

Waynesville R-VI
Math Scope and Sequence 2021-2022

Algebra 1

Days Month(s)		1st Semester				2nd Semester				
		21 8/23-9/24	15 9/27-10/15	17 10/18-11/10	15 11/15-12/8	13 1/4-1/21	18 1/24-2/16	31 2/17-4/8	9 4/11-4/22	15 4/25-5/13
Unit 1	Solving Equations and Inequalities	SA Ans. Key								
Unit 2	Linear Equations and Inequalities		SA Ans. Key							
Unit 3	Systems of Linear Equations/Inequalities			SA Ans. Key						
Unit 4	Data Analysis and Stats				SA Ans. Key					
Unit 5	Polynomials					SA Ans. Key				
Unit 6	Factoring Polynomials						SA Ans. Key			
Unit 7	Quadratic Functions							SA Ans. Key		
Unit 8	Exponential Functions								SA Ans. Key	
Unit 9	Functions									SA Ans. Key

[Standards Guide](#)

[Item Specifications](#)

Solving Equations and Inequalities

Grade: 8-10 Subject: Math Dates: 8/23-9/24 Text: 1-2,1-3, 1-4, 1-5, 1-6

Standards

Unit Title	Solving Equations and Inequalities	Expectation Unwrapped
Priority Standard	A1.REI.A.1 Explain how each step taken when solving an equation or inequality in one variable creates an equivalent equation or inequality that has the same solution(s) as the original.	<ul style="list-style-type: none"> The student will explain how each step taken when solving an equation in one variable creates an equivalent equation that has the same solution(s) as the original. The student will explain how each step taken when solving an inequality in one variable creates an equivalent inequality that has the same solution(s) as the original.
Supporting Standards	A1.CED.A.1 Create equations and inequalities in one variable and use them to model and/or solve problems.	Listed on the item specification linked to the standard's code
	A1.NQ.B.3.a Use units of measure as a way to understand and solve problems involving quantities. Identify, label and use appropriate units of measure within a problem.	Listed on the item specification linked to the standard's code
	A1.NQ.B.4 Define and use appropriate quantities for representing a given context or problem.	Listed on the item specification linked to the standard's code
	A1.CED.A.4 Solve literal equations and formulas for a specified variable that highlights a quantity of interest.	Listed on the item specification linked to the standard's code
	A1.NQ.B.3.b Use units of measure as a way to understand and solve problems involving quantities. Convert units and rates.	Listed on the item specification linked to the standard's code

**Click on standard code above to see Item Specifications from DESE and Released Items*

Solving Equations and Inequalities

Instructional Ideas/Notes

		Assessed on Post Test	Instructional Ideas/Prerequisite Knowledge
Priority Standard	A1.REI.A.1	Yes	Instructional Notes: Task 1: Identify solutions of equations and inequalities in one variable. Write and graph inequalities in one variable. Task 2: Solve two-step and multi-step equations Task 3: Solve equations with variables on both sides Task 4: Solve two-step and multi-step equations Task 5: Solve inequalities that contain variable terms on both sides Task 6: Solve compound inequalities in one variable. Graph solution sets of compound inequalities in one variable

Key Vocabulary

compound inequality	intersection	solutions		
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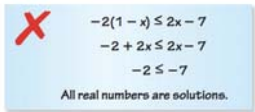
Common Assessments

CFA 1 Answer Key	Unit 1 Summative Answer Key
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Solving Equations and Inequalities

Proficiency Scale

Proficiency Scale: A score of 3.0 correlates with grade-level proficiency on the priority standard.

Score	Learning Goal	Sample Tasks
Score 4.0	<p>In addition to Score 3.0, in-depth inferences or applications that go beyond what was taught. For example, the student may:</p> <ul style="list-style-type: none"> Analyzes the structure of expressions and equations to determine the optimal method of solving or creating equivalent expressions; critiques the reasoning of others' solution methods; analyzes the details of a solution of inequalities in the context of a real-world situation 	<p>ERROR ANALYSIS In Exercises 29 and 30, describe and correct the error in solving the inequality.</p> <p>29. </p> <p>30. </p>
3.5 In addition to 3.0 performance, in-depth inferences and applications with partial success.		
Score 3.0	<p>The student exhibits no major errors or gaps in the learning goal (complex ideas and processes).</p> <p>The student will:</p> <ul style="list-style-type: none"> Explains/illustrates the steps in solving an inequality in one variable; graphs the solution to a linear inequality in one variable; solves literal equations for a specific variable. 	<p>The formula $F = \frac{GmM}{r^2}$ gives the gravitational force between two masses m and M separated by a distance of r units. The value G is a constant. Select the formula solved for m.</p> <p><input type="radio"/> A. $m = \frac{Gr^2}{FM}$</p> <p><input type="radio"/> B. $m = \frac{GM}{r^2 F}$</p> <p><input type="radio"/> C. $m = \frac{M}{Gr^2 F}$</p> <p><input type="radio"/> D. $m = \frac{r^2 F}{GM}$</p>
2.5 No major errors or gaps in 2.0 content and partial knowledge of 3.0 content.		
Score 2.0	<p>The student exhibits no major errors or gaps in the simpler details and processes.</p> <p>The student will:</p> <ul style="list-style-type: none"> Explains/illustrates the steps in solving an equation 	<p>Find the value of x in this equation.</p> $\frac{2}{5}(4x - 3) - 2x = \frac{4}{5} - x$ <p>$x =$ <input style="width: 80px; height: 20px;" type="text"/></p>
1.5 Partial understanding of the 2.0 content with major errors or gaps in 3.0 content.		
Score 1.0	<p>With help, a partial understanding of the 2.0 content and some of the 3.0 content.</p> <ul style="list-style-type: none"> Solves a linear equation one variable 	<p>What is the value of x in this equation?</p> $3x + 8 - 2(1 - x) = 1$ <p><input type="radio"/> A. -9</p> <p><input type="radio"/> B. -6</p> <p><input type="radio"/> C. -5</p> <p><input type="radio"/> D. -1</p>

