	
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content	
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.	
LND	Even with help, no understanding or skill demonstrated.	



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OBJECTIVE # 2	Graph and Interpret Absolute Value Equations		
REFERENCES/STANDARDS i.e. GLE/CLE/MLS/NGSS	 A2.IF.A.1: Identify and interpret key characteristics of functions represented graphically, with tables and with algebraic symbolism to solve problems A2.BF.A.3: Describe the effects of transformations algebraically and graphicallyfor absolute value functions 		
	WHAT SHOULD STUDENTS		
UNDERSTAND? Concepts; essential truths that give meaning to the topic; ideas that transfer across situations.	KNOW? Facts, Names, Dates, Places, Information, ACADEMIC VOCABULARY	BE ABLE TO DO? Skills; Products	
 How to graph an absolute value function How to graph a piecewise function 	 Vertex Domain Range Interval Notation Piecewise Function 	 Graph an Absolute Value Function Identify the domain & range of an absolute value function Graph a piecewise function 	
FACILITATING ACTI	VITIES – STRATEGIES AND METHODS FOR TEACHIN	NG AND LEARNING	
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)	
 Academic vocabulary/language Model graphing absolute value and piecewise functions Effective questioning Targeted feedback Nonlinguistic representations 	 Summarizing and note taking Practice graphing absolute value functions Practice graphing piecewise functions Use a graphing calculator to graph a function Self-assessment 	 2 = skill/concept taught in Algebra 1 2 for graphing absolute value functions; 4 for graphing piecewise functions on calculator 	
INTERDISCIPLINARY CONNECTION	PRIOR KNOWLEDGE CONNECTIONS	INQUIRY CONNECTIONS	
Architecture	Graph a linear equation	 What is a piecewise function? 	
НО	W DO WE KNOW WHAT STUDENTS HAVE LEARNE	D?	



Quizzes

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The City of St. Charles School District Honors Algebra 2 Curriculum ASSESSMENT DESCRIPTION FORMATIVE OR SUMMATIVE? DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking) Daily homework checks 1-3 Formative ٠ ٠ Formative 1-3 ٠ ٠ Comprehensive assessment Summative 1-4 Graph absolute value and piecewise • ٠

functions of varying difficulty

HOW WILL WE RESPOND IF STUDENTS HAVE NOT LEARNED?			
Possible Interventions			
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET	
		(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,	
		4=Extended Thinking)	
Reteach graphing linear equations	Practice graphing linear equations,	2 = skill/concept taught in Algebra 1	
	then extend to absolute value		
	Watch video lessons		
HOW WI	LL WE RESPOND IF STUDENTS HAVE ALREADY LE	ARNED?	
	Possible Extensions/Enrichments		
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET	
		(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,	
		4=Extended Thinking)	
 Extend graphing to non-linear pieces 	Students will graph more complex	4 = extended thinking; graphing with a piece that is	
• Extend graphing to step functions & greatest	piecewise functions	not linear or graphing a step function	
integer function			



The City of St. Charles School District Honors Algebra 2 Curriculum **PROFICIENCY SCALES FOR THIS STANDARD**

SCORE	DESCRIPTION	SAMPLE TASKS
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.	
3.0	 The student: Graph a piece-wise function Interpret the domain and range of an absolute value function. 	
	The student exhibits no major errors or omissions.	
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content	
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Graphs an absolute value function. Given a piece-wise function, evaluates the function for the given values. 	
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.	
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content	
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.	
LND	Even with help, no understanding or skill demonstrated.	



OBJECTIVE # 3	Write Absolute Value Equations & Piecewise Funct	ions	
REFERENCES/STANDARDS	A2.REI.A.1: Create and solve equations, including those that involve absolute value		
	• AZ.REI.A.1. Create and solve equations, including those that involve absolute value		
i.e. GLE/CLE/MLS/NGSS WHAT SHOULD STUDENTS			
UNDERSTAND? Concepts; essential truths that give meaning to the topic; ideas that transfer across situations.	KNOW? Facts, Names, Dates, Places, Information, ACADEMIC VOCABULARY	BE ABLE TO DO? Skills; Products	
 How to write an absolute value equation , given a graph How to write an absolute value equation or inequality, given an application problem How to write a piecewise function, given an application problem 	 Vertex Equation Inequality Function Notation Domain 	 Write an absolute value function from a graph Solve an application problem by writing an absolute value equation or inequality Write a piecewise function, given an application problem Use their function to evaluate/solve a related problem 	
FACILITATING ACTI	VITIES – STRATEGIES AND METHODS FOR TEACHING	AND LEARNING	
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)	
 Academic vocabulary/language Model writing absolute value and piecewise functions Effective questioning Targeted feedback 	 Summarizing and note taking Practice writing absolute value functions, given a graph Practice solving application problems involving absolute value/piecewise Self-assessment 	 3 - working backwards from a graph 3 and 4 - writing an equation given words and then using the equation to solve a problem 	
INTERDISCIPLINARY CONNECTION	PRIOR KNOWLEDGE CONNECTIONS	INQUIRY CONNECTIONS	
Income TaxesFinance	 Solving application problems with linear equations 	 How can a piecewise function be used to model a real-life situation? 	



HOW DO WE KNOW WHAT STUDENTS HAVE LEARNED?			
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET	
		(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,	
		4=Extended Thinking)	
Daily homework checks	Formative	• 1-3	
• quizzes	Formative	• 1-3	
Comprehensive assessment	Summative	• 1 - 4 Write absolute value equations	
HOW	WILL WE RESPOND IF STUDENTS HAVE NOT LEARNEI	D?	
	Possible Interventions	_	
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET	
		(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,	
		4=Extended Thinking)	
 Teach key words to look for when 	Write a piecewise function that has been	2 = Solve a partially completed problem	
interpreting word problems	partially completed		
 Emphasize proper notation 	Write the function in words, then convert to		
	proper math notation		
	Watch video lessons		
HOW W	ILL WE RESPOND IF STUDENTS HAVE ALREADY LEARN	NED?	
	Possible Extensions/Enrichments		
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET	
		(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,	
		4=Extended Thinking)	
 Student-created problems 	 Develop their own piecewise defined 	4 = extend piecewise functions	
	application problem and write the		
	function		



STANDA	STANDARD: Write Absolute Value Equations & Piecewise Functions			
SCORE	DESCRIPTION	SAMPLE TASKS		
4.0	In addition to score 3.0, in-depth inferences and			
	applications that go beyond what was taught.			
3.5	In addition to score 3.0 performance, in-depth			
	inferences and applications with partial success.			
3.0	 The student: Write a piecewise function. Write an absolute value function, given a graph The student exhibits no major errors or omissions.	 A plane descends from 5000ft at 250 ft/min for 6 minutes. After 6 minutes, it descends at 150ft/min. (from 3500 ft) Let t = the number of minutes and A = the altitude. Write a piecewise function for this situation. What is the plane's altitude after 12 minutes? Taisha uses the elliptical cross-trainer at the gym. Her general goal is to burn 280 Calories per workout, but she varies by as much as 25 Calories from this amount on any given day. Write and solve an equation to find the maximum and minimum number of Calories Taisha burns on 		
		the cross-trainer.		
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content			
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Writes a piecewise function with minor errors in the domain. Given the solutions, writes an absolute value inequality Writes and solves an absolute value equation or inequality, given a real-life situation. (one variable) However, the student exhibits major errors or omissions regarding the more complex ideas and processes. 	 Ice cream should be stored at with an allowance of. Write and solve an equation to find the maximum and minimum temperatures at which the ice cream should be stored. The average depth <i>d</i> of an aquarium tank for dolphins is 50m. The actual depth cannot vary by more than 5m. Write and solve an absolute value inequality to determine acceptable tank depths. 		



1.5	Partial knowledge of the 2.0 content but major errors or	
	omissions regarding the 3.0 content	
1.0	With help, a partial understanding of some of the	
	simpler details and processes and some of the more	
	complex ideas and processes.	
LND	Even with help, no understanding or skill	
	demonstrated.	



CONTENT AREA: Mathematics	UNIT: Systems of Linear Functions
COURSE: Honors Algebra 2	UNIT DURATION: 4 Weeks

MATERIALS / INSTRUCTIONAL RESOURCES FOR THIS U	JNIT:	BIG IDEA(S):		
Graphing Calculator, Textbook, Supplementa	Solve a system of linear equations			
	Graph a system of linear equations and inequalities			
		Apply sys	tems of linear	equations and inequalities
ENDURING UNDERSTANDINGS:		ESSENTIAL QUEST		• •
 Recognize that a system of equations is two or more equations with the same variable 		What are	the solutions t	o a system of equations?
				tem of equations?
• A system of equations can have no solution		• • •	tem of inequalities?	
A system of equations can have an infinite number of solutions		How do you solve an application problem by writing a system of		
	equations			
				plication problem using linear programming?
WHAT SHOULD STUDEN				IND OF THIS UNIT?
	ndards, Concepts, Con		1	
REFERENCE/STANDARD	STANDARDS: C		MAJOR	SUPPORTING STANDARD
i.e. GLE/CLE/MLS/NGSS		II be addressed in	STANDARD	
	this			
A2.REI.B.3		lve systems of	x	
	equations that n			
	linear equations		-	
OBJECTIVE # 1	-	t System of Linear E	-	
REFERENCES/STANDARDS			ystems of equa	tions that may include non-linear equations and
i.e. GLE/CLE/MLS/NGSS	inequalitie			
	WHAT SH	OULD STUDENTS		
UNDERSTAND?		KNOW?		BE ABLE TO DO?
Concepts; essential truths that give meaning to the		ates, Places, Informa	ition,	Skills; Products
topic; ideas that transfer across situations.	ACADEN	IIC VOCABULARY		
 How to solve a system of equations (in 2 	 System of 	equations		 Solve a system of equations in 2 and 3
and 3 variables)	Substitution	on Method		variables



	Honors Algebra 2 Curriculum	
Using Algebra Using Inverse Matrices FACILITATING ACTI TEACHER INSTRUCTIONAL ACTIVITY	Elimination Method Ordered Triple Matrix Determinant Inverse Matrix Identity Matrix VITIES – STRATEGIES AND METHODS FOR TEACH STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking,
 Academic vocabulary/language Model solving systems of linear equations using algebra Introduce matrices and their operations Model using matrices to solve a system of equations Effective questioning Targeted feedback 	 Summarizing and note taking Practice solving systems of linear equations in 2 and 3 variables Learn operations with matrices and how to use them to solve a system of equations Self-assessment 	4=Extended Thinking) 2 - Two variable systems were taught in Algebra 1 3 - Solve a System in 3 variables 3 - Solve a System using matrices
INTERDISCIPLINARY CONNECTION Engineering	 PRIOR KNOWLEDGE CONNECTIONS Solve a linear equation Solve a system of equations in 2 	INQUIRY CONNECTIONS What does it mean to solve a system of equations?
HO ASSESSMENT DESCRIPTION	variables W DO WE KNOW WHAT STUDENTS HAVE LEARN FORMATIVE OR SUMMATIVE?	DOK TARGET
 Daily homework checks Quizzes Comprehensive assessment on solving linear systems of equations 	FormativeFormativeSummative	 (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking) 1-3 1-3 1-4



HOW WILL WE RESPOND IF STUDENTS HAVE NOT LEARNED?					
Possible Interventions					
STUDENT LEARNING TASK	DOK TARGET				
	(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,				
4=Extended Thinking)					
Additional practice solving systems of	• 1-3				
equations in 2-variables					
Watch video lessons					
VILL WE RESPOND IF STUDENTS HAVE ALREADY LE	ARNED?				
Possible Extensions/Enrichments					
STUDENT LEARNING TASK	DOK TARGET				
	(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,				
Solve more complex systems of equations	• 3-4				
Peer Teaching					
Class Presentation on application of inverse					
matrices					
	Possible Interventions STUDENT LEARNING TASK Additional practice solving systems of equations in 2-variables Watch video lessons VILL WE RESPOND IF STUDENTS HAVE ALREADY LE Possible Extensions/Enrichments STUDENT LEARNING TASK Solve more complex systems of equations Peer Teaching Class Presentation on application of inverse				



The City of St. Charles School District Honors Algebra 2 Curriculum **PROFICIENCY SCALES FOR THIS STANDARD**

SCORE	DESCRIPTION	SAMPLE TASKS
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.	
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.	
3.0	The student will be able to:	
	 Solve a system of three equations in three variables 	
	Solve a system of equations using matrices	
	Given a real-life situation, write and solve a system of equations.	
	The student exhibits no major errors or omissions.	
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content	
2.0	There are no major errors or omissions regarding the simpler details and processes as the student:	
	 Solves a system of two equations algebraically 	
	Performs operations on matrices	
	Calculates the determinant of a matrix	
	Finds the inverse of a matrix	
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.	
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content	
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.	
LND	Even with help, no understanding or skill demonstrated.	



The City of St. Charles School District Honors Algebra 2 Curriculum **OBJECTIVE # 2 Graph Systems of Linear Equations and Inequalities REFERENCES/STANDARDS** • A2.REI.B.3: Create and solve systems of equations that may include nonlinear equations i.e. GLE/CLE/MLS/NGSS and inequalities. WHAT SHOULD STUDENTS... **UNDERSTAND?** KNOW? **BE ABLE TO DO?** *Concepts; essential truths that give meaning to the topic;* Facts, Names, Dates, Places, Information, Skills; Products ideas that transfer across situations. ACADEMIC VOCABULARY • The solution to a system of equations in two Consistent Solve a system of equations • ٠ variables is the point of intersection of the graphs. by graphing Inconsistent • Solve a system of inequalities Dependent • by graphing Independent ٠ Plot an ordered triple Ordered Triple • Graph an equation in three X-y-z coordinate system variables FACILITATING ACTIVITIES – STRATEGIES AND METHODS FOR TEACHING AND LEARNING TEACHER INSTRUCTIONAL ACTIVITY STUDENT LEARNING TASK DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking) Academic vocabulary/language Summarizing and note taking • 1-3 ٠ • Model solving a system of linear equations by Practice graphing systems of linear equations • • graphing and linear inequalities Model solving a system of linear inequalities by Practice graphing in the xyz-coordinate ٠ ٠ graphing system Model graphing in the xyz-coordinate system ٠ ٠ Model graphing in the xyz-coordinate system Effective questioning using paper . Targeted feedback Self-assessment . Nonlinguistic representations . INTERDISCIPLINARY CONNECTION PRIOR KNOWLEDGE CONNECTIONS Science Graph linear equations . • Finance (Cell Phone Plans) Graph linear inequalities . •



	Honors Algebra 2 Curriculum					
HOW DO	WE KNOW WHAT STUDENTS HAVE LEARNED?					
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)				
 Daily homework checks Quizzes Comprehensive assessment 	FormativeFormativeSummative	• 1-3 • 1-3 • 1-4				
HOW WILL WE RESPOND IF STUDENTS HAVE NOT LEARNED?						
	Possible Interventions					
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)				
 Reteach graphing linear equations Provide a visual for a system of equations in three variables 	 Use colored pencils to graph linear inequalities Model the xyz-coordinate system with paper Practice graphing systems of equations and inequalities Watch video lessons 	2-3				
HOW WILL WE	RESPOND IF STUDENTS HAVE ALREADY LEARNED?					
	Possible Extensions/Enrichments					
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)				
Graph systems of 3 equations in 3 variablesPeer Teaching	 Use graphing software to model the solution to a system of 3 equations in 3 variables Peer Teaching 	3-4				



STANDA	RD: Graph Systems of Linear Equations and Inequalities		
SCORE	DESCRIPTION		SAMPLE TASKS
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.		
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.		
3.0	The student will be able to:	•	Graph the ordered triple (3, -4,
	Plot an ordered triple.		6)
	Graph an equation in three variables		
	The student exhibits no major errors or omissions.		
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content		
2.0	There are no major errors or omissions regarding the simpler details and processes as the student:	•	Graph the system of equations
	 Identifies an ordered triple given a graph. 		x+y=6
	 Solves a system of equations in two variables by graphing. 		3x-4y=4
	Graphs a system of two inequalities		
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.		
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content		
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more		
	complex ideas and processes.		
LND	Even with help, no understanding or skill demonstrated.		