Linear Equations and Inequalities

Grade: 8-10 Subject: Math Dates: 9/27-10/15 Text: Lesson 2

Standards

Unit Title	Systems of Linear Equations/Inequalities	Expectation Unwrapped
Priority Standard	A1.CED.A.2 Create and graph linear, quadratic and exponential equations in two variables.	<ul style="list-style-type: none"> The student will create and/or graph linear equations in two variables on the Cartesian coordinate plane with labels and scales. The student will create and/or graph exponential equations in two variables on the Cartesian coordinate plane with labels and scales. The student will create and/or graph quadratic equations in two variables on the Cartesian coordinate plane with labels and scales.
Supporting Standards	A1.IF.C.8 Translate between different but equivalent forms of a function to reveal and explain properties of the function and interpret these in terms of a context.	Listed on the item specification linked to the standard's code
	A1.REI.C.6 Explain that the graph of an equation in two variables is the set of all its solutions plotted in the Cartesian coordinate plane.	Listed on the item specification linked to the standard's code
	A1.REI.C.7 Graph the solution to a linear inequality in two variables.	Listed on the item specification linked to the standard's code
	A1.LQE.A.3 Construct linear, quadratic and exponential equations given graphs, verbal descriptions or tables.	Listed on the item specification linked to the standard's code

**Click on standard code above to see Item Specifications from DESE and Released Items*

Linear Equations and Inequalities

Instructional Ideas/Notes

		Assessed on Post Test	Instructional Ideas/Prerequisite Knowledge
Priority Standard	A1.CED.A.2	Yes	Instructional Notes: Task 1: Create a linear equation in slope intercept form from two points, table, or graph Task 2: Graph linear equations: slope-intercept, point-slope, standard form Task 3: Create linear equation in point-slope form from two points, tables, or a graph Task 4: Explore concepts of parallel and perpendicular slope. Task 5: Write equations of parallel and perpendicular lines to a given equation through a given slope

Key Vocabulary

slope	constant rate of change	point-slope	slope-intercept	standard form
parallel				

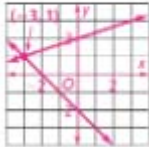
Common Assessments

CFA	Unit 2 Summative Answer Key
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Linear Equations and Inequalities

Proficiency Scale

Proficiency Scale: A score of 3.0 correlates with grade-level proficiency on the priority standard.

Score	Learning Goal	Sample Tasks
Score 4.0	<p>In addition to Score 3.0, in-depth inferences or applications that go beyond what was taught. For example, the student may:</p> <p>Analyzes the structure of equations and inequalities to determine the optimal method of solving or creating equivalent expressions; justifies understanding of the technique of linear combination; critiques the reasoning of others' solution methods; analyzes the details of a solution of a system of inequalities in the context of a real-world situation.</p>	<p>At a movie theater, the price of 2 adult tickets and 4 child tickets is \$48. The price of 5 adult tickets and 2 child tickets is \$64. What is the ticket price for one adult and for one child?</p> <p>adult: <u>\$10</u> child: <u>\$7</u></p>
3.5 In addition to 3.0 performance, in-depth inferences and applications with partial success.		
Score 3.0	<p>The student exhibits no major errors or gaps in the learning goal (complex ideas and processes). The student will:</p> <p>Explains/illustrates the steps in solving an inequality; selects and uses appropriate strategies to solve a system of equations; solves a system of linear inequalities; explains/show that the graph of linear equation or inequality in two variables is the set of all its solutions plotted in the Cartesian coordinate plane</p>	<p>What is the solution of the system of equations?</p> $\begin{aligned} 5x - 4y &= -10 \\ 3x + 2y &= 16 \end{aligned}$ <p style="text-align: right; color: red;">(2, 5)</p>
2.5 No major errors or gaps in 2.0 content and partial knowledge of 3.0 content.		
Score 2.0	<p>The student exhibits no major errors or gaps in the simpler details and processes. The student will:</p> <p>Explains/illustrates the steps in solving an equation; solves a system of linear equations algebraically and graphically; solves a system of a linear graphically; graphs the solution to a linear inequality in two variables.</p>	<p>Solve the system by graphing.</p> $\begin{aligned} y &= \frac{1}{3}x + 2 \\ y &= -x - 2 \end{aligned}$  <p>solution: <u>(-3, 1)</u></p>
1.5 Partial understanding of the 2.0 content with major errors or gaps in 3.0 content.		

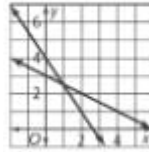
Linear Equations and Inequalities

Score
1.0

With help, a partial understanding of the 2.0 content and some of the 3.0 content.

Identify the solution to a linear system of equations given a graph.