The City of St. Charles School District Honors Algebra 2 Curriculum **OBJECTIVE #3 Apply Systems of Inequalities REFERENCES/STANDARDS** A2.REI.A.1: Create and solve equations and inequalities, including those that involve absolute • i.e. GLE/CLE/MLS/NGSS value. A2.REI.B.3 Create and solve systems of equations that may include nonlinear equations and ٠ inequalities. WHAT SHOULD STUDENTS... UNDERSTAND? KNOW? **BE ABLE TO DO?** *Concepts; essential truths that give meaning to the* Facts, Names, Dates, Places, Information, Skills; Products topic; ideas that transfer across situations. ACADEMIC VOCABULARY • How to solve problems using linear Solve an application problem using ٠ Linear Programming ٠ programming Constraint linear programming . Feasible region **Objective Function** Vertices Optimization Maximum ٠ Minimum FACILITATING ACTIVITIES – STRATEGIES AND METHODS FOR TEACHING AND LEARNING **TEACHER INSTRUCTIONAL ACTIVITY** STUDENT LEARNING TASK DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking) 2-4 Academic vocabulary/language Summarizing and note taking ٠ . Model solving an application problem using Practice solving application problems using ٠ ٠ linear programming linear programming Self-assessment Cooperative learning . . Effective questioning Linear programming project . Nonlinguistic representations • Cooperative learning . Targeted feedback Discovery learning ٠ ٠ INTERDISCIPLINARY CONNECTION PRIOR KNOWLEDGE CONNECTIONS **INQUIRY CONNECTIONS** Solving a system of linear inequalities by How can a system of linear Business - optimizing profit ٠ • ٠ inequalities by used to solve a realgraphing Solving an application problem by writing a life situation? ٠ system of equations



н	OW DO WE KNOW WHAT STUDENTS HAVE LEARNED?					
ASSESSMENT DESCRIPTION Daily Homework check	FORMATIVE OR SUMMATIVE? Formative	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking) • 1-3				
Quizzes	Formative	• 1-3				
Comprehensive assessment	Summative	• 1-4				
Linear Programming Project	Summative	• 2-4				
HOW WILL WE RESPOND IF STUDENTS HAVE NOT LEARNED?						
	Possible Interventions					
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)				
 Emphasize vocabulary Provide practice problems with the inequalities already written Provide keywords for interpreting word problems 	 Learn vocabulary with flashcards Practice solving systems of linear inequalities Use keywords to interpret word problems Watch video lessons 	1-3				
HOW V	VILL WE RESPOND IF STUDENTS HAVE ALREADY LEARNED	?				
	Possible Extensions/Enrichments					
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)				
 Student-generated problem More complex linear programming problem Peer teaching 	 Research and solve a real life problem using linear programming Peer teaching 	3-4				



SCORE	DESCRIPTION	SAMPLE TASKS
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.	
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.	
3.0	 The student will be able to: Write, graph and interpret a system of inequalities, given a real-life situation. 	Linear Programmir
	The student exhibits no major errors or omissions.	
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content	
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Given a system of inequalities for a real-life situation, graph the inequalities. 	Linear Programmir
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.	
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content	
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.	
LND	Even with help, no understanding or skill demonstrated.	



	REA: Mathematics LE: Honors Algebra 2	UNIT: Quadrat		
MATERIALS / INSTRUCTIONAL	RESOURCES FOR THIS UNIT:	BIG IDEA(S):		
Textbook		Solve Quadra	tic Equations	
Supplemental Handouts			atic Functions	
			atic Functions	
ENDURING UNDERSTANDINGS		ESSENTIAL QUESTION		
	h of a quadratic function			a quadratic equation related to
-	eal and complex solutions		the quadratic fur	
A quadratic can be sol	ved using a variety of methods	 What are the standard form 	-	quadratic in vertex form? In
		 How is any query y=x2 	ladratic related	to the parent quadratic function
	HAT SHOULD STUDENTS KNOW, UNDERSTAND, A		F FND OF THIS U	NIT?
	Standards, Concepts, Content, S			
REFERENCE/STANDARD	STANDARDS: Content specific standards that	at will be addressed in	MAJOR	SUPPORTING STANDARD
i.e. GLE/CLE/MLS/NGSS	this unit.		STANDARD	
A2.NQ.B.5	Represent complex numbers.			x
A2.NQ.B.6	Add, subtract, multiply and divide complex nu	mbers.		x
A2.REI.A.1	Create and solve equations and inequalities, including those that		х	
		0		
	involve absolute value.	-		
A2.APR.A.1 E	Extend the knowledge of factoring to include f	-		x
	Extend the knowledge of factoring to include f coefficients.	factors with complex		x
A2.APR.A.1 E A2.BF.A.3	Extend the knowledge of factoring to include f coefficients. Describe the effects of transformations algebr	factors with complex aically and graphically,	x	x
	Extend the knowledge of factoring to include f coefficients. Describe the effects of transformations algebr creating vertical and horizontal translations, vertical and horizontal translations.	factors with complex raically and graphically, ertical and horizontal	x	x
	 Extend the knowledge of factoring to include f coefficients. Describe the effects of transformations algebr creating vertical and horizontal translations, we reflections and dilations (expansions/compressions/comp	factors with complex aically and graphically, ertical and horizontal sions) for linear,	x	x
	 Extend the knowledge of factoring to include f coefficients. Describe the effects of transformations algebr creating vertical and horizontal translations, w reflections and dilations (expansions/compres quadratic, cubic, square and cube root, absolution) 	factors with complex aically and graphically, ertical and horizontal sions) for linear,	x	x
	 Extend the knowledge of factoring to include f coefficients. Describe the effects of transformations algebr creating vertical and horizontal translations, we reflections and dilations (expansions/compressions/comp	factors with complex raically and graphically, ertical and horizontal isions) for linear, ite value, exponential	x	x



		Honors / ligebra 2 Carriediani	0	
		and with algebraic symbolism to solve		
	problems.			
A2.FM.A.1		se them to solve applications of quadratic and	x	
	exponential function m			
OBJECTIVE # 1		Solve Quadratic Functions		
REFERENCES/STANDARDS i.e. GLE/CLE/MLS/NGSS		 A2.REI.A.1: Create and solve equations and inequalities, including those that involve absolute value. A2.NQ.B.6: Add, subtract, multiply and divide complex numbers. A2.APR.A.1 E: Extend the knowledge of factoring to include factors with complex 		
		coefficients.		
		WHAT SHOULD STUDENTS		
UNDERS Concepts; essential truths tha ideas that transfer	t give meaning to the topic;	KNOW? Facts, Names, Dates, Places, Information, ACADEMIC VOCABULARY	,	BE ABLE TO DO? <i>Skills; Products</i>
 How to solve a quadratic equation How to perform operations with complex numbers 		 Roots Zeros Imaginary unit Complex Number Discriminant Completing the square Complex Conjugate Quadratic formula 	 Add, subtract, multiply & complex numbers Solve a quadratic equation By factoring Using the square root prop By completing the square Using the quadratic formution 	
	FACILITATING ACTIVITIE	S – STRATEGIES AND METHODS FOR TEACHING	AND LEARNING	3
TEACHER INSTRUC	TIONAL ACTIVITY	STUDENT LEARNING TASK		DOK TARGET Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)
 Academic vocabulary/language Modeling how to solve quadratic equations & how to perform operations with complex numbers Effective questioning Discovery learning Nonlinguistic representations 		 Summarizing and note taking Graphic organizers Homework and practice Discovery Learning Self-assessment 		olve quadratic equations with real omplex solutions



INTERDISCIPLINARY CONNECTION		INQUIRY CONNECTIONS			
Physics	Simplify Algebraic expressions	How can a quadratic function be			
	• Factor quadratic expressions (Algebra 1)	used to model a real-world			
	• Solve quadratic equations (Algebra 1)	situation?			
HOW DO	O WE KNOW WHAT STUDENTS HAVE LEARNED?				
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET			
		(1=Recall, 2=Skill/Concept, 3=Strategic			
		Thinking, 4=Extended Thinking)			
Daily Homework check	Formative	• 1-3			
Frequent Quizzes	Formative	• 1-3			
Comprehensive assessment	Summative	• 1-4			
HOW WILL	WE RESPOND IF STUDENTS HAVE NOT LEARNED?				
	Possible Interventions				
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET			
		(1=Recall, 2=Skill/Concept, 3=Strategic			
		Thinking, 4=Extended Thinking)			
Additional modeling	Additional practice	• 1-3			
 Emphasize steps used in the different solving 	 Practice vocabulary and solving methods 				
methods	using flashcards, matching, graphic				
	organizers, foldables.				
	Watch video lessons				
HOW WILL W	/E RESPOND IF STUDENTS HAVE ALREADY LEARNED?				
	Possible Extensions/Enrichments				
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET			
		(1=Recall, 2=Skill/Concept, 3=Strategic			
		Thinking, 4=Extended Thinking)			
Discovery Learning	Peer TeachPresent applications of quadratic functions	• 3-4			



The City of St. Charles School District Honors Algebra 2 Curriculum **PROFICIENCY SCALES FOR THIS STANDARD**

STANDA	STANDARD: Solve Quadratic Functions				
SCORE	DESCRIPTION	SAMPLE TASKS			
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.				
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.				
3.0	 The student will be able to: Multiply and Divide Complex numbers Solve Quadratic Functions with complex roots Factoring (A.SSE.2, F.IF.8a) Completing the square (N.CN.7, F.IF.8a) Using the quadratic formula (N.CN.7, A.SSE.1b 	 The sum of two squares Solve a quadratic by completing the Square, in which the coefficient for "b" is odd and/or "a" is not 1 			
2.5	The student exhibits no major errors or omissions. No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content				
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Add/Subtract and graph complex numbers Solve Quadratic Functions with real roots Factoring (A.SSE.2, F.IF.8a) Completing the square (N.CN.7, F.IF.8a) Using the quadratic formula (N.CN.7, A.SSE.1b) Given a graph However, the student exhibits major errors or omissions regarding the more complex ideas and processes. 	 Solve a quadratic by completing the Square, in which the coefficient for "b" is even 			
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the				



	3.0 content	
1.0	With help, a partial understanding of some of the simpler details and	
	processes and some of the more complex ideas and processes.	
LND	Even with help, no understanding or skill demonstrated.	

OBJECTIVE # 2	Graph and Interpret Quadratic Functions		
REFERENCES/STANDARDS i.e. GLE/CLE/MLS/NGSS	 A2.BF.A.3 : Describe the effects of transformations algebraically and graphically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations (expansions/compressions) for linear, quadratic, cubic, square and cube root, absolute value, exponential and logarithmic functions A2.IF.A.1: Identify and interpret key characteristics of functions represented graphically, with tables and with algebraic symbolism to solve problems. 		
	WHAT SHOULD STUDENTS		
UNDERSTAND? Concepts; essential truths that give meaning to the topic; ideas that transfer across situations.	KNOW? Facts, Names, Dates, Places, Information, ACADEMIC VOCABULARY	BE ABLE TO DO? <i>Skills; Products</i>	
 A quadratic function can be graphed from standard form, vertex form and intercept form 	 Parabola Vertex of a parabola Axis of Symmetry X-intercepts (roots, zeros) Standard Form Vertex Form Intercept Form Maximum Minimum 	 Graph a quadratic function that is written in standard, vertex and intercept form Graph a quadratic inequality Identify the vertex, maximum, and minimum Write a quadratic in vertex form, given standard form 	
FACILITATI	NG ACTIVITIES – STRATEGIES AND METHODS FOR TEAC	HING AND LEARNING	



TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)
 Academic vocabulary/language Modeling Effective questioning Nonlinguistic representations Targeted feedback 	 Summarizing and note taking Homework and practice Graphic organizers Self-assessment 	1-4
INTERDISCIPLINARY CONNECTION	PRIOR KNOWLEDGE CONNECTIONS	INQUIRY CONNECTIONS
PHysics	 Graphing Quadratic functions in standard form (Algebra 1) 	• How can the graph of a quadratic function be used to solve a quadratic equation?
	HOW DO WE KNOW WHAT STUDENTS HAVE LEAR	NED?
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)
Daily Homework check	Formative	• 1-3
Quizzes	Formative	• 1-3
Comprehensive Assessment	Summative	• 1-4
	HOW WILL WE RESPOND IF STUDENTS HAVE NOT LEA Possible Interventions	ARNED?
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)
 Emphasize vocabulary and different forms Additional Modeling 	Practice graphing quadratic functionsWatch video lessons	• 1-3
	HOW WILL WE RESPOND IF STUDENTS HAVE ALREADY	LEARNED?
INSTRUCTIONAL ACTIVITY/METHOD	Possible Extensions/Enrichments STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)
Discovery LearningPeer Teaching	 Research & present how to graphically represent quadratic functions with complex roots Peer Teaching 	• 3-4



The City of St. Charles School District Honors Algebra 2 Curriculum **PROFICIENCY SCALES FOR THIS STANDARD**

SCORE	DESCRIPTION	SAMPLE TASKS
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.	
3.0	 The student will be able to: Given a real-life situation, write and graph a quadratic equation. Graph in vertex and intercept form. Graph quadratic inequalities 	 Vertical motion Area problem using max, min
	The student exhibits no major errors or omissions.	
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content	
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Graph a quadratic function in standard form Identify vertex, maximum, and minimum 	• Explain how to determine the solution to a quadratic equation using the graph of the quadratic function. What are the solutions to the graph shown?
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.	
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content	
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.	
LND	Even with help, no understanding or skill demonstrated.	