Estimate the solution of the system of equations.



solution: (1, 2.5)

Systems of Linear Equations/Inequalities

Grade: 8-10 Subject: Math Dates: 10/18-11/10 Text: 4-1, 4-2, 4-3, 4-4,4-5

Standards

Unit Title	Systems of Linear Equations/Inequalities		Expectation Unwrapped
Priority Standard	A1.REI.B.3	Solve a system of linear equations algebraically and/or graphically.	<ul style="list-style-type: none"> The student will solve a system of linear equations graphically. The student will solve a system of linear equations algebraically. (e.g., substitution, linear combination)
	A1.REI.C.8	Solve problems involving a system of linear inequalities.	<ul style="list-style-type: none"> The student will solve problems involving a system of linear inequalities by graphing. The student will interpret the solution to a system of linear inequalities in the context provided when appropriate.
Supporting Standards	A1.CED.A.1	Create equations and inequalities in one variable and use them to model and/or solve problems.	Listed on the item specification linked to the standard's code
	A1.NQ.B.3.d	Use units of measure as a way to understand and solve problems involving quantities. Choose and interpret the scale and the origin in graphs and data displays.	Listed on the item specification linked to the standard's code
	A1.NQ.B.3.c	Use units of measure as a way to understand and solve problems involving quantities. Use units within problems.	Listed on the item specification linked to the standard's code
	A1.NQ.B.3.a	Use units of measure as a way to understand and solve problems involving quantities. Identify, label and use appropriate units of measure within a problem.	Listed on the item specification linked to the standard's code
	A1.REI.B.5	Justify that the technique of linear combination produces an equivalent system of equations.	Listed on the item specification linked to the standard's code
	A1.CED.A.3	Represent constraints by equations or inequalities and by systems of equations or inequalities, and interpret the data points as a solution or non-solution in a modeling context.	Listed on the item specification linked to the standard's code
	A1.NQ.B.4	Define and use appropriate quantities for representing a given context or problem.	Listed on the item specification linked to the standard's code
	A1.IF.C.8	Translate between different but equivalent forms of a function to reveal and explain properties of the function and interpret these in terms of a context.	Listed on the item specification linked to the standard's code
	A1.REI.C.6	Explain that the graph of an equation in two variables is the set of all its solutions plotted in the	Listed on the item specification linked to the standard's code

Systems of Linear Equations/Inequalities

		Cartesian coordinate plane.	
	A1.REI.C.7	Graph the solution to a linear inequality in two variables.	Listed on the item specification linked to the standard's code
	A1.CED.A.2	Create and graph linear, quadratic and exponential equations in two variables.	Listed on the item specification linked to the standard's code
	A1.LQE.A.3	Construct linear, quadratic and exponential equations given graphs, verbal descriptions or tables.	Listed on the item specification linked to the standard's code

*Click on standard code above to see Item Specifications from DESE and Released Items

Instructional Ideas/Notes

		Assessed on Post Test	Instructional Ideas/Prerequisite Knowledge
Priority Standard	A1.REI.B.3	Yes	Instructional Notes: Task 1: Solve Systems of linear equations by graphing Task 2: Solve systems of linear equations using substitution Task 3: Solve systems of linear equations using elimination Task 4: Classify systems and determine the number of solutions Task 5: Graph and solve linear inequalities Task 6: Graph and solve systems of linear inequalities
	A1.REI.C.8	Yes	

Key Vocabulary

system of equations	consistent	inconsistent	independent	dependent
substitution	elimination			

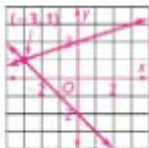
Common Assessments

CFA	CFA	Unit 3 Summative Answer Key
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Systems of Linear Equations/Inequalities

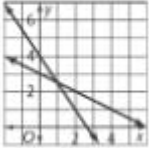
Proficiency Scale

Proficiency Scale: A score of 3.0 correlates with grade-level proficiency on the priority standard.

Score	Learning Goal	Sample Tasks
Score 4.0	<p>In addition to Score 3.0, in-depth inferences or applications that go beyond what was taught. For example, the student may:</p> <p>Analyzes the structure of equations and inequalities to determine the optimal method of solving or creating equivalent expressions; justifies understanding of the technique of linear combination; critiques the reasoning of others' solution methods; analyzes the details of a solution of a system of inequalities in the context of a real-world situation.</p>	<p>At a movie theater, the price of 2 adult tickets and 4 child tickets is \$48. The price of 5 adult tickets and 2 child tickets is \$64. What is the ticket price for one adult and for one child?</p> <p>adult: <u>\$10</u> child: <u>\$7</u></p>
3.5 In addition to 3.0 performance, in-depth inferences and applications with partial success.		
Score 3.0	<p>The student exhibits no major errors or gaps in the learning goal (complex ideas and processes). The student will:</p> <p>Explains/illustrates the steps in solving an inequality; selects and uses appropriate strategies to solve a system of equations; solves a system of linear inequalities; explains/show that the graph of linear equation or inequality in two variables is the set of all its solutions plotted in the Cartesian coordinate plane</p>	<p>What is the solution of the system of equations?</p> $5x - 4y = -10$ $3x + 2y = 16$ <p style="text-align: right; color: red;">(2, 5)</p>
2.5 No major errors or gaps in 2.0 content and partial knowledge of 3.0 content.		
Score 2.0	<p>The student exhibits no major errors or gaps in the simpler details and processes. The student will:</p> <p>Explains/illustrates the steps in solving an equation; solves a system of linear equations algebraically and graphically; solves a system of a linear graphically; graphs the solution to a linear inequality in two variables.</p>	<p>Solve the system by graphing.</p> $y = \frac{1}{3}x + 2$ $y = -x - 2$  <p>solution: <u>(-3, 1)</u></p>

Systems of Linear Equations/Inequalities

1.5 Partial understanding of the 2.0 content with major errors or gaps in 3.0 content.

<p>Score 1.0</p>	<p>With help, a partial understanding of the 2.0 content and some of the 3.0 content. Identify the solution to a linear system of equations given a graph.</p>	<p>Estimate the solution of the system of equations.</p>  <p>solution: (1, 2.5)</p>
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0.5 With help, a partial understanding of the 2.0 content but not of the 3.0 content.

<p>Score 0.0</p>	<p>Even with help, no understanding of skill or content demonstrated.</p>	
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Data Analysis & Statistics

Grade: 8-10 Subject: Math Dates: 11/15-12/8 Text: _____

Standards

Unit Title	Data Analysis & Statistics		Expectation Unwrapped
Priority Standard	A1.DS.A.1	Analyze and interpret graphical displays of data.	<ul style="list-style-type: none"> The student will analyze and interpret data plots displayed in a dot plot. The student will analyze and interpret data plots displayed in a histogram. The student will analyze and interpret data plots displayed in a box plot.
Supporting Standards	A1.DS.A.2	Use statistics appropriate to the shape of the data distribution to compare center and spread of two or more different data sets.	Listed on the item specification linked to the standard's code
	A1.DS.A.3	Interpret differences in shape, center and spreads in the context of the data sets, accounting for possible effects of outliers.	Listed on the item specification linked to the standard's code
	A1.DS.A.4.a	Summarize data in two-way frequency tables. Interpret relative frequencies in the context of the data.	Listed on the item specification linked to the standard's code
	A1.DS.A.4.b	Summarize data in two-way frequency tables. Recognize possible associations and trends in the data.	Listed on the item specification linked to the standard's code
	A1.DS.A.5.a	Construct a scatter plot of bivariate quantitative data describing how the variables are related; determine and use a function that models the relationship. Construct a linear function to model bivariate data represented on a scatter plot that minimizes residuals.	Listed on the item specification linked to the standard's code
	A1.DS.A.5.b	Construct a scatter plot of bivariate quantitative data describing how the variables are related; determine and use a function that models the relationship. Construct an exponential function to model bivariate data represented on a scatter plot that minimizes residuals.	Listed on the item specification linked to the standard's code
	A1.DS.A.8	Distinguish between correlation and causation.	Listed on the item specification linked to the standard's code
	A1.DS.A.6	Interpret the slope (rate of change) and the y-intercept (constant term) of a linear model in the context of the data.	Listed on the item specification linked to the standard's code
	A1.DS.A.7	Determine and interpret the correlation coefficient for a linear association.	Listed on the item specification linked to the standard's code

**Click on standard code above to see Item Specifications from DESE and Released Items*

Data Analysis & Statistics

Instructional Ideas/Notes

		Assessed on Post Test	Instructional Ideas/Prerequisite Knowledge
Priority Standard	A1.DS.A.1	Yes	Instructional Notes: Task 1: Scatter Plots and Line of Fit (3-5) Task 2: Analyzing line of fit to make predictions (3-6) Task 3: Correlation and Causation (3-6) Task 4: Organize and Understand data using dot plots, histograms, and box and whisker plots (11-1) Task 5: Compare data sets using measures of center and spread (11-2) Task 6: Interpret shapes of data displays representing different types of data distribution (11-3) Task 7: Organize data in a two-way frequency table and use them to make inferences (11-5) Lessons: 3-5, 3-6, 11-1, 11-2, 11-3, 11-5

Key Vocabulary

conditional relative frequency	joint frequency	joint relative frequency	marginal frequency	marginal relative frequency
normal distribution	standard deviation	variance	negative association	negative correlation
no association	positive association	positive correlation	trend line	causation
correlation coefficient	extrapolation	interpolation	line of best fit	linear regression
residual				

Common Assessments

CFA	CFA	Unit 4 Summative Answer Key
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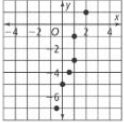
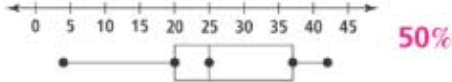
Data Analysis & Statistics

Proficiency Scale

Proficiency Scale: A score of 3.0 correlates with grade-level proficiency on the priority standard.