Honors Algebra 2 Curriculun	n

	nonors Aigebra 2 curriculum			
OBJECTIVE # 3	Write Quadratic Functions			
REFERENCES/STANDARDS <i>i.e. GLE/CLE/MLS/NGSS</i>	• A2.FM.A.1: Create functions and use them to solve applications of quadratic and exponential			
function modeling problems.				
	WHAT SHOULD STUDENTS			
UNDERSTAND?	KNOW?	BE ABLE TO DO?		
Concepts; essential truths that give meaning to the	Facts, Names, Dates, Places, Information,	Skills; Products		
topic; ideas that transfer across situations.	ACADEMIC VOCABULARY			
 A quadratic function can be used to model a 	Roots, Zeros	Write and solve a quadratic equation,		
real-life situation	Maximum/Minimum	given a real-life situation		
Three no collinear points are on the graph of	 Pythagorean Theorem 	Write a quadratic function, given thre		
exactly one quadratic function	Area formulas	ordered pairs		
FACILITATING ACTIV	ITIES – STRATEGIES AND METHODS FOR TEACHING A			
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)		
Academic vocabulary/language	Summarizing and note taking	1-4		
 Model writing quadratic functions 	Practice writing quadratic functions from			
Effective questioning	a real-life situation			
Targeted feedback	Practice writing quadratic functions from			
 Connect material to a real world application 	three ordered pairs			
	Self-assessment			
INTERDISCIPLINARY CONNECTION	PRIOR KNOWLEDGE CONNECTIONS	INQUIRY CONNECTIONS		
Landscaping	 Multiplying algebraic expressions 	How can a quadratic function be used		
Physics	 Solve a system of equations in three 	to model/solve a real-life situation?		
Architecture	variables			
	 Solving quadratic equations 			
	Geometry formulas			
HOV	V DO WE KNOW WHAT STUDENTS HAVE LEARNED?			
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)		
Daily homework checks	Formative	• 1-3		
Quizzes	Formative	• 1-3		
Comprehensive assessment	Summative	• 1-4 Write quadratic functions of varying difficulty		



	Honois Algebra 2 carriedian					
HOW	HOW WILL WE RESPOND IF STUDENTS HAVE NOT LEARNED?					
	Possible Interventions					
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET				
		(1=Recall, 2=Skill/Concept, 3=Strategic				
		Thinking, 4=Extended Thinking)				
 Teach key words to look for when 	Additional practice writing quadratic functions	1-3				
interpreting word problems	Additional practice solving a system of					
 Additional modeling 	equations in three variables					
	Watch video lessons					
HOW W	ILL WE RESPOND IF STUDENTS HAVE ALREADY LEARN	ED?				
	Possible Extensions/Enrichments					
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET				
		(1=Recall, 2=Skill/Concept, 3=Strategic				
		Thinking, 4=Extended Thinking)				
Quadratic Regression	Research & present a quadratic regression	3-4				
Peer Teaching	problem					
	Peer Teaching					



STANDA	STANDARD: Write Quadratic Functions				
SCORE	DESCRIPTION	SAMPLE TASKS			
4.0	In addition to score 3.0, in-depth inferences and				
	applications that go beyond what was taught.				
3.5	In addition to score 3.0 performance, in-depth				
	inferences and applications with partial success.				
3.0	The student will be able to:	 Vertical Motion, Pythagorean Theorem and Area 			
	 Given a real-life situation, write and solve a 	 Use a graphing calculator to write the equation for the quadratic that passes 			
	quadratic equation.	through (2, 4), (-1, 4) and (5, 6).			
	 Given three ordered pairs, write the 				
	quadratic equation.				
2.5	The student exhibits no major errors or omissions.				
2.5	No major errors or omissions regarding 2.0 content				
2.0	and partial knowledge of 3.0 content				
2.0	There are no major errors or omissions regarding the simpler details and processes as the student:	• An object is launched at 19.6 meters per second (m/s) from a 58.8-meter tall			
	Given an equation that models a real-life	platform. The equation for the object's height <i>s</i> at time <i>t</i> seconds after launch is $s(t) = -4.9t^2 + 19.6t + 58.8$, wheres is in meters. When does the object strike the			
	situation, solves and interprets the results.	S(t) = -4.5t + 19.6t + 58.6, where is in meters. When does the object strike the ground?			
	situation, solves and interprets the results.	giouna:			
	However, the student exhibits major errors or				
	omissions regarding the more complex ideas and				
	processes.				
	P. 000000				
1.5	Partial knowledge of the 2.0 content but major errors				
	or omissions regarding the 3.0 content				
1.0	With help, a partial understanding of some of the				
	simpler details and processes and some of the more				
	complex ideas and processes.				
LND	Even with help, no understanding or skill				
	demonstrated.				



CONTENT AREA: Mathematics		UNIT: Technology		
COURSE TITLE: Honors Algebra 2		UNIT DURATION: 36 Weeks		
MATERIALS / INSTRUCTIONAL RESOURCES FOR THIS UNIT: • Textbook • Graphing Calculator • Graphing Software for teacher • Supplemental Handouts ENDURING UNDERSTANDINGS: • A graphing calculator is a useful tool when solving complex algebra probleme		BIG IDEA(S): Use technology to model and solve algebra problems ESSENTIAL QUESTIONS: How do you graph an equation using a graphing calculator?		
problems		 How do you use a graphing matrices? How do you use a graphing equations? 		-
WHAT	SHOULD STUDENTS KNOW, UNDERSTAND,	AND BE ABLE TO DO AT THE END OF TH	IS UNIT?	
	Standards, Concepts, Content,	, Skills, Products, Vocabulary		
REFERENCE/STANDARD	STANDARDS: Content specific standard	ds that will be addressed in this unit.	MAJOR	SUPPORTING
i.e. GLE/CLE/MLS/NGSS			STANDARD	STANDARD
A2.REI.A.1	Create and solve equations and inequ	· •		х
	absolute			
A2.REI.B.3	Create and solve systems of equations and inequ		х	
A2.IF.A.1	· · · ·	Identify and interpret key characteristics of functions represented graphically, with tables and with algebraic symbolism to solve problems.		
A2.BF.A.3	A2.BF.A.3 Describe the effects of transformations algebraically and graphically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations (expansions/compressions) for linear, quadratic, cubic, square and cube root, absolute value, exponential and logarithmic functions		x	
OBJECTIVE # 1 Use technology to interpret re				
REFERENCES/STANDARDS • A2.REI.A.1: Create and solve equations and inequalities, including those that invol <i>i.e. GLE/CLE/MLS/NGSS</i> • absolute value.			that involve	



A 2.REL 8.3 : Create and solve systems of equations that may include nonlinear equations and inequalities. A 2.JE A.1 : Identify and interpret key characteristics of functions represented graphically, with tables and with algebraic symbolism to solve problems. A 2.JE A.1 : Identify and interpret key characteristics of functions represented graphically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations (expansions/compressions) for linear, quadratic, cubic, square and cube root, absolute value, exponential and logarithmic functions WHAT SHOULD STUDENTS A 2.JE A.3: Describe the effects of frantformation algebraically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations (expansions/compressions) for linear, quadratic, cubic, square and cube root, absolute value, exponential and logarithmic functions WHAT SHOULD STUDENTS A ZADEMIC VOCABULARY A graphing calculator can be used to graph an equations is the point of intersection a graphing calculator can be used to solve a system of equations is the point of intersection argression equation be used to find a regression equation be used to find a regression equation A graphing calculator can be used to find a regression equation activity suggestrices FACILITATING ACTIVITIES – STRATEGIES AND METHODS FOR TEACHING AND LEARNING Academic vocabulary/language Academic vocabulary/language Model the use of the graphing calculator Effective questioning Targeted feedback Nonlinguistic representations INTERDISCIPLINARY CONNECTION PRIOR KNOWLEDGE CONNECTIONS INQUIRY CONNECTIONS Nouries as system of equations Solve a system of equations Yea syst		Honors Algebra 2 Curriculum		
UNDERSTAND? KNOW? BE ABLE TO DO? Concepts; essential truths that give meaning to the topic; ideas that transfer across situations. Academic vocabulary Skills; Products • A graphing calculator can be used to graph an equation • Matrices • Use a graphing calculator to: • A graphing calculator can be used to solve a system of equations by graphing & using matrices • Matrices • Inverse Matrix • A graphing calculator can be used to find a regression equation • The solution to a system of equations is the point of intersection • Find the solution to a system of two equations by graphing • A graphing calculator can be used to find a regression equation • Strategies AND METHODS FOR TEACHING AND LEARNING • Find the solution to a system of equations i more than 2 variables) by using matrices • A cademic vocabulary/language • Summarizing and note taking • Targeted feedback • Self-assessment 1-3 • Model the use of the graphing calculator • Self-assessment 1-3 • INTERDISCIPLINARY CONNECTION PRIOR KNOWLEDGE CONNECTIONS INQUIRY CONNECTIONS • Computer Science • Solve a system of equations • How can technology be used in algebra?		 A2.REI.B.3 : Create and solve systems of equations that may include nonlinear equations and inequalities. A2.IF.A.1 : Identify and interpret key characteristics of functions represented graphically, with tables and with algebraic symbolism to solve problems. A2.BF.A.3: Describe the effects of transformations algebraically and graphically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations (expansions/compressions) for linear, quadratic, cubic, square and cube root, absolute 		
Concepts; essential truths that give meaning to the topic; ideas that transfer across situations. Facts, Names, Dates, Places, Information, ACADEMIC VOCABULARY Skills; Products • A graphing calculator can be used to graph an equation • Matrices • Inverse Matrix • Use a graphing calculator to: • Find a regression equation, given a set of data • A graphing calculator can be used to find a regression equation • Matrices • Find the solution to a system of equations by graphing & using matrices • Find the solution to a system of equations is the point of intersection • Find the solution to a system of equations by graphing • A graphing calculator can be used to find a regression equation • Student transfer across situm of intersection • Find the solution to a system of equations is more than 2 variables) by using matrices • A crademic vocabulary/language • Academic vocabulary/language • Summarizing and note taking • Targeted feedback • Nonlinguistic representations • Self-assessment 1-3 • INTERDISCIPLINARY CONNECTION PRIOR KNOWLEDGE CONNECTIONS • How can technology be used in algebra?		WHAT SHOULD STUDENTS		
topic; ideas that transfer across situations.ACADEMIC VOCABULARY• A graphing calculator can be used to graph an equation• Matrices• Use a graphing calculator to:• A graphing calculator can be used to solve a system of equations by graphing & using matrices• Inverse Matrix• Find a regression equation, given a set of data• A graphing calculator can be used to solve a system of equations by graphing & using matrices• The solution to a system of equations is the point of intersection• Find the solution to a system of two equations by graphing• A graphing calculator can be used to find a regression equation• STRATEGIES AND METHODS FOR TEACHING AND LEARNING• Find the solution to a system of equations the more than 2 variables) by using matrices• Academic vocabulary/language • Model the use of the graphing calculator • Effective questioning • Targeted feedback • Nonlinguistic representations• Summarizing and note taking • Self-assessment1-3• INTERDISCIPLINARY CONNECTION • Computer Science• Solve a system of equations• How can technology be used in algebra?	UNDERSTAND?	KNOW?	BE ABLE TO DO?	
equationInverse MatrixFind a regression equation, given a set of data• A graphing calculator can be used to solve a system of equations by graphing & using matrices• The solution to a system of equations is the point of intersection• Find the solution to a system of two equations by graphing• A graphing calculator can be used to find a regression equation• EXCLUTATING ACTIVITIES - STRATEGIES AND METHODS FOR TEACHING AND LEARNINGTEACHER INSTRUCTIONAL ACTIVITYSTUDENT LEARNING TASKDOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)• Academic vocabulary/language • Model the use of the graphing calculator • Effective questioning • Targeted feedback • Nonlinguistic representations• Summarizing and note taking • Self-assessment1-3INTERDISCIPLINARY CONNECTION • Computer SciencePRIOR KNOWLEDGE CONNECTIONS • Solve a system of equations• How can technology be used in algebra?			Skills; Products	
TEACHER INSTRUCTIONAL ACTIVITYSTUDENT LEARNING TASKDOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)• Academic vocabulary/language • Model the use of the graphing calculator • Effective questioning • Targeted feedback • Nonlinguistic representations• Summarizing and note taking • Practice using the graphing calculator • Self-assessment1-3INTERDISCIPLINARY CONNECTION • Computer SciencePRIOR KNOWLEDGE CONNECTIONS • Solve a system of equations• How can technology be used in algebra?	 equation A graphing calculator can be used to solve a system of equations by graphing & using matrices A graphing calculator can be used to find a regression equation 	 Inverse Matrix The solution to a system of equations is the point of intersection 	 FInd a regression equation, given a set of data Find the solution to a system of two equations by graphing Find the solution to a system of equations (in more than 2 variables) by using matrices 	
• Academic vocabulary/language • Summarizing and note taking 1-3 • Model the use of the graphing calculator • Practice using the graphing calculator 1-3 • Effective questioning • Self-assessment 1-3 • Nonlinguistic representations • Self-assessment • Self-assessment • Computer Science • Solve a system of equations • How can technology be used in algebra?				
 Model the use of the graphing calculator Effective questioning Targeted feedback Nonlinguistic representations INTERDISCIPLINARY CONNECTION Practice using the graphing calculator Self-assessment INQUIRY CONNECTIONS Computer Science Solve a system of equations How can technology be used in algebra? 	TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,	
Computer Science Solve a system of equations How can technology be used in algebra?	 Model the use of the graphing calculator Effective questioning Targeted feedback 	 Practice using the graphing calculator 	1-3	
	INTERDISCIPLINARY CONNECTION	PRIOR KNOWLEDGE CONNECTIONS	INQUIRY CONNECTIONS	
		 Solve a system of equations 	 How can technology be used in algebra? 	



HOW DO WE KNOW WHAT STUDENTS HAVE LEARNED?				
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET		
		(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,		
		4=Extended Thinking)		
Daily homework checks	Formative	• 1-3		
Quizzes	Formative	• 1-3		
Comprehensive assessment	Summative	• 1-4		
HOW W	/ILL WE RESPOND IF STUDENTS HAVE NOT LEA	RNED?		
	Possible Interventions			
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET		
		(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,		
		4=Extended Thinking)		
Additional Modeling	 Additional practice using the 	• 1-2		
	graphing calculator			
	Watch video lessons			
HOW WIL	L WE RESPOND IF STUDENTS HAVE ALREADY L	EARNED?		
	Possible Extensions/Enrichments			
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET		
		(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,		
		4=Extended Thinking)		
Discovery Learning	Use the graphing calculator to	• 3-4		
Cooperative Learning	solve more complex algebra			
Peer Teaching	problems.			
	Peer Teaching			



The City of St. Charles School District Honors Algebra 2 Curriculum **PROFICIENCY SCALES FOR THIS STANDARD**

SCORE	DESCRIPTION	SAMPLE TASKS
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.	
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.	
3.0	The student:	
	 Given a set of data, find the linear regression equation using a graphing calculator. 	
	• Solve a system of two equations by graphing.	
	Solve a system of three equations using matrices	
	•	
2.5	The student exhibits no major errors or omissions. No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content	
2.0	There are no major errors or omissions regarding the simpler details and processes as the student:	
	Performs matrix operations using a graphing calculator.	
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.	
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content	
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and	
	processes.	
LND	Even with help, no understanding or skill demonstrated.	



CONTENT AREA: Mathematics		UNIT: Polync	mial Functions		
COURSE: Honors Algebra 2		UNIT DURAT	ION: 6 Weeks		
MATERIALS / INSTRUCTIONAL RESOURC	ES FOR THIS UNIT:	BIG IDEA(S):			
Textbook			n operations with po	lynomial functions	
Supplemental Handouts		Solve pe	olynomial equations		
Graphing Calculator		Graph p	olynomial functions		
		 Apply p 	olynomial functions	to real-life situations	
ENDURING UNDERSTANDINGS:		ESSENTIAL QUES	STIONS:		
Arithmetic operations can be ex-	tended to polynomial functions	 How do 	you factor a polyno	mial expression?	
 You can divide polynomials using 		•	Recognize factoring		
long-division steps that you use			you solve a polynon	•	
Several different factoring patte	rns can be used to solve a		How do graph a polynomial function?		
polynomial equation			How do you write a polynomial function, given its zeros?		
	ial function can be used to create	How do	you write a polynon	nial function, given a real-life situation?	
its graph					
You can use polynomial function	is to model real-life situations				
WHAT SHO	ULD STUDENTS KNOW, UNDERSTA	AND, AND BE ABLI	E TO DO AT THE END	OF THIS UNIT?	
Standards, Concepts, Content, Skills, Products, Vocabular					
REFERENCE/STANDARD	STANDARDS: Content specific		MAJOR	SUPPORTING STANDARD	
i.e. GLE/CLE/MLS/NGSS	will be addressed in th		STANDARD		
A2.NQ.B.7	Know and apply the Fundament	al Theorem of	х		
	Algebra.				
A2.REI.A.1			x		
including those that involve abso					
A2.APR.A.2 Understand the Remainder Theore to solve problems.		orem and use it	×		
A2.APR.A.3 Find the least common multiple of		of two or more		x	
	polynomials.				
A2.APR.A.5	Identify zeros of polynomials wh		x		
	factorizations are available, and	use the zeros to			



	aliana la 11	function defined by the networking	 	
		e function defined by the polynomial.		
A2.IF.A.1	Identify and interpret key characteristics of		х	
		represented graphically, with tables		
	and with a	algebraic symbolism to solve		
	problems			
A2.IF.A.2	Translate	between equivalent forms of		x
	functions.			
A2.FM.A.1	Create fur	nctions and use them to solve	х	
	applicatio	ns of quadratic and exponential		
	function r	nodeling problems.		
A2.BF.A.1	Create ne	w functions by applying the four	х	
	arithmetic	c operations		
	and comp	osition of functions (modifying the		
	domain a	nd range		
	as necess	ary).		
OBJECTIVE # 1		Perform Operations with Polynomial E	xpressions	
REFERENCES/STANDARDS		• A2.IF.A.2: Translate between	equivalent forms	of functions.
<i>i.e. GLE/CLE/MLS/NGSS</i> • A2.BF.A.1: Create new functi		A2.BF.A.1: Create new function	ons by applying th	e four arithmetic operations and composition of
		functions (modifying the dom	ain and ranges ne	ecessary).
		A2.APR.A.2: Understand the F	• A2.APR.A.2: Understand the Remainder Theorem and use it to solve problems.	
		WHAT SHOULD STUDENTS		
UNDERSTAND?		KNOW?		BE ABLE TO DO?
Concepts; essential truths that give mean	nina to the	Facts, Names, Dates, Places, Inform	nation.	Skills; Products
topic; ideas that transfer across situa		ACADEMIC VOCABULARY		
There are several different factor		Degree	•	Simplify monomials using rules of exponents
patterns that can be used to factor a		Standard form	•	Add, subtract, multiply and divide
polynomial		Terms		polynomial expressions
• You can divide polynomials using steps that		Turns		Factor a polynomial expression
are similar to the long-division steps that		Long division		- F - /
you use to divide whole numbers		Synthetic division		
 The Remainder Theorem can be used to 		Remainder Theorem		
evaluate a polynomial				
			•	



FACILITATING ACTI	FACILITATING ACTIVITIES – STRATEGIES AND METHODS FOR TEACHING AND LEARNING				
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)			
 Academic vocabulary/language Model the use of the graphing calculator Effective questioning Targeted feedback 	 Summarizing and note-taking Practice performing operations on polynomial expressions Self-assessment 	1-3			
INTERDISCIPLINARY CONNECTION Business Science 	 PRIOR KNOWLEDGE CONNECTIONS Arithmetic operations Long division of whole numbers Simplify algebraic expressions 	INQUIRY CONNECTIONS How do you apply operations with polynomials to a real-life situation?			
НО	W DO WE KNOW WHAT STUDENTS HAVE LEAR	NED?			
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)			
 Daily Homework Frequent Quizzes Comprehensive Assessment on operations with polynomial expressions 	 Formative Formative Summative 	 1-3 1-3 1-4 			



	Tonors Aigebra 2 Carriedian			
НОМ	V WILL WE RESPOND IF STUDENTS HAVE NOT LEA	RNED?		
	Possible Interventions			
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)		
Academic VocabularyAdditional Modeling	 Additional practice Practice long division of whole numbers Graphic organizers Peer Tutoring Watch video lessons 	1-3		
HOW V	VILL WE RESPOND IF STUDENTS HAVE ALREADY L	EARNED?		
	Possible Extensions/Enrichments			
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)		
Discovery LearningPeer Teaching	Research and present how the Binomial Theorem and Pascal's Triangle relates to polynomials Peer Teaching	3-4		



The City of St. Charles School District Honors Algebra 2 Curriculum **PROFICIENCY SCALES FOR THIS STANDARD**

STANDA	RD: Perform Operations with Polynomial Expressions	
SCORE	DESCRIPTION	SAMPLE TASKS
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.	
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.	
3.0	The student will be able to: Evaluate a polynomial expression with algebra Derform an evaluation with notice particle. 	• Find f(x+3) if f(x)=2x3-5x+1
	 Perform operations with polynomials The student exhibits no major errors or omissions. 	 Multiply (x+2)3 Long Division and Synthetic Division
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content	
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Recognizes or recalls specific terminology, such as: Degree, number of terms, standard form, synthetic division/substitution, direct substitution Performs basic processes, such as: Evaluate a polynomial with a number Add, subtract, and multiply simple polynomial expressions However, the student exhibits major errors or omissions regarding the more complex ideas and processes. 	• FInd f(2) if f(x)=2x2-7x+8
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content	
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.	
LND	Even with help, no understanding or skill demonstrated.	



	Honors Algebra 2 Curriculum		
OBJECTIVE # 2	Solve Polynomial Equations		
REFERENCES/STANDARDS i.e. GLE/CLE/MLS/NGSS	 A2.IF.A.2: Translate between equivalent forms of functions. A2.NQ.B.7: Know and apply the Fundamental Theorem of Algebra. A2.REI.A.1: Create and solve equations and inequalities, including those that involve absolute value. A2.APR.A.2: Understand the Remainder Theorem and use it to solve problems. A2.APR.A.3: Find the least common multiple of two or more polynomials. 		
	WHAT SHOULD STUDENTS		
UNDERSTAND? Concepts; essential truths that give meaning to the topic; ideas that transfer across situations.	KNOW? Facts, Names, Dates, Places, Information, ACADEMIC VOCABULARY	BE ABLE TO DO? <i>Skills; Products</i>	
 There are several different factoring patterns that can be used to factor a polynomial Factoring a polynomial equation will help you find its zeros The factor theorem can be used to find remaining factors of a polynomial function 	 Greatest common factor Formula for Sum & Difference of Cubes Quadratic formula Formula for difference of squares Factor by grouping Factor Theorem Complex zeros/roots 	 Solve a polynomial equation by factoring and using the zero product property Given a zero, use the factor theorem to find the remaining zeros 	
FACILITATING ACTIVITIES –	STRATEGIES AND METHODS FOR TEACHI	NG AND LEARNING	
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)	
 Academic vocabulary/language Model solving polynomial equations Effective questioning Targeted feedback 	 Summarizing and note-taking Practice solving polynomial equations Self-assessment 	1-3	



Peer Teaching

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Honors Algebra 2 Curriculum INTERDISCIPLINARY CONNECTION PRIOR KNOWLEDGE CONNECTIONS **INQUIRY CONNECTIONS** Business • Factor and solve quadratic ٠ How do you apply solving polynomials to a . real-life situation? equations Science Recognize complex zeros ٠ HOW DO WE KNOW WHAT STUDENTS HAVE LEARNED? ASSESSMENT DESCRIPTION FORMATIVE OR SUMMATIVE? DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking) Daily Homework Formative ٠ 1-3 ٠ ٠ **Frequent Quizzes** Formative 1-3 ٠ . • Comprehensive Assessment on operations with Summative 1-4 • • • polynomial expressions HOW WILL WE RESPOND IF STUDENTS HAVE NOT LEARNED? **Possible Interventions TEACHER INSTRUCTIONAL ACTIVITY** STUDENT LEARNING TASK DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking) Additional practice 1-3 Academic Vocabulary ٠ ٠ Graphic organizers Additional Modeling . . Peer Tutoring . Watch video lessons ٠ HOW WILL WE RESPOND IF STUDENTS HAVE ALREADY LEARNED? Possible Extensions/Enrichments **INSTRUCTIONAL ACTIVITY/METHOD** STUDENT LEARNING TASK DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking) Research and present the rational 3-4 **Discovery Learning** ٠

zero theorem

Peer Teaching

The City of St. Charles School District



STANDA	RD: Perform Operations with Polynomial Expressions	
SCORE	DESCRIPTION	SAMPLE TASKS
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.	
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.	
3.0	 The student will be able to: Solve polynomials of degree 3 or higher by rational root theorem and factoring. 	Ex: Solve the polynomial equation
	The student exhibits no major errors or omissions.	
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content	
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Performs basic processes, such as: 	Ex: Solve the polynomial equation
	Solving quadratics by factoring However, the student exhibits major errors or omissions regarding the more complex ideas and processes.	
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content	
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.	
LND	Even with help, no understanding or skill demonstrated.	



,	s Algebra 2 Curriculum		
OBJECTIVE # 3	Graph Polynomial Functions		
REFERENCES/STANDARDS i.e. GLE/CLE/MLS/NGSS	 A2.APR.A.5: Identify zeros of polynomials when suitable factorizations are available, and use the zeros to sketch the function defined by the polynomial. A2.IF.A.1: Identify and interpret key characteristics of functions represented 		
(WHA)	T SHOULD STUDENTS	algebraic symbolism to solve problems.	
UNDERSTAND? Concepts; essential truths that give meaning to the topic; ideas that transfer across situations.	KNOW? Facts, Names, Dates, Places, Information, ACADEMIC VOCABULARY	BE ABLE TO DO? Skills; Products	
 The degree and leading coefficient of a polynomial function can be used to determine end behavior, number of zeros, number of turns Finding the zeros of a polynomial function will help to graph the function 	Degree Leading Coefficient End behavior Turns Roots, zeros, <i>x</i> -intercepts Even & Odd function Continuous function Domain and range	 Describe the characteristics of a polynomial, given a graph or equation of a polynomial Graph a polynomial function by finding the zeros and making a table of values 	
FACILITATING ACTIVITIES – STRATE	GIES AND METHODS FOR TEACHING AND	LEARNING	
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)	
 Academic Vocabulary/language Model graphing polynomial functions Effective questioning Targeted feedback 	Summarizing and note-taking Practice graphing polynomials and identifying characteristics Self-assessment	1-3	
INTERDISCIPLINARY CONNECTION Roller Coaster Design	PRIOR KNOWLEDGE CONNECTIONS Evaluating algebraic expressions x-intercepts Graphing from a table of values	 INQUIRY CONNECTIONS How do the zeros of a polynomial help you to graph the function? 	



HOW DO WE KNOW WHAT STUDENTS HAVE LEARNED?					
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET			
		(1=Recall, 2=Skill/Concept, 3=Strategic			
		Thinking, 4=Extended Thinking)			
Daily Practice	Formative	• 1-3			
Frequent Quizzes	Formative	• 1-3			
Comprehensive Assessment	Summative	• 1-4			
HOW WILL WE RESPO	ND IF STUDENTS HAVE NOT LEARNED?				
Po	ssible Interventions				
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET			
		(1=Recall, 2=Skill/Concept, 3=Strategic			
		Thinking, 4=Extended Thinking)			
Additional modeling	Additional Practice	1-3			
 Nonlinguistic representation 	Peer tutoring				
	Watch video lessons				
	D IF STUDENTS HAVE ALREADY LEARNED?				
Possible Extensions/Enrichments					
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET			
		(1=Recall, 2=Skill/Concept, 3=Strategic			
		Thinking, 4=Extended Thinking)			
Discovery Learning	 Graph a 4th degree polynomial 	3-4			
Peer Teaching	that has double zeros				
	Peer Teaching				



The City of St. Charles School District Honors Algebra 2 Curriculum **PROFICIENCY SCALES FOR THIS STANDARD**

STANDA	RD: Graph and Interpret Polynomial Functions	
SCORE	DESCRIPTION	SAMPLE TASKS
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was	
	taught.	
3.0	The student:	Graph the polynomial
	Graph a polynomial function	
	The student exhibits no major errors or omissions.	
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content	
2.0	There are no major errors or omissions regarding the simpler details and processes as the	 Identify end behavior, degree, and leading
	student:	coefficient.
	 Recognizes or recalls specific terminology, such as: 	
	Degree, leading coefficient, end behavior, even & odd function, continuity	
	Performs basic processes, such as:	
	Classify polynomial functions	
	Given the zeros, graph a polynomial function.	
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.	
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content	
1.0	With help, a partial understanding of some of the simpler details and processes and some	
	of the more complex ideas and processes.	
LND	Even with help, no understanding or skill demonstrated.	