Score	Learning Goal	Sample Tasks																
Score 4.0	<p>In addition to Score 3.0, in-depth inferences or applications that go beyond what was taught. For example, the student may:</p> <p>Critiques the validity of conjectures about a data set in various forms; discusses possible associations and trends in data; constructs viable arguments to justify relationship between the variables; analyzes the fit of various models of data.</p>	<p>21. During one month, the mean high temperature in Boise, Idaho, was 52.1° F with a standard deviation of 6.5° F. During the same month, the mean high temperature in Death Valley, California, was 81.9° F with a standard deviation of 6.4° F. Which of the following are true? Select all that apply.</p> <ul style="list-style-type: none"> <input type="checkbox"/> A About 95% of the high temperatures measured in Boise ranged from 45.6° to 58.6°. <input type="checkbox"/> B The average high temperature in Death Valley was greater than the average in Boise. <input type="checkbox"/> C The variation of high temperatures in Death Valley was about the same as the variation in Boise. 																
<p>3.5 In addition to 3.0 performance, in-depth inferences and applications with partial success.</p>																		
Score 3.0	<p>The student exhibits no major errors or gaps in the learning goal (complex ideas and processes). The student will:</p> <p>Compares, interprets and analyzes sets of data using statistical measures or graphs; recognizes the presence and effects of outliers; summarizes and interprets data in two-way frequency tables; uses appropriate tools and/or technology to construct scatterplots of bivariate data; determines a function that models a data set; interprets parameters of data models; interpret the correlation coefficient for a linear association; understands that correlation does not necessarily lead to causation; interprets the relationships of the variables in the contexts of the data.</p>	<p>1. A school offers two music classes, Band and Choir. Out of 66 students in Band, 36 are male. Twelve males and 42 females are in choir. There are no students who are enrolled in both classes.</p> <p>Complete the two-way frequency table to organize the Band and Choir data.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Band</th> <th>Choir</th> <th>Totals</th> </tr> </thead> <tbody> <tr> <th>Males</th> <td style="text-align: center;">36</td> <td style="text-align: center;">12</td> <td style="text-align: center;">48</td> </tr> <tr> <th>Females</th> <td style="text-align: center;">30</td> <td style="text-align: center;">42</td> <td style="text-align: center;">72</td> </tr> <tr> <th>Totals</th> <td style="text-align: center;">66</td> <td style="text-align: center;">54</td> <td style="text-align: center;">120</td> </tr> </tbody> </table> <p>2. Use the table in Item 1. Which of these statements is true?</p> <ul style="list-style-type: none"> <input type="checkbox"/> A Of the students in music, 10% are males in Choir, and 35% are females in Choir. <input type="checkbox"/> B Of the students in music, 55% are males, and 45% are females. <input type="checkbox"/> C Of the students in music, 25% are males in Choir, and 75% are males in Band. <input type="checkbox"/> D Of the students in music, 25% are females in Choir, and 30% are males in Choir. 		Band	Choir	Totals	Males	36	12	48	Females	30	42	72	Totals	66	54	120
	Band	Choir	Totals															
Males	36	12	48															
Females	30	42	72															
Totals	66	54	120															
<p>2.5 No major errors or gaps in 2.0 content and partial knowledge of 3.0 content.</p>																		

Data Analysis & Statistics

Score 2.0	<p>The student exhibits no major errors or gaps in the simpler details and processes.</p> <p>The student will:</p> <p>Interprets graphical representations of data; organizes data in a given two-way frequency table; creates a scatter plot from given data; creates a trend line from two optimal points that are given;</p>	<p>2. Which equation best models the data shown in the scatter plot?</p> <p>Ⓐ $y = x - 3$</p> <p>Ⓑ $y = x - 5$</p> <p>Ⓒ $y = 3x - 3$</p> <p>Ⓓ $y = 3x - 5$</p> <div style="text-align: right;">  </div>
1.5 Partial understanding of the 2.0 content with major errors or gaps in 3.0 content.		
Score 1.0	<p>With help, a partial understanding of the 2.0 content and some of the 3.0 content.</p> <p>Calculates statistical measures of center and spread for a given data set; creates representations of data;</p>	<p>4. The box plot shows the ages of people at a movie screening. What percent of the people are between 20 and 37 years old?</p> <div style="text-align: center;">  </div>

Polynomials

Grade: 8-10 Subject: Math Dates: 1/4-1/21 Text: _____

Standards

Unit Title	Polynomials		Expectation Unwrapped
Priority Standard	A1.APR.A.1	Add, subtract and multiply polynomials, and understand that polynomials follow the same general rules of arithmetic and are closed under these operations.	<ul style="list-style-type: none"> The student will add polynomials and understand that polynomials follow the same general rules of arithmetic and are closed under addition. The student will subtract polynomials and understand that polynomials follow the same general rules of arithmetic and are closed under subtraction. The student will multiply polynomials and understand that polynomials follow the same general rules of arithmetic and are closed under multiplication.
Supporting Standards	A1.NQ.B.3.a	Use units of measure as a way to understand and solve problems involving quantities. Identify, label and use appropriate units of measure within a problem.	Listed on the item specification linked to the standard's code
	A1.APR.A.2	Divide polynomials by monomials.	Listed on the item specification linked to the standard's code
	A1.NQ.B.4	Define and use appropriate quantities for representing a given context or problem.	Listed on the item specification linked to the standard's code
	A1.SSE.A.2	Analyze the structure of polynomials to create equivalent expressions or equations.	Listed on the item specification linked to the standard's code

**Click on standard code above to see Item Specifications from DESE and Released Items*

Instructional Ideas/Notes

Polynomials

		Assessed on Post Test	Instructional Ideas/Prerequisite Knowledge
Priority Standard	A1.APR.A.1	Yes	Instructional Notes: Task 1: Classify polynomials and write them in standard form. Evaluate polynomial expressions. Task 2: Add and subtract polynomials. Task 3: Multiply polynomials by a monomial. Task 4: Multiply polynomials. Task 5: Find special products of binomials. Lessons: 7-1, 7-2, 7-3

Key Vocabulary

polynomial	binomial	trinomial	degree of a monomial	degree of a polynomial leading coefficient
FOIL Method	quadratic expression	difference of squares		

Common Assessments

CFA	CFA	Unit 5 Summative Answer Key
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Polynomials

Proficiency Scale

Proficiency Scale: A score of 3.0 correlates with grade-level proficiency on the priority standard.