	Honors Algebra 2 Curriculum	
OBJECTIVE # 4	Write and Apply Polynomial Functions	
REFERENCES/STANDARDS i.e. GLE/CLE/MLS/NGSS	 A2.FM.A.1: Create functions and use them to solve applications of quadratic and exponential function modeling problems. 	
	WHAT SHOULD STUDENTS	
UNDERSTAND?	KNOW?	BE ABLE TO DO?
Concepts; essential truths that give meaning to the topic;	Facts, Names, Dates, Places, Information,	Skills; Products
ideas that transfer across situations.	ACADEMIC VOCABULARY	
 A polynomial function can be used to model a real- 	Zeros	Write a polynomial function, given real
life situation	Complex conjugate	and complex zeros
 A polynomial function can be written from the zeros 	Geometry formulas for area and volume	Write and solve a polynomial equation,
of the function		given a real-life situation
FACILITATING ACTIVITIES –	STRATEGIES AND METHODS FOR TEACHING AN	D LEARNING
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET
		(1=Recall, 2=Skill/Concept, 3=Strategie
		Thinking, 4=Extended Thinking)
Academic Vocabulary/Language	Summarizing and Notetaking	1-3
 Model writing polynomial functions 	Practice writing polynomial functions	
Effective questioning	Self-Assessment	
Targeted Feedback		
INTERDISCIPLINARY CONNECTION	PRIOR KNOWLEDGE CONNECTIONS	INQUIRY CONNECTIONS
Archaeology		How can you write a polynomial
Landscape & design	□Conjugates	given the zeros?
Meteorology	Writing quadratic functions	
	Applications of quadratic functions	
HOW DO W	/E KNOW WHAT STUDENTS HAVE LEARNED?	
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET
		(1=Recall, 2=Skill/Concept, 3=Strategic
		Thinking, 4=Extended Thinking)
Daily practice	Formative	• 1-3
Frequent Quizzes	Formative	• 1-3
Comprehensive Assessment	Summative	• 1-4
• • • •		



	Honors / ligebra 2 carried ann				
HOW WILL WE RESPOND IF STUDENTS HAVE NOT LEARNED?					
Possible Interventions					
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET			
		(1=Recall, 2=Skill/Concept, 3=Strategic			
		Thinking, 4=Extended Thinking)			
Additional modeling	Additional practice	1-3			
 Use technology as a visual aid 	Use a graphing calculator to help visualize				
	the zeros				
	Watch video lessons				
HOW WILL WE	RESPOND IF STUDENTS HAVE ALREADY LEARNED	?			
	Possible Extensions/Enrichments				
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET			
		(1=Recall, 2=Skill/Concept, 3=Strategic			
		Thinking, 4=Extended Thinking)			
Discovery Learning	Write a polynomial function with more	3-4			
Peer Teaching	than four complex zeros				
	Write a polynomial function, given				
	coordinate points				
	Cubic & quadratic regression				
	Peer Teaching				



SCORE	DESCRIPTION	SAMPLE TASKS
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.	
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.	
3.0	 The student: Write an equation in factored form with complex roots or irrational roots. Solve an application problem by writing and solving a polynomial equation The student exhibits no major errors or omissions.	 Write a polynomial with the given zeros: -1, 4-i
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content	
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Recognizes or recalls specific terminology, such as: Zeros, roots Performs basic processes, such as: Write an equation in factored form with rational roots. However, the student exhibits major errors or omissions regarding the more complex ideas and processes. 	 Write a polynomial with the given zeros: -2, 4, 3
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content	
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.	
LND	Even with help, no understanding or skill demonstrated.	



C	CONTENT AREA: Mat	hematics	UNIT: Rad	ical Functions	
C	COURSE: Honors Alg	ebra 2	UNIT DUR	ATION: 3-4 Wee	ks
MATERIALS / IN	STRUCTIONAL RESOU	RCES FOR THIS UNIT:	BIG IDEA(S):		
-	ok ng Calculator mental Handouts		exponents Perform o functions Solve radio Graph squ 	;	-
EquationAll mat	orld applications can k ons can have extraneo hematical operations	e represented mathematically us solutions have an inverse operation eflections of each other over the line y =	ESSENTIAL QUESTION How will I rational exp How will I composition How will I How will I How will I	DNS: simplify radical ex ponents? perform operatio on of functions? solve radical equa graph square roo write inverses of	xpressions and expressions with ns on functions including the ations and inequalities? t and cube root functions? functions? ctions to a real-life situation?
	WHAT S	HOULD STUDENTS KNOW, UNDERSTAND,			IS UNIT?
DEEEDEA		Standards, Concepts, Content,		MAJOR	SUPPORTING STANDARD
	I CE/STANDARD /CLE/MLS/NGSS	STANDARDS: Content specific stan addressed in this un		STANDARD	SUPPORTING STANDARD
	2.NQ.A.1	Extend the system of powers and roots exponents.			Х
A	2.NQ.A.2	Create and recognize equivalent expres radical and exponential forms of expres	-		Х
A	2.NQ.A.3	Add, subtract, multiply, and divide radio	cal expressions		Х
A	2.NQ.A.4	Solve equations involving rational expo and identify situations where extraneou		Х	



result result A2.BF.A.1 Create new functions by applying the four arithmetic operations and composition of functions the original functions to show that the functions are inverses. X A2.BF.A.2 Derive inverses of functions and compose the inverse with the original functions to show that the functions are inverses. X A2.BF.A.1 Identify and interpret key characteristics of functions represented graphically, with tables, and algebraic symbolism X A2.BF.A.3 Describe the effects of transformations algebraically and graphically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations of cube root and square root functions X A2.REI.A.1 Create and solve equations and inequalities involving radical functions. Simplify Radical Expressions A2.REI.A.1 Create and solve equations and inequalities involving radical functions. A2.NCLA.1 Extend the system of powers and roots to include rational exponents. A.2.NCLA.2 Create and recognize equivalent expressions. A.2.NCLA.3 Add, subtract, multiply and divide radical expressions. A.2.NCLA.3 Create new functions by applying the four arithmetic operations and composition of functions (modifying the domain and range as necessary). WHAT SHOLD STUDENTS EABLE TO DO? Concepts; essential truths that give meaning to the topic; ld ess that transfer across situations. • How to perform basic function operations. • How			nonors / iigebra 2 carriediani		
operations and composition of functions Image: model of the second of		result			
A2.BF.A.2 Derive inverses of functions and compose the inverse with the original functions to show that the functions are inverses. X A2.IF.A.1 Identify and interpret key characteristics of functions are inverses. X A2.IF.A.1 Identify and interpret key characteristics of functions are inverses. X A2.BF.A.3 Describe the effects of transformations algebraically and graphically, with tables, and algebraic and horizontal reflections and dilations of cube root and square root functions X A2.BF.A.3 Describe the effects of transformations algebraically and graphically, creating vertical and horizontal reflections and dilations of cube root and square root functions X B2.ECTVE # 1 Simplify Radical Expressions Image: Create and solve equations and inequalities involving radical expressions involving radical and exponents. REFERENCES/STANDARDS A2.NQ.A.1 Extend the system of powers and roots to include rational exponents. A2.NQ.A.2 Create and recognize equivalent expressions involving radical and exponential forms of expressions. NOLESTAND? WHAT SHOULD STUDENTS BE ABLE TO DO? Concepts; essential truths that give meaning to the topic; ideas that transfer across situations. ACADEMIC VOCABULARY Skills; Products • How to simplify a radical expression. • Radical index/Root • Simplify radical expressions • Radical index/Root • Simplify radical expressions.	A2.BF.A.1 Create new functions b		ions by applying the four arithmetic		X
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		FACILITATING ACTIVITIE	ES – STRATEGIES AND METHODS FOR TEACH	ING AND LEARN	ING



	Honors Algebra 2 Curriculum					
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET				
		(1=Recall, 2=Skill/Concept, 3=Strategic				
		Thinking, 4=Extended Thinking)				
Demonstrate simplifying radical expressions	 Practice simplifying radical expressions 	DOK Level 2 - 3				
Demonstrate how to perform basic function	Practice how to perform basic function	Questions # 2, 4, 5, 7, 11, 12, 14, 15, 16, 17 -				
operations	operations	22				
Demonstrate how to restrict the domain of	Practice how to restrict the domain of	**See linked document**				
algebraic expressions.	algebraic expressions.					
INTERDISCIPLINARY CONNECTION	PRIOR KNOWLEDGE CONNECTIONS	INQUIRY CONNECTIONS				
Computer Technology	Properties of Exponents	• What can be modeled by a radical				
Science	Combine Like Terms	expression?				
	Operations with Fractions					
HOW D	O WE KNOW WHAT STUDENTS HAVE LEARNED?					
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET				
		(1=Recall, 2=Skill/Concept, 3=Strategic				
		Thinking, 4=Extended Thinking)				
Daily Homework check	FORMATIVE	1 - 4				
Frequent Quizzes	FORMATIVE	2 - 3				
Comprehensive Test	SUMMATIVE	1 - 4				
HOW WIL	HOW WILL WE RESPOND IF STUDENTS HAVE NOT LEARNED?					
	Possible Interventions					
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET				
		(1=Recall, 2=Skill/Concept, 3=Strategic				
		Thinking, 4=Extended Thinking)				
Provide additional instruction from Khan	Additional practice	2-3				
Academy or Fort Bend Tutoring.	Test corrections					
HOW WILL WE RESPOND IF STUDENTS HAVE ALREADY LEARNED?						
Possible Extensions/Enrichments						
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET				
		(1=Recall, 2=Skill/Concept, 3=Strategic				
		Thinking, 4=Extended Thinking)				
Self-guided assignment	Student presentation on the information	3-4				



PROFICIENCY SCALES FOR THIS STANDARD

STANDA	STANDARD 16: Simplify Radical Expressions			
SCORE	DESCRIPTION	SAMPLE TASKS		
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.			
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.			
3.0	 The student: Rationalize a radical expression including a complex denominator. Add, subtract, multiply and divide radical expressions Simplify radical expressions in both radical form and rational exponent form. Restrict the domain for algebraic expressions. 	Questions # 2, 4, 5, 7, 11, 12, 14, 15, 16, 17 - 22 **See linked document**		
2.5	The student exhibits no major errors or omissions. No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content			
2.0	There are no major errors or omissions regarding the simpler details and processes as the student:	Questions # 1, 3, 6, 8, 9, 10, 13, 17 - 22		
	 Perform operations on functions with minor mistakes. 	**See linked document**		
	Add, subtract, multiply, divide simplified radical expressions.			
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.			
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content			
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.			
LND	Even with help, no understanding or skill demonstrated.			



The City of St. Charles School District Honors Algebra 2 Curriculum **OBJECTIVE # 2** Solving Radical Equations A2. NQ. A. 4 Solve equations involving rational exponents and/or radicals and identify situations **REFERENCES/STANDARDS** i.e. GLE/CLE/MLS/NGSS where extraneous solutions may result. A2.REI.A.1 Create and solve equations and inequalities involving radical functions. WHAT SHOULD STUDENTS... **UNDERSTAND?** KNOW? **BE ABLE TO DO?** Concepts; essential truths that give meaning to the topic; Facts, Names, Dates, Places, Information, Skills; Products ideas that transfer across situations. ACADEMIC VOCABULARY Solve a radical equation. How to solve a radical equation Extraneous Solutions ٠ ٠ • How to solve a radical inequality **Radical Equation** Solve a radical inequality. ٠ ٠ How to solve an equation with rational exponents Radical Index/Root Solve an equation with rational . • How to apply radical equations to real-life exponents. Radicand • situations. Apply radical equations to real-life • Interval Notation situations. Interpretation of a rational exponent • FACILITATING ACTIVITIES – STRATEGIES AND METHODS FOR TEACHING AND LEARNING **TEACHER INSTRUCTIONAL ACTIVITY** STUDENT LEARNING TASK DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking) Demonstrate solving a radical equation and • Questions # 23, 24, 25, 26 Practice solving a radical equations • ٠ **See linked document** and inequality. inequality. Connect material to real-world material. Practice connecting material to realworld situations. INQUIRY CONNECTIONS INTERDISCIPLINARY CONNECTION PRIOR KNOWLEDGE CONNECTIONS Why would we model a situation with a Science ٠ Factoring a quadratic . Quadratic Formula radical equation? Architecture ٠ Order of Operations Construction • Solving Linear Equations/Inequalities HOW DO WE KNOW WHAT STUDENTS HAVE LEARNED? ASSESSMENT DESCRIPTION FORMATIVE OR SUMMATIVE? DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking) Daily Homework check FORMATIVE 1 - 4 FORMATIVE 2 - 3 Frequent Quizzes .



	Honors Algebra 2 Curriculum	
Comprehensive Test	SUMMATIVE	1 - 4
HOW WIL	L WE RESPOND IF STUDENTS HAVE NOT LEARNED?	
	Possible Interventions	
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET
		(1=Recall, 2=Skill/Concept, 3=Strategic
		Thinking, 4=Extended Thinking)
Provide additional Instruction through Khan	Additional practice	
Academy or Fort Bend Tutoring	Test corrections	
HOW WILL \	WE RESPOND IF STUDENTS HAVE ALREADY LEARNEI)?
	Possible Extensions/Enrichments	
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET
		(1=Recall, 2=Skill/Concept, 3=Strategic
		Thinking, 4=Extended Thinking)
Self guided assignments	Student presentation on the information	



The City of St. Charles School District Honors Algebra 2 Curriculum **PROFICIENCY SCALES FOR THIS STANDARD**

STANDA	STANDARD 17: Solve Radical Equations			
SCORE	DESCRIPTION	SAMPLE TASKS		
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.			
3.0	The student:	• <u>Questions # 23, 24, 25, 26</u>		
	Solve multi-step radical equations.	**See linked document-**		
	 Solve multi-step equations with rational exponents. 			
	Solve radical inequalities.			
	The student exhibits no major errors or omissions.			
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content			
2.0	There are no major errors or omissions regarding the simpler details and processes as the student:	• <u>Questions # 22, 27</u>		
	 Solve radical equation in which the radical is isolated. 	**See linked document**		
	Solve a simply rational exponent equation.			
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.			
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content			
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more			
	complex ideas and processes.			
LND	Even with help, no understanding or skill demonstrated.			



The City of St. Charles School District		
•		
A2.IF.A.1 Identify and interpret key characteristics of functions represented graphically, with tables and algebraic symbolism to solve problems. A2.BF.A.3 Describe the effects of transformations algebraically and graphically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations for cube root and square root		
KNOW ? Facts, Names, Dates, Places, Information, ACADEMIC VOCABULARY	BE ABLE TO DO? Skills; Products	
 Interpretation of Vertex Form Expand Compress Reflect Translate Domain Range Inverse 	 Graph cube root and square root functions Graph graph a radical inequality State the domain and range 	
CTIVITIES – STRATEGIES AND METHODS FOR TEACHING	AND LEARNING	
STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)	
 Practice graphing cube root and square root functions Practice graphing a radical inequality Practice finding the domain and range 		
PRIOR KNOWLEDGE CONNECTIONS		
 Graphing a parabola Graphing a cubic Finding domain and range of a polynomial 	What is modeled using a square root or cube root function?	
	algebraic symbolism to solve problems. A2.BF.A.3 Describe the effects of transformations alge horizontal translations, vertical and horizontal reflecti functions. WHAT SHOULD STUDENTS KNOW? Facts, Names, Dates, Places, Information, ACADEMIC VOCABULARY Interpretation of Vertex Form Expand Compress Reflect Translate Domain Range Inverse CTIVITIES – STRATEGIES AND METHODS FOR TEACHING STUDENT LEARNING TASK Practice graphing cube root and square root functions Practice graphing a radical inequality Practice finding the domain and range PRIOR KNOWLEDGE CONNECTIONS Graphing a parabola Graphing a cubic	



HOW DO WE KNOW WHAT STUDENTS HAVE LEARNED?					
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET			
		(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,			
		4=Extended Thinking)			
Daily Homework check	FORMATIVE	1 - 4			
Frequent Quizzes	FORMATIVE	2 - 3			
Comprehensive Test	SUMMATIVE	1 - 4			
НО	W WILL WE RESPOND IF STUDENTS HAVE NOT LEARNE	D?			
	Possible Interventions				
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET			
		(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,			
		4=Extended Thinking)			
Provide additional instruction from Khan	Additional practice	Questions # 28 - 36			
Academy or Fort Bend Tutoring.	Test corrections	**See linked document**			
HOW	WILL WE RESPOND IF STUDENTS HAVE ALREADY LEAR	NED?			
	Possible Extensions/Enrichments				
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET			
		(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,			
		4=Extended Thinking)			
Self guided assignments	Student presentation on the information				



STANDA	STANDARD 18 : Graphing Radical Functions and Inequalities		
SCORE	DESCRIPTION	SAMPLE TASKS	
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.		
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.		
3.0	The student: Graph square root function Graph inverse functions Graph cube root function 	Questions # 28 - 36 **See linked document**	
	 Graph radical inequalities Identify transformations Find domain and range The student exhibits no major errors or omissions.		
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content		
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Graph square root function with minor mistakes Graph cube root function with minor mistakes Graph radical inequalities with minor mistakes Identify transformations with minor mistakes Find domain and range with minor mistakes However, the student exhibits major errors or omissions regarding the more complex ideas and processes. 	Questions # 28 - 36 **See linked document**	
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content		
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex		
1.0	ideas and processes.		
LND	Even with help, no understanding or skill demonstrated.		



The City of St. Charles School District Honors Algebra 2 Curriculum **PROFICIENCY SCALES FOR THIS STANDARD**

OBJECTIVE # 4	Writing Radical Equations and Inverses			
REFERENCES/STANDARDS	A2.BF.A.2 Derive inverses of functions and compose the inverse with the original function to show that			
e. GLE/CLE/MLS/NGSS the functions are inverses.				
	WHAT SHOULD STUDENTS			
UNDERSTAND?	KNOW?	BE ABLE TO DO?		
Concepts; essential truths that give meaning to the topic; ideas that transfer across situations.	Facts, Names, Dates, Places, Information, ACADEMIC VOCABULARY	Skills; Products		
 How to write an inverse How to to write a radical equation given a real world problem How to verify that two functions are inverses of each other 	 Inverse Cube root Square root 	 Write the inverse of an equation Model a real-world problem using a radical function Verify two functions are inverses of each other using the composition of functions 		
FACILITATING AC	TIVITIES – STRATEGIES AND METHODS FOR TEACHING A	ND LEARNING		
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)		
 Demonstrate how to write an inverse Demonstrate how to to write a radical equation given a real world problem Demonstrate how to verify that two functions are inverses of each other 	 Practice writing the inverse of an equation Practice modeling a real-world problem using a radical function Practice verifying two functions are inverses of each other using the composition of functions 	Questions #37 - 42 ** See linked document**		
INTERDISCIPLINARY CONNECTION	PRIOR KNOWLEDGE CONNECTIONS			
BusinessPsychologyEngineering	Isolate a variableOrder of operations	What is modeled using a square root or cube root function?		
HOW DO WE KNOW WHAT STUDENTS HAVE LEARNED?				
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)		
 Daily Homework check Frequent Quizzes Comprehensive Test 	FORMATIVE FORMATIVE SUMMATIVE	1 - 4 2 - 3 1 - 4		



HOW WILL WE RESPOND IF STUDENTS HAVE NOT LEARNED?				
	Possible Interventions			
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET		
		(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,		
		4=Extended Thinking)		
Provide additional instruction from Khan	Additional practice			
Academy or Fort Bend Tutoring.	Test corrections			
HOW	HOW WILL WE RESPOND IF STUDENTS HAVE ALREADY LEARNED?			
Possible Extensions/Enrichments				
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET		
		(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,		
		4=Extended Thinking)		
Self guided assignments	Student presentation on the information			



STANDA	STANDARD 19: Writing Inverses and Radical Equations			
SCORE	DESCRIPTION	SAMPLE TASKS		
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.			
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.			
3.0	 The student: Use composition of functions to verify that two equations are inverses. Write the inverse of a non-linear equation 	Questions # 38, 39, 41, 42 **See linked document**		
	The student exhibits no major errors or omissions.			
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content			
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Write the inverse of a linear equation. 	Questions # 37, 40 **See linked document**		
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.			
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content			
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.			
LND	Even with help, no understanding or skill demonstrated.			



CONTENT AREA: Mathematics	UNIT: Exponential and Logarithmic Functions
COURSE: Honors Algebra 2	UNIT DURATION: 3 Weeks
MATERIALS / INSTRUCTIONAL RESOURCES FOR THIS UNIT:	BIG IDEA(S):
Graphing calculator	 Simplify exponential and logarithmic expressions
Textbook	 Solve exponential and logarithmic equations
Supplemental Handouts	Graph exponential and logarithmic equations
	Write equations that model exponential and logarithmic situations
ENDURING UNDERSTANDINGS:	ESSENTIAL QUESTIONS:
Real world applications can be represented mathematically	• What are the solutions to a logarithm or exponential equations?
Equations can have extraneous solutions	 How do you graph a logarithmic or exponential functions?
• Exponentials and logarithms are inverses of each other.	How can you model and exponential or logarithmic function?
• A logarithm is defined as an exponent.	

WHAT S	WHAT SHOULD STUDENTS KNOW, UNDERSTAND, AND BE ABLE TO DO AT THE END OF THIS UNIT?			
	Standards, Concepts, Content, Skills, Products, Vocabulary			
REFERENCE/STANDARD	STANDARDS: Content specific standards that will be addressed in	MAJOR	SUPPORTING	
i.e. GLE/CLE/MLS/NGSS	this unit.	STANDARD	STANDARD	
A2.SSE.A.1	Develop the definition of logarithms based on properties of		Х	
	exponents			
A2.SSE.A.2	Use the inverse relationship between exponents and logarithms to	Х		
	solve exponential and logarithmic equations			
A2.SSE.A.3	Use properties of logarithms to solve equations or find equivalent		Х	
	expressions.			
A2.SSE.A.4	Understand why logarithmic scales are used and use them to solve		Х	
	problems			
A2.IF.A.1	Identify and interpret key characteristics of functions represented	Х		
	graphically, with tables, and algebraic symbolism			
A2.BF.A.3	Describe the effects of transformations algebraically and graphically,	Х		
	creating vertical and horizontal translations, vertical and horizontal			
	reflections and dilations of exponential and logarithmic functions.			



A2.FM.A.1	Create functions and use them to solve applications of exponential	Х	
	functions modeling problems .		
A2.REI.A.1	Create and solve equations and inequalities involving exponential		
	and logarithmic functions.		

OBJECTIVE # 1	Simplifying Exponential and Logarithmic Expressions		
REFERENCES/STANDARDS i.e. GLE/CLE/MLS/NGSS	A2.SSE.A.1 Develop the definition of logarithms based on properties of exponents. A2.SSE.A.2 Use the inverse relationship between exponents and logarithms to solve exponential and logarithmic equations. A2.SSE.A.3 Use properties of logarithms to find equivalent expressions.		
	WHAT SHOULD STUDENTS		
UNDERSTAND? Concepts; essential truths that give meaning to the topic; ideas that transfer across situations. • How to convert between logarithmic and exponential form. • How to evaluate a logarithm • How to expand and condense logarithms using the properties of logarithms.	KNOW? Facts, Names, Dates, Places, Information, ACADEMIC VOCABULARY Log Exponential Condense Expand	 BE ABLE TO DO? Skills; Products Expand logarithms Condense logarithms Simplify logarithmic and exponential expressions. 	
How to simplify exponential expressions.			
	ES – STRATEGIES AND METHODS FOR TEACHING AND LE STUDENT LEARNING TASK	DOK TARGET	
	STODENT LEARNING TASK	(1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)	
 Demonstrate how to convert between logarithmic and exponential form. Demonstrate how to evaluate a logarithm Demonstrate how to expand and condense logarithms using the properties of logarithms. Demonstrate how to simplify exponential expressions. 	 Practice converting between logarithmic and exponential form. Practice evaluating a logarithm. Practice expanding and condensing logarithms and using the properties of logarithms. Practice simplifying exponential expressions. 	Questions # 1 - 16 **See linked document**	



INTERDISCIPLINARY CONNECTION	PRIOR KNOWLEDGE CONNECTIONS		
		INQUIRY CONNECTIONS	
•	Properties of exponents	 How can a logarithm be applied 	
		to help us solve problems?	
HOW	DO WE KNOW WHAT STUDENTS HAVE LEARNED?		
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET	
		(1=Recall, 2=Skill/Concept, 3=Strategic	
		Thinking, 4=Extended Thinking)	
Daily Homework check	Formative	1 - 4	
Frequent Quizzes	Formative	2 - 3	
Comprehensive Test	Summative	1 - 4	
HOW W	ILL WE RESPOND IF STUDENTS HAVE NOT LEARNED?		
	Possible Interventions		
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET	
		(1=Recall, 2=Skill/Concept, 3=Strategic	
		Thinking, 4=Extended Thinking)	
Provide additional instruction from Khan	Additional practice	1-3	
Academy or Fort Bend Tutoring.	Test corrections		
HOW WILL	WE RESPOND IF STUDENTS HAVE ALREADY LEARNED?		
Possible Extensions/Enrichments			
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET	
		(1=Recall, 2=Skill/Concept, 3=Strategic	
	Chudent are attain an the infanti	Thinking, 4=Extended Thinking)	
 Self guided assignments 	 Student presentation on the information 	3-4	



The City of St. Charles School District Honors Algebra 2 Curriculum **PROFICIENCY SCALES FOR THIS STANDARD**

STANDA	STANDARD 20: Simplify Logarithmic and Exponential Expressions			
SCORE	DESCRIPTION	SAMPLE TASKS		
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.			
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.			
3.0	The student:	• <u>Questions # 10 - 16</u>		
	Use the properties of logarithms to condense and expand logarithms.	** See linked document**		
	The student exhibits no major errors or omissions.			
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content			
2.0	There are no major errors or omissions regarding the simpler details and processes as the student:	• <u>Questions # 1 - 9</u>		
	Convert between logarithmic and exponential form.	**See linked document**		
	Evaluate a logarithm			
	Simplify exponential expressions			
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.			
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content			
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.			
LND	Even with help, no understanding or skill demonstrated.			



The City of St. Charles School District Honors Algebra 2 Curriculum **OBJECTIVE # 2** Solve exponential and logarithmic equations A2.SSE.A.3 Use properties of logarithms to solve equations **REFERENCES/STANDARDS** *i.e. GLE/CLE/MLS/NGSS* A2.SSE.A.4 Understand why logarithmic scales are used and use them to solve problems. A2.REI.A.1 Create and solve equations and inequalities involving exponential and logarithmic functions. WHAT SHOULD STUDENTS... UNDERSTAND? KNOW? **BE ABLE TO DO?** Concepts; essential truths that give meaning to the topic; ideas Facts, Names, Dates, Places, Information, Skills; Products that transfer across situations. ACADEMIC VOCABULARY Solve a logarithmic equation. Logarithms and exponentials are inverses of each Logarithm • • ٠ other. Exponential Solve an exponential equation. • How solve a logarithmic equation. Identify extraneous solutions for **Extraneous Solution** • ٠ How to solve an exponential equation. logarithmic equations. How to apply properties of logarithms to solve an ٠ equation. How to check for extraneous solutions for logarithmic ٠ equations. FACILITATING ACTIVITIES – STRATEGIES AND METHODS FOR TEACHING AND LEARNING DOK TARGET **TEACHER INSTRUCTIONAL ACTIVITY** STUDENT LEARNING TASK (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking) Demonstrate that logarithms and exponentials are 1-4 Practice solving exponential ٠ ٠ 1-4 inverses of each other. equations. 1-4 Demonstrate how solve a logarithmic equation. Practice solving logarithmic ٠ Questions # 17 - 28 Demonstrate how to solve an exponential equation. equations. ٠ **See linked document** Demonstrate how to apply properties of logarithms to Practice checking for extraneous ٠ ٠ solve an equation. solutions. Demonstrate how to check for extraneous solutions ٠ for logarithmic equations.



	PRIOR KNOWLEDGE CONNECTIONS		
Science	Solve linear equation		
	Factor		
Engineering			
	Order of operations		
	Quadratic formula		
	KNOW WHAT STUDENTS HAVE LEARNED?		
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET	
		(1=Recall, 2=Skill/Concept, 3=Strategic	
		Thinking, 4=Extended Thinking)	
Daily Homework check	Formative	1 - 4	
Frequent Quizzes	Formative	2 - 3	
Comprehensive Test	Summative	1 - 4	
HOW WILL WE I	RESPOND IF STUDENTS HAVE NOT LEARNED	?	
	Possible Interventions		
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET	
		(1=Recall, 2=Skill/Concept, 3=Strategic	
		Thinking, 4=Extended Thinking)	
Provide additional instruction from Khan Academy or	Additional practice	1-3	
Fort Bend Tutoring.	Test corrections		
HOW WILL WE RE	SPOND IF STUDENTS HAVE ALREADY LEARNI	D?	
Possible Extensions/Enrichments			
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET	
		(1=Recall, 2=Skill/Concept, 3=Strategic	
		Thinking, 4=Extended Thinking)	
Self guided assignments	Student presentation on the	<u> </u>	
	information		



The City of St. Charles School District Honors Algebra 2 Curriculum **PROFICIENCY SCALES FOR THIS STANDARD**

STANDA	STANDARD 21: Solve Logarithmic and Exponential Equations			
SCORE	DESCRIPTION	SAMPLE TASKS		
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.			
3.0	The student:	• Questions # 17 - 19, 21, 23, 25 -		
	 Solve exponential equations with unlike bases. 	<u>27, 29</u>		
	Solve logarithmic equations that require changing forms.	**See linked document**		
	The student exhibits no major errors or omissions.			
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content			
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Solve exponential equations that contain like bases or can be rewritten with like bases. Solve logarithmic equations that contain like bases. However, the student exhibits major errors or omissions regarding the more complex ideas and processes. 	Questions # 20, 24, 28 **See linked document**		
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content			
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.			
LND	Even with help, no understanding or skill demonstrated.			