Score	Learning Goal	Sample Tasks
Score 4.0	<p>In addition to Score 3.0, in-depth inferences or applications that go beyond what was taught. For example, the student may:</p> <p>Connects mathematical ideas and real-world situations through modeling of arithmetic on polynomials. Generalize the operations of addition, subtraction, and multiplication of polynomials to construct an argument that polynomials are closed under addition, subtraction, and multiplication.</p>	<p>7. A portrait without its frame has a height 1.5 times its width w, in inches. Its frame is 2 in. wide all along its perimeter. What is an expression for the area of the framed portrait in terms of w? Simplify your expression and write it in standard form.</p> <p>$1.5w^2 + 10w + 16$</p>
3.5 In addition to 3.0 performance, in-depth inferences and applications with partial success.		
Score 3.0	<p>The student exhibits no major errors or gaps in the learning goal (complex ideas and processes). The student will:</p> <p>Adds, subtracts and multiplies multivariable polynomials; divides polynomials by monomials.</p>	<p>9. Find the product.</p> <p>$(4x - 7)(4x + 7)$</p> <p>$16x^2 - 49$</p>
2.5 No major errors or gaps in 2.0 content and partial knowledge of 3.0 content.		
Score 2.0	<p>The student exhibits no major errors or gaps in the simpler details and processes. The student will:</p> <p>Multiply single variable polynomials.</p>	<p>5. Find the product.</p> <p>$-8y^2(2y^2 + 7y - 5)$</p> <p>Ⓐ $-16y^4 - 56y - 40$</p> <p>Ⓑ $-16y^4 - 56y^3 + 40y^2$</p> <p>Ⓒ $16y^4 + 56y^3 - 40y^2$</p> <p>Ⓓ $-6y^4 - y^3 - 13y^2$</p>
1.5 Partial understanding of the 2.0 content with major errors or gaps in 3.0 content.		

Polynomials

<p>Score 1.0</p>	<p>With help, a partial understanding of the 2.0 content and some of the 3.0 content. Adds and subtracts polynomials, multiplies a single variable monomial and a single variable polynomial.</p>	<p>3. Simplify: $(5x^3 + 7x - 8) + (2x^3 - 5x^2 - x + 3)$. Write your answer in standard form. $7x^3 - 5x^2 + 6x - 5$</p> <hr/> <p>4. Simplify: $(-7x + 5) - (2x^2 - 8x + 6)$. Write your answer in standard form. $-2x^2 + x - 1$</p>
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Factoring Polynomials

Grade: 8-10 Subject: Math Dates: 1/24-2/16 Text: _____

Standards

Unit Title	Factoring Polynomials		Expectation Unwrapped
Priority Standard	A1.SSE.A.2	Analyze the structure of polynomials to create equivalent expressions or equations.	<ul style="list-style-type: none"> • The student will factor a polynomial expression. • The student will analyze the structure of polynomials to determine an appropriate method for decomposing and composing to create equivalent expressions. • The student will analyze the structure of polynomials to determine an appropriate method for decomposing and composing to create equivalent equations
Supporting Standards	A1.SSE.A.3.a	Choose and produce equivalent forms of a quadratic expression or equations to reveal and explain properties. Find the zeros of a quadratic function by rewriting it in factored form.	Listed on the item specification linked to the standard's code
	A1.NQ.B.3.a	Use units of measure as a way to understand and solve problems involving quantities. Identify, label and use appropriate units of measure within a problem.	Listed on the item specification linked to the standard's code
	A1.NQ.B.4	Define and use appropriate quantities for representing a given context or problem.	Listed on the item specification linked to the standard's code
	A1.SSE.A.1	Interpret the contextual meaning of individual terms or factors from a given problem that utilizes formulas or expressions.	Listed on the item specification linked to the standard's code

**Click on standard code above to see Item Specifications from DESE and Released Items*

Factoring Polynomials

Instructional Ideas/Notes

		Assessed on Post Test	Instructional Ideas/Prerequisite Knowledge
Priority Standard	A1.SSE.A.2	Yes	<p>Instructional Notes:</p> <p>Task 1: Write prime factorization of numbers. Find the Greatest Common Factor of monomials.</p> <p>Task 2: Factor polynomials using Greatest Common Factor.</p> <p>Task 3: Factor quadratic trinomials of the form $y = x^2 + bx + x$</p> <p>Task 4: Factor quadratic trinomials in the form $y = ax^2 + bx + x$</p> <p>Task 5: Factor perfect square trinomials. Factor difference of two squares.</p> <p>Task 6: Choose an appropriate method for factoring polynomials. Combine methods for factoring a polynomial.</p> <p>Lessons: 7-4, 7-5, 7-6, 7-7</p>

Key Vocabulary

factoring	factoring by grouping	zero product property	quadratic equation	prime polynomial
perfect square trinomial	difference of two squares			

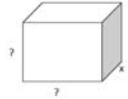
Common Assessments

CFA	CFA	Unit 6 Summative Answer Key
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Factoring Polynomials

Proficiency Scale

Proficiency Scale: A score of 3.0 correlates with grade-level proficiency on the priority standard.