A CONTROLLER	The City of St. Charles School District			
	Honors Algebra 2 Curriculum			
OBJECTIVE # 3	Graph exponential and logarithmic functions			
REFERENCES/STANDARDS	A.1F.A.1 Identify and interpret key characteristics of functions represented graphically with tables and			
i.e. GLE/CLE/MLS/NGSS	with algebraic symbolism to solve problems.			
	A2.BF.3 Describe the effects of transformations algebra	ically and graphically creating vertical and		
	horizontal translations, vertical and horizontal reflection	ns, and dilations of exponential and logarithmic		
	functions.			
	WHAT SHOULD STUDENTS			
UNDERSTAND?	KNOW?	BE ABLE TO DO?		
Concepts; essential truths that give meaning to the	Facts, Names, Dates, Places, Information,	Skills; Products		
topic; ideas that transfer across situations.	ACADEMIC VOCABULARY			
• How to graph a logarithmic function.	Domain	Graph a logarithmic function.		
• How to graph an exponential function.	Range	• Graph an exponential function.		
• How to describe the domain and range of	Asymptote	• Describe the domain and range of an		
an exponential function.	Vertex Form	exponential function.		
• How to describe the domain and range of		• Describe the domain and range of a		
a logarithmic function.		logarithmic function.		
FACILITATING AC	TIVITIES – STRATEGIES AND METHODS FOR TEACHING A	ND LEARNING		
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET		
		(1=Recall, 2=Skill/Concept, 3=Strategic		
		Thinking, 4=Extended Thinking)		
• Demonstrate how to graph a logarithmic	Practice graphing logarithmic functions.	1-4		
function.	• Practice graphing exponential functions.	1-4		
• Demonstrate how to graph an exponential	• Practice describing the domain and range of	3		
function.	logarithmic.	3		
• Demonstrate how to describe the domain	Practice describing the domain and range	<u>Questions # 30 - 44</u>		
and range of an exponential function.	for exponential functions.			
• Demonstrate how to describe the domain				
and range of a logarithmic function.				
INTERDISCIPLINARY CONNECTION	PRIOR KNOWLEDGE CONNECTIONS			
Science	Vertex Form			
Engineering	Equation of horizontal and vertical lines			



HOW DO WE KNOW WHAT STUDENTS HAVE I FARNED?					
ASSESSMENT DESCRIPTION Daily Homework check Frequent Quizzes Comprehensive Test	HOW DO WE KNOW WHAT STUDENTS HAVE LEARNED? FORMATIVE OR SUMMATIVE? Formative Formative Summative	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking) 1 - 4 2 - 3 1 - 4			
· · · · · · · · · · · · · · · · · · ·	HOW WILL WE RESPOND IF STUDENTS HAVE NOT LEARNED?				
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)			
 Provide additional instruction from Khan Academy or Fort Bend Tutoring. 	Additional practiceTest corrections				
HOW WILL WE RESPOND IF STUDENTS HAVE ALREADY LEARNED? Possible Extensions/Enrichments					
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)			
Self guided assignments	Student presentation on the information				



STANDA	STANDARD 22: Graph Exponential and Logarithmic Functions			
SCORE	DESCRIPTION	SAMPLE TASKS		
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.			
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.			
3.0	The student:	• <u>Questions # 30 - 44</u>		
	Graph a logarithmic function	**See linked document**		
	Graph an exponential function			
	State the domain and range for logarithmic and exponential functions.			
	The student exhibits no major errors or omissions.			
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content			
2.0	There are no major errors or omissions regarding the simpler details and processes as the student:	• <u>Questions # 30 - 44</u>		
	Graph a logarithmic function with minor errors.	** See linked document**		
	Graph an exponential function with minor errors.			
	• State the domain and range for logarithmic and exponential functions with minor mistakes.			
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.			
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content			
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.			
LND	Even with help, no understanding or skill demonstrated.			



	The City of St. Charles School District	
	Honors Algebra 2 Curriculum	
OBJECTIVE # 4	Write Exponential and Logarithmic Equations	
REFERENCES/STANDARDS	A2.FM.A.1 Create functions and use them to solve a	pplications of exponential functions modeling
i.e. GLE/CLE/MLS/NGSS	problems.	
	WHAT SHOULD STUDENTS	
UNDERSTAND?	KNOW?	BE ABLE TO DO?
Concepts; essential truths that give meaning to the topic;	Facts, Names, Dates, Places, Information,	Skills; Products
ideas that transfer across situations.	ACADEMIC VOCABULARY	
 How to write inverses for exponential and 	Inverses	Write inverses for exponential and
logarithmic functions.	Exponential Growth/Decay Model	logarithmic functions.
 How to model a real-life situation using 	Compound Interest	 Model real-life situation using
logarithmic and exponential functions.		logarithmic and exponential
		functions.
FACILITATING ACTIVITI	ES – STRATEGIES AND METHODS FOR TEACHING AND	LEARNING
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)
Demonstrate how to write inverses for	Practice writing inverses for exponential	1-4
exponential and logarithmic functions.	and logarithmic functions.	1-4
 Demonstrate how to model a real-life situation 	Practice modeling real-life situation using	
using logarithmic and exponential functions.	logarithmic and exponential functions.	Questions # 40 - 48
		See linked document
INTERDISCIPLINARY CONNECTION	PRIOR KNOWLEDGE CONNECTIONS	
Science	Writing Inverses	
• Finance	Order of operations	
HOW D	O WE KNOW WHAT STUDENTS HAVE LEARNED?	
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)
Daily Homework check	Formative	1 - 4
Frequent Quizzes	Formative	2 - 3
Comprehensive Test	Summative	1 - 4



HOW WII	L WE RESPOND IF STUDENTS HAVE NOT LEARNED?	
	Possible Interventions	
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)
 Provide additional instruction from Khan Academy or Fort Bend Tutoring. 	Additional practiceTest corrections	
HOW WILL V	WE RESPOND IF STUDENTS HAVE ALREADY LEARNED?	
	Possible Extensions/Enrichments	
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)
Self guided assignments	Student presentation on the information	



STANDA	STANDARD 23: Write Exponential and Logarithmic Equations			
SCORE	DESCRIPTION	SAMPLE TASKS		
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.			
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.			
3.0	 The student: Writes inverse of logarithmic and exponential function Models real-life scenarios using exponential and logarithmic functions. 	Questions # 40 - 48 **See linked document**		
	The student exhibits no major errors or omissions.			
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content			
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Writes inverses of logarithmic and exponential functions with minor mistakes. Models real-life scenarios with minor mistakes. 	Questions # 40 - 48 **See linked document**		
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.			
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content			
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.			
LND	Even with help, no understanding or skill demonstrated.			



CONTENT AREA: Mathemat	ics		UNIT: Ratio	nal Functions		
COURSE: Honors Algebra 2			UNIT DURA	TION: 3 Weeks		
MATERIALS / INSTRUCTIONAL RESOURCE	S FOR THIS UNIT	:	BIG IDEA(S):			
Graphing Calculator			• •	tional expression	s	
Textbook				nal equations		
Supplemental Handouts				onal equations		
				tion functions		
ENDURING UNDERSTANDINGS:			ESSENTIAL QUESTIC			
Real world applications can be re	epresented math	ematically	What are t	he solutions to a	rational function	?
Equations can have extraneous s	-		How do yo	u simplify rationa	I expressions?	
Domain has restrictions			How do yo	u graph rational f	unctions?	
• Asymptotes are where a graph a	approaches		How can y	ou model rational	I functions?	
WHAT SHOP	ULD STUDENTS K	NOW, UNDERSTAND, AI	ND BE ABLE TO DO AT	THE END OF THIS	S UNIT?	
	Standard	ds, Concepts, Content, S	kills, Products, Vocabu	ilary		
REFERENCE/STANDARD STANDARDS: Content specific standard						
REFERENCE/STANDARD	STANDARDS: C	ontent specific standard	ls that will be address	ed in this unit.	MAJOR	SUPPORTING
i.e. GLE/CLE/MLS/NGSS		-		ed in this unit.	MAJOR STANDARD	SUPPORTING STANDARD
i.e. GLE/CLE/MLS/NGSS A2.APR.A.3	Add, subtract ,	multiply, and divide ratio	onal expressions.		STANDARD	
i.e. GLE/CLE/MLS/NGSS	Add, subtract , Identify and int	multiply, and divide rational end of the second sec	onal expressions. s of functions represe			STANDARD
i.e. GLE/CLE/MLS/NGSS A2.APR.A.3 A2.IF.A.1	Add, subtract , Identify and int graphically, wit	multiply, and divide ratio erpret key characteristic h tables, and with algebr	onal expressions. s of functions represe raic symbolism.	nted	STANDARD X	STANDARD
i.e. GLE/CLE/MLS/NGSS A2.APR.A.3	Add, subtract, Identify and int graphically, wit Describe the eff	multiply, and divide ratio erpret key characteristic h tables, and with algebu fects of transformations	onal expressions. is of functions represe raic symbolism. algebraically and grag	nted	STANDARD	STANDARD
i.e. GLE/CLE/MLS/NGSS A2.APR.A.3 A2.IF.A.1	Add, subtract, Identify and int graphically, wit Describe the efficient of the creating vertica	multiply, and divide ratio erpret key characteristic h tables, and with algebr fects of transformations I and horizontal translat	onal expressions. s of functions represe raic symbolism. algebraically and grap ions, vertical and hori	nted	STANDARD X	STANDARD
i.e. GLE/CLE/MLS/NGSS A2.APR.A.3 A2.IF.A.1 A2.BF.A.3	Add, subtract, Identify and int graphically, witl Describe the eff creating vertica reflections and	multiply, and divide ratio erpret key characteristic h tables, and with algebu fects of transformations II and horizontal translat dilations for rational fun	onal expressions. is of functions represe raic symbolism. algebraically and grag ions, vertical and hori actions.	nted hically zontal	STANDARD X X	STANDARD
i.e. GLE/CLE/MLS/NGSS A2.APR.A.3 A2.IF.A.1	Add, subtract, Identify and int graphically, with Describe the eff creating vertica reflections and Solve rational e	multiply, and divide ratio erpret key characteristic h tables, and with algebr fects of transformations I and horizontal translat dilations for rational fun equations where numera	onal expressions. s of functions represe raic symbolism. algebraically and grap ions, vertical and hori ictions. tors and denominator	nted hically zontal	STANDARD X	STANDARD
<i>i.e. GLE/CLE/MLS/NGSS</i> A2.APR.A.3 A2.IF.A.1 A2.BF.A.3 A2.REI.A.2	Add, subtract, Identify and int graphically, with Describe the eff creating vertica reflections and Solve rational e	multiply, and divide ratio erpret key characteristic h tables, and with algebr fects of transformations and horizontal translat dilations for rational fun equations where numera d where extraneous solu	onal expressions. s of functions represe raic symbolism. algebraically and grap ions, vertical and hori actions. tors and denominator itions may result.	nted hically zontal	STANDARD X X	STANDARD
<i>i.e. GLE/CLE/MLS/NGSS</i> A2.APR.A.3 A2.IF.A.1 A2.BF.A.3 A2.REI.A.2 OBJECTIVE # 1	Add, subtract, Identify and int graphically, with Describe the eff creating vertica reflections and Solve rational e	multiply, and divide ratio erpret key characteristic h tables, and with algebu fects of transformations and horizontal translat dilations for rational fun equations where numera d where extraneous solu Simplify Rational Expre	onal expressions. is of functions represe raic symbolism. algebraically and grap ions, vertical and hori actions. tors and denominator itions may result.	nted hically zontal s are	STANDARD X X X	STANDARD X
i.e. GLE/CLE/MLS/NGSS A2.APR.A.3 A2.IF.A.1 A2.BF.A.3 A2.REI.A.2 OBJECTIVE # 1 REFERENCES/STANDARDS	Add, subtract, Identify and int graphically, with Describe the eff creating vertica reflections and Solve rational e	multiply, and divide ratio erpret key characteristic h tables, and with algebr fects of transformations and horizontal translat dilations for rational fun equations where numera d where extraneous solu Simplify Rational Expre • A2.APR.A.3 Ac	onal expressions. s of functions represe raic symbolism. algebraically and grap ions, vertical and hori actions. tors and denominator itions may result.	nted hically zontal s are	STANDARD X X X	STANDARD X
<i>i.e. GLE/CLE/MLS/NGSS</i> A2.APR.A.3 A2.IF.A.1 A2.BF.A.3 A2.REI.A.2 OBJECTIVE # 1	Add, subtract, Identify and int graphically, with Describe the eff creating vertica reflections and Solve rational e	multiply, and divide ratio erpret key characteristic h tables, and with algebr fects of transformations I and horizontal translat dilations for rational fun equations where numera d where extraneous solu Simplify Rational Expres • A2.APR.A.3 Ac fractions.	onal expressions. s of functions represe raic symbolism. algebraically and grap ions, vertical and hori actions. tors and denominator itions may result. essions dd, subtract , multiply	nted hically zontal s are	STANDARD X X X	STANDARD X
i.e. GLE/CLE/MLS/NGSS A2.APR.A.3 A2.IF.A.1 A2.BF.A.3 A2.REI.A.2 OBJECTIVE # 1 REFERENCES/STANDARDS i.e. GLE/CLE/MLS/NGSS	Add, subtract, Identify and int graphically, with Describe the eff creating vertica reflections and Solve rational e	multiply, and divide ratio erpret key characteristic h tables, and with algebric fects of transformations and horizontal translat dilations for rational fun equations where numera d where extraneous solu Simplify Rational Expres • A2.APR.A.3 Ac fractions. WHAT SHOULD S	onal expressions. s of functions represe raic symbolism. algebraically and grap ions, vertical and hori ictions. tors and denominator itions may result. essions dd, subtract , multiply,	nted hically zontal s are	STANDARD X X X al expressions inc	STANDARD X
i.e. GLE/CLE/MLS/NGSS A2.APR.A.3 A2.IF.A.1 A2.BF.A.3 A2.REI.A.2 OBJECTIVE # 1 REFERENCES/STANDARDS	Add, subtract, Identify and int graphically, with Describe the eff creating vertica reflections and Solve rational e polynomials and	multiply, and divide ratio erpret key characteristic h tables, and with algebr fects of transformations I and horizontal translat dilations for rational fun equations where numera d where extraneous solu Simplify Rational Expres • A2.APR.A.3 Ac fractions.	onal expressions. s of functions represe raic symbolism. algebraically and grap ions, vertical and hori actions. tors and denominator itions may result. essions dd, subtract , multiply, TUDENTS	nted hically zontal s are	STANDARD X X X	STANDARD X :luding complex