Score	Learning Goal	Sample Tasks
Score 4.0	<p>In addition to Score 3.0, in-depth inferences or applications that go beyond what was taught. For example, the student may:</p> <p>Analyzes and manipulates the structure of polynomials and exponentials to highlight key features with or without context; manipulates quadratic expressions that have been factored completely to reveal the solutions of the quadratic equation.</p>	<p>13. The volume of the box shown is $x^3 - 5x^2 + 6x$ if one of the dimensions is x, which represents the two missing dimensions?</p> <p>A $(x + 2)(x - 3)$ B $(x + 2)(x + 3)$ C $(x - 2)(x - 3)$ D $(x - 2)(x + 3)$</p> 
3.5 In addition to 3.0 performance, in-depth inferences and applications with partial success.		
Score 3.0	<p>The student exhibits no major errors or gaps in the learning goal (complex ideas and processes). The student will:</p> <p>Looks for and makes use of structure in quadratic expressions to produce equivalent forms; interprets mathematics models including individual terms and factors in the context of the problem; recognizes when expressions can be factored to find the solutions of an equation.</p>	<p>18. Factor $15y^2 + 10y - 40$.</p> <p><input type="radio"/> A $5(y + 4)(3y - 2)$ <input type="radio"/> B $(5y - 10)(3y + 4)$ <input type="radio"/> C $5(y - 2)(3y + 4)$ <input checked="" type="radio"/> D $5(y + 2)(3y - 4)$</p>
2.5 No major errors or gaps in 2.0 content and partial knowledge of 3.0 content.		
Score 2.0	<p>The student exhibits no major errors or gaps in the simpler details and processes. The student will:</p> <p>Identifies key terms in expressions and equations; uses mathematical models; factors a simple ($a=1$) quadratic expression.</p>	<p>20. Factor the perfect square trinomial $x^2 - 12x + 36$.</p> <p><input checked="" type="radio"/> A $(x - 6)^2$ <input type="radio"/> B $(x - 6)(x + 6)$ <input type="radio"/> C $(x + 6)^2$ <input type="radio"/> D $(x - 12)^2$</p>
1.5 Partial understanding of the 2.0 content with major errors or gaps in 3.0 content.		
Score 1.0	<p>With help, a partial understanding of the 2.0 content and some of the 3.0 content.</p> <p>Identifies parts of an expression to write it in standard form; factors a GCF from a quadratic expression.</p>	<p>11. What is the greatest common factor of the terms of the polynomial $-16y^4 + 12y^2 - 4y$?</p> <p>$-4y$</p>

Quadratic Functions

Grade: 8-10 Subject: Math Dates: 2/17-4/8 Text: _____

Standards

Unit Title	Quadratic Functions		Expectation Unwrapped
Priority Standard	A1.REI.A.2.c	Solve problems involving quadratic equations. Analyze different methods of solving quadratic equations.	<ul style="list-style-type: none"> The student will solve quadratic equations using different methods. (e.g., inspection, the square root property, completing the square, using the quadratic formula, factoring) The student will analyze quadratic equations to determine the best method for solving.
Supporting Standards	A1.SSE.A.3.a	Choose and produce equivalent forms of a quadratic expression or equations to reveal and explain properties. Find the zeros of a quadratic function by rewriting it in factored form.	Listed on the item specification linked to the standard's code
	A1.SSE.A.3.b	Choose and produce equivalent forms of a quadratic expression or equations to reveal and explain properties. Find the maximum or minimum value of a quadratic function by completing the square.	Listed on the item specification linked to the standard's code
	A1.IF.B.3	Using tables, graphs and verbal descriptions, interpret key characteristics of a function that models the relationship between two quantities.	Listed on the item specification linked to the standard's code
	A1.REI.A.2.a	Solve problems involving quadratic equations. Use the method of completing the square to create an equivalent quadratic equation.	Listed on the item specification linked to the standard's code
	A1.REI.A.2.b	Solve problems involving quadratic equations. Derive the quadratic formula.	Listed on the item specification linked to the standard's code
	A1.REI.B.4	Solve a system consisting of a linear equation and a quadratic equation algebraically and/or graphically.	Listed on the item specification linked to the standard's code
	A1.NQ.B.3.a	Use units of measure as a way to understand and solve problems involving quantities. Identify, label and use appropriate units of measure within a problem.	Listed on the item specification linked to the standard's code
	A1.NQ.B.4	Define and use appropriate quantities for representing a given context or problem.	Listed on the item specification linked to the standard's code
	A1.CED.A.2	Create and graph linear, quadratic and exponential equations in two variables.	Listed on the item specification linked to the standard's code
	A1.IF.B.4	Relate the domain and range of a function to its graph and, where applicable, to the quantitative relationship it describes.	Listed on the item specification linked to the standard's code
	A1.IF.B.5	Determine the average rate of change of a function over a specified interval and interpret the meaning.	Listed on the item specification linked to the standard's code

Quadratic Functions

	A1.IF.C.7	Graph functions expressed symbolically and identify and interpret key features of the graph.	Listed on the item specification linked to the standard's code
	A1.IF.C.8	Translate between different but equivalent forms of a function to reveal and explain properties of the function and interpret these in terms of a context.	Listed on the item specification linked to the standard's code
	A1.IF.C.9	Compare the properties of two functions given different representations.	Listed on the item specification linked to the standard's code
	A1.BF.A.1	Analyze the effect of translations and scale changes on functions.	Listed on the item specification linked to the standard's code
	A1.IF.A.2	Use function notation to evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	Listed on the item specification linked to the standard's code

**Click on standard code above to see Item Specifications from DESE and Released Items*

Quadratic Functions

Instructional Ideas/Notes

		Assessed on Post Test	Instructional Ideas/Prerequisite Knowledge
Priority Standard	A1.REI.A.2.c	Yes	<p>Instructional Notes:</p> <p>Task 1: Identify functions and determine whether they have a minimum or maximum. Graph a quadratic function and give its domain and range.</p> <p>Task 2: Find the zeros of a quadratic from its graph. Find the axis of symmetry and the vertex of a parabola.</p> <p>Task 3: Graph a quadratic function in the form $y = ax^2 + bx + c$</p> <p>Task 4: Solve quadratic equations by graphing.</p> <p>Task 5: Solve quadratic equations by factoring.</p> <p>Task 6: Solve quadratic equations by using square roots.</p> <p>Task 7: Solve quadratic equations by completing the square.</p> <p>Task 8: Solve quadratic equations by using Quadratic Formula. Determine the number of solutions of a quadratic equation by using the discriminant.</p> <p>Lessons: 8-1, 8-2, 8-3, 8-4, 9-1, 9-2, 9-3, 9-4, 9-5, 9-6</p>