	Honors Algebra 2 Curriculum	
 How to get a common denominator How to add and subtract rationals How to multiply and divide rationals How to use factor and reduce rationals 	 Complex fraction Reduce LCD, least common denominator Factor reciprocal 	 Add rationals Subtract rationals Multiply rationals Divide rationals Simplify rationals Simplify complex fractions
	IES – STRATEGIES AND METHODS FOR TEACH	
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)
 Demonstrate how to get a common denominator Demonstrate how to add and subtract rationals Demonstrate how to multiply and divide rationals Demonstrate how to use factor and reduce rationals INTERDISCIPLINARY CONNECTION Medicine Science engineering 	 Practice adding fractions with common denominator Practice getting a common denominator Practice multiplying rationals Practice dividing rationals Practice simplifying complex fractions PRIOR KNOWLEDGE CONNECTIONS Adding and subtracting fractions with no variables Multiplying and dividing fractions with no variable Factoring polynomials Reducing fractions Properties of exponents 	1-4 1-4 1-4 1-4 1-4 1-4 • How can simplifying rational expressions help to solve and graph rational functions?
HOW [OO WE KNOW WHAT STUDENTS HAVE LEARN	
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)
 Daily Homework check Frequent Quizzes Comprehensive Test 	Formative Formative Summative	1 - 4 2 - 3 1 - 4



HOW WILL WE RESPOND IF STUDENTS HAVE NOT LEARNED?				
Possible Interventions				
STUDENT LEARNING TASK	DOK TARGET			
	(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,			
	4=Extended Thinking)			
Additional practice	1-3			
Test corrections	1-3			
L WE RESPOND IF STUDENTS HAVE ALREAD	Y LEARNED?			
Possible Extensions/Enrichments				
STUDENT LEARNING TASK	DOK TARGET			
	(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,			
	4=Extended Thinking)			
Student presentation on the	3-4			
information				
	Possible Interventions STUDENT LEARNING TASK Additional practice Test corrections LWE RESPOND IF STUDENTS HAVE ALREAD Possible Extensions/Enrichments STUDENT LEARNING TASK Student presentation on the			



The City of St. Charles School District Honors Algebra 2 Curriculum **PROFICIENCY SCALES FOR THIS STANDARD**

SCORE	ARD 24: Simplify Rational Expressions DESCRIPTION	SAMPLE TASKS
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.	
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.	
3.0	 Add, subtract, multiply and divide rational expressions including complex fractions. 	(3x+2-6x2-4)/(3xx2+2x-3+xx2- 9)
	The student exhibits no major errors or omissions.	
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content	
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Recognizes or recalls specific terminology, such as: Common denominator Simplify Reduce reciprocal Performs basic processes, such as: Add and subtract rational expressions with a common denominator Add and subtract rational expressions without a common denominator Multiply rational expressions Divide rational expressions Simplify complex fractions 	• (3x+2-6x2-4)x2+2x-3
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.	
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content	
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.	
LND	Even with help, no understanding or skill demonstrated.	



	Honors Algebra 2 Curriculum		
OBJECTIVE # 2	Solve rational equations		
REFERENCES/STANDARDS i.e. GLE/CLE/MLS/NGSS	• A2.REI.A.2 Solve rational equations where numerators and denominators are polynomials and where extraneous solutions may result.		
	WHAT SHOULD STUDENTS		
UNDERSTAND? Concepts; essential truths that give meaning to the topic; ideas that transfer across situations. • How to solve rationals using cross- multiplication method • How to solve rational functions by multiplying by the least common denominator. • How to determine if a solution is extraneous	KNOW? Facts, Names, Dates, Places, Information, ACADEMIC VOCABULARY Cross-multiplication LCD, least common denominator Extraneous solution Undefined values Domain Factoring Rational roots rational	 BE ABLE TO DO? Skills; Products Solve rationals using cross- multiplication method Solve rational functions by multiplying by the least common denominator. Determine if a solution is extraneous 	
FACILITATING ACTIVIT	IES – STRATEGIES AND METHODS FOR TEACHING A	ND LEARNING	
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)	
 Demonstrate how to solve rationals using cross- multiplication method Demonstrate how to solve rational functions by multiplying by the least common denominator. Demonstrate how to determine if a solution is extraneous 	 Practice solving rationals using cross- multiplication method Practice solving rational functions by multiplying by the least common denominator. Practice how to find the domain and determine if a solution is extraneous 	1-4 1-4 1-4	
INTERDISCIPLINARY CONNECTION	PRIOR KNOWLEDGE CONNECTIONS	INQUIRY CONNECTIONS	
EngineeringSciencearchitecture	 Multiply polynomials Simplify polynomials Find a least common denominator Factor Solve polynomials Find domain 	How can rational functions be applied to help us solve real life problems?	



HOW DO WE KNOW WHAT STUDENTS HAVE LEARNED?				
ASSESSMENT DESCRIPTION Daily Homework check Frequent Quizzes Comprehensive Test 	FORMATIVE OR SUMMATIVE? Formative Formative Summative	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking) 1 - 4 2 - 3 1 - 4		
HOW W	HOW WILL WE RESPOND IF STUDENTS HAVE NOT LEARNED? Possible Interventions			
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)		
 Provide additional instruction from Khan Academy or Fort Bend Tutoring. 	<pre> Additional practice Test corrections </pre>	1-3		
HOW WILL WE RESPOND IF STUDENTS HAVE ALREADY LEARNED? Possible Extensions/Enrichments				
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)		
Self guided assignments	Student presentation on the information			



The City of St. Charles School District Honors Algebra 2 Curriculum **PROFICIENCY SCALES FOR THIS STANDARD**

SCORE	DESCRIPTION	SAMPLE TASKS
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.	
3.0	 The student: Solve rational functions with just one term on each side of the equation. At least one of the terms is nonlinear. Solve rational functions with multiple terms on one or both sides of the equation. At least one of the terms is nonlinear. Solve a rational function that has at least one extraneous solution 	 x+2x+1=x-3x x+2x+1=x-3x+x+2x2+2x+1
	The student exhibits no major errors or omissions.	
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content	
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Solve rational functions with just one term on each side of the equation. Terms are linear. Solve rational functions with multiple terms on one or both sides of the equation. Terms are linear. Solve a rational function that has an extraneous solution 	 x+2x+1=34x x+2x+1=x-35+2x+1
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.	
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content	
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.	
LND	Even with help, no understanding or skill demonstrated.	



The City of St. Charles School District Honors Algebra 2 Curriculum **OBJECTIVE #3 Graph Rational Functions REFERENCES/STANDARDS** • A2.IF.A.1 Identify and interpret key characteristics of functions represented graphically with i.e. GLE/CLE/MLS/NGSS tables and with algebraic symbolism. A.BF.A.3 Describe the effects of transformations algebraically and graphically, creating vertical and horizontal translations, vertical and horizontal reflections and dilations for rational functions. WHAT SHOULD STUDENTS... **UNDERSTAND?** KNOW? **BE ABLE TO DO?** Concepts; essential truths that give meaning to the Facts, Names, Dates, Places, Information, Skills; Products topic; ideas that transfer across situations. ACADEMIC VOCABULARY How to graph a rational function in basic Domain How to graph a rational function in ٠ • standard form of a, h, and k basic standard form of a, h, and k . Range How to describe domain and range of How to describe domain and range of ٠ Asymptote rational functions in standard form rational functions in standard form translations How to find asymptotes and holes in graph How to find asymptotes and holes in ٠ if not in standard form of a, h, and k. graph if not in standard form of a, h, and k. FACILITATING ACTIVITIES – STRATEGIES AND METHODS FOR TEACHING AND LEARNING **TEACHER INSTRUCTIONAL ACTIVITY STUDENT LEARNING TASK** DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking) 1-4 How to graph a rational function in basic • How to graph a rational function in basic • standard form of a, h, and k standard form of a, h, and k 1-4 How to describe domain and range of How to describe domain and range of • rational functions in standard form rational functions in standard form How to find asymptotes and holes in graph How to find asymptotes and holes in graph ٠ if not in standard form of a, h, and k. 1-4 if not in standard form of a, h, and k. ٠ INTERDISCIPLINARY CONNECTION PRIOR KNOWLEDGE CONNECTIONS INQUIRY CONNECTIONS How can graphs of rational functions help Medical Vertex form • predict information that might occur if trend Science Asymptotes continues? Engineering Equations of lines Domain Range ٠



HOW DO WE KNOW WHAT STUDENTS HAVE LEARNED?			
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET	
		(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,	
		4=Extended Thinking)	
Daily Homework check	Formative	1 - 4	
Frequent Quizzes	Formative	2 - 3	
Comprehensive Test	Summative	1 - 4	
HO	N WILL WE RESPOND IF STUDENTS HAVE NOT LEARN	NED?	
	Possible Interventions		
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET	
		(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,	
		4=Extended Thinking)	
Provide additional instruction from Khan	Additional practice		
Academy or Fort Bend Tutoring.	Test corrections		
HOW	WILL WE RESPOND IF STUDENTS HAVE ALREADY LEA	RNED?	
Possible Extensions/Enrichments			
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET	
		(1=Recall, 2=Skill/Concept, 3=Strategic Thinking,	
		4=Extended Thinking)	
Self guided assignments	Student presentation on the information		
Self guided assignments	Student presentation on the information		



STANDARD	26: Graph	Rational	Functions
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STANDA	STANDARD 26: Graph Rational Functions			
SCORE	DESCRIPTION	SAMPLE TASKS		
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.			
3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.			
3.0	 The student: Graph rational functions in standard a, h, k form Graph rational functions not in the standard a, h, k form State domain and range for rational functions 	 y=3x2-5x+3x-2 y=3x2-5x+3x2+2 y=3x2-5x+2x-2 		
	The student exhibits no major errors or omissions.			
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content			
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Graph rational functions in standard form a, h, k Graph rational functions that can be rewritten in standard form with a, h, k 	 y=2x-2+5 y=-5x+2x-2 		
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.			
1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content			
1.0	With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.			
LND	Even with help, no understanding or skill demonstrated.			



	Honors Algebra 2 Curriculum	
OBJECTIVE # 4	Write and Apply Variations Functions	
REFERENCES/STANDARDS	• A.FM.A.1 create functions and use them to solve application problems.	
i.e. GLE/CLE/MLS/NGSS		
	WHAT SHOULD STUDENTS	
UNDERSTAND?	KNOW?	BE ABLE TO DO?
Concepts; essential truths that give meaning to the topic;	Facts, Names, Dates, Places, Information,	Skills; Products
ideas that transfer across situations.	ACADEMIC VOCABULARY	
 How to write direct, inverse, and joint variation 	Direct	 Write direct, inverse, and joint
functions	Inverse	variation functions
 How to model a real-life situation using rational 	• Joint	 Model a real-life situation using
functions	variation	rational functions
FACILITATING ACTIVITIES –	STRATEGIES AND METHODS FOR TEACHING AND	LEARNING
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)
• Demonstrate how to write direct, inverse, and joint variation functions	 Practice writing direct, inverse, and joint variation functions 	1-4
 Demonstrate how to model a real-life situation 	 Practice modeling a real-life situation 	
using rational functions	using rational functions	1-4
	PRIOR KNOWLEDGE CONNECTIONS	
Medical	Linear equation	How can writing an inverse variation help
Science	 Inverses 	solve problems?
Engineering	constant	
 Music 	constant	
	/E KNOW WHAT STUDENTS HAVE LEARNED?	
ASSESSMENT DESCRIPTION	FORMATIVE OR SUMMATIVE?	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)
Daily Homework check	Formative	1 - 4
Frequent Quizzes	Formative	2 - 3
Comprehensive Test	Summative	1 - 4
HOW WILL W	E RESPOND IF STUDENTS HAVE NOT LEARNED?	
HOW WILL W	E RESPOND IF STUDENTS HAVE NOT LEARNED?	



Possible Interventions			
TEACHER INSTRUCTIONAL ACTIVITY	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)	
 Provide additional instruction from Khan Academy or Fort Bend Tutoring. 	Additional practiceTest corrections		
HOW WILL WE RESPOND IF STUDENTS HAVE ALREADY LEARNED? Possible Extensions/Enrichments			
INSTRUCTIONAL ACTIVITY/METHOD	STUDENT LEARNING TASK	DOK TARGET (1=Recall, 2=Skill/Concept, 3=Strategic Thinking, 4=Extended Thinking)	
Self guided assignments	 Student presentation on the information 		



STANDA	STANDARD 27: Write and Apply Variation Functions			
SCORE	DESCRIPTION	SAMPLE TASKS		
4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught.			
3.5	In addition to score 3.0 performance, in- depth inferences and applications with partial success.			
3.0	 Writes direct, inverse, and joint variation functions Models real-life scenarios using direct, inverse, and joint variations. 	 The owners of Roller Plus determine that the monthly sales, S, of its skates vary directly as its advertising budget, A and inversely as the price of the skates, P. When \$60,000 is spent on advertising and the price of the skates is \$40, the monthly sales are 12,00 pairs of rollerblades. Determine the monthly sales if the amount of the advertising budget is increased to \$70,000. The volume of a cone, V, varies jointly as its height, h, and the square of its radius, r. A cone 		
	The student exhibits no major errors or omissions.	with a radius measuring 6 feet and a height measuring 10 feet has a volume of 120 cubic feet. Find the volume of a cone having a radius of 12 feet and a height of 2 feet.		
2.5	No major errors or omissions regarding 2.0 content and partial knowledge of 3.0 content			
2.0	 There are no major errors or omissions regarding the simpler details and processes as the student: Writes direct and inverse variation functions Models real-life scenarios with minor mistakes 	 The volume of blood, B, in a person's body varies directly as body weight, W. A person who weighs 160 pounds has approximately 5 quarts of blood. Estimate the number of quarts of blood in a person who weighs 200 pounds The length of a violin string varies inversely as the frequency of its vibrations. A violin string 8 inches long vibrates at a frequency of 640 cycles per second. What is the frequency of a 10-inch string? 		
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.			



		0
1.5	Partial knowledge of the 2.0 content but	
	major errors or omissions regarding the 3.0	
	content	
1.0	With help, a partial understanding of some	
	of the simpler details and processes and	
	some of the more complex ideas and	
	processes.	
LND	Even with help, no understanding or skill	
	demonstrated.	