Key Vocabulary

quadratic formula	standard form	parabola	axis of symmetry	vertex
minimum	maximum	double root	quadratic equation	prime polynomial
difference of two squares	perfect square trina			

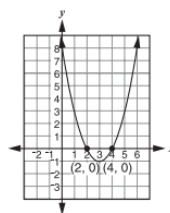
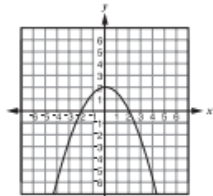
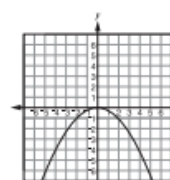
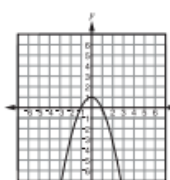
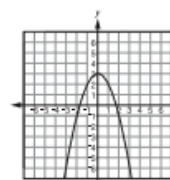
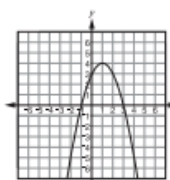
Common Assessments

CFA	CFA	Unit 7 Summative Answer Key
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Quadratic Functions

Proficiency Scale

Proficiency Scale: A score of 3.0 correlates with grade-level proficiency on the priority standard.

Score	Learning Goal	Sample Tasks
Score 4.0	<p>In addition to Score 3.0, in-depth inferences or applications that go beyond what was taught. For example, the student may:</p> <p>Analyzes and manipulates the structure of polynomials to highlight key features with or without context; manipulates quadratic expressions to reveal the vertex or zeros of a quadratic function.</p>	<p>13. Which of the equations are represented by the graph shown? Select <u>all</u> that apply.</p>  <p>A. $y = (x - 2)(x - 4)$ B. $y = (x - 3)^2 - 1$ C. $y = (x - 3)^2 + 1$ D. $y = x^2 - 6x + 8$ E. $y = x^2 + 6x + 8$</p>
3.5	<p>In addition to 3.0 performance, in-depth inferences and applications with partial success.</p>	
Score 3.0	<p>The student exhibits no major errors or gaps in the learning goal (complex ideas and processes). The student will:</p> <p>Looks for and makes use of structure in quadratic functions to produce equivalent forms to reveal and explain properties; interprets mathematics models including individual terms and factors in the context of the problem; recognizes when expressions can be factored to find the zeros (solutions) of an equation.</p>	<p>8. This is the graph of $y = f(x)$.</p>  <p>Which of the following is the graph of $y = 2f(x) - 1$?</p> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <p>A. </p> </div> <div style="width: 50%;"> <p>C. </p> </div> <div style="width: 50%;"> <p>B. </p> </div> <div style="width: 50%;"> <p>D. </p> </div> </div>

Quadratic Functions

2.5 No major errors or gaps in 2.0 content and partial knowledge of 3.0 content.

Score 2.0	<p>The student exhibits no major errors or gaps in the simpler details and processes. The student will: Identifies key terms in quadratic functions; uses mathematical models; factors and solves a simple ($a=1$) quadratic functions.</p>	<p>8. Identify the vertex and y-intercept of the graph of the function $y = (x + 2)^2 - 3$. vertex: <u> (-2, -3) </u> y-intercept: <u> 1 </u></p>
1.5 Partial understanding of the 2.0 content with major errors or gaps in 3.0 content.		
Score 1.0	<p>With help, a partial understanding of the 2.0 content and some of the 3.0 content. Identifies parts of an expression to write it in standard form; factors and solves quadratic functions with GCF only; uses given expressions and equations to solve problems</p>	<p>10. What is the axis of symmetry of the graph of the function $f(x) = 2x^2 + 8x - 5$?</p> <p> <input type="radio"/> (A) $x = -5$ <input checked="" type="radio"/> (C) $x = -2$ <input type="radio"/> (B) $x = -4$ <input type="radio"/> (D) $x = 2$ </p>

Exponents & Exponential Functions

Grade: 8-10 Subject: Math Dates: 4/11-4/22 Text: _____

Standards

Unit Title	Exponents & Exponential Functions		Expectation Unwrapped
Priority Standard	A1.LQE.A.3	Construct linear, quadratic and exponential equations given graphs, verbal descriptions or tables.	<ul style="list-style-type: none"> The student will construct linear equations given graphs. The student will construct linear equations given verbal descriptions. The student will construct linear equations given tables. The student will construct quadratic equations given graphs. The student will construct quadratic equations given verbal descriptions. The student will construct quadratic equations given tables. The student will construct exponential equations given graphs. The student will construct exponential equations given verbal descriptions. The student will construct exponential equations given tables.
Supporting Standards	A1.NQ.A.1	Explain how the meaning of rational exponents extends from the properties of integer exponents.	Listed on the item specification linked to the standard's code
	A1.NQ.A.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents. Limit to rational exponents with a numerator of 1.	Listed on the item specification linked to the standard's code
	A1.NQ.B.5	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Listed on the item specification linked to the standard's code
	A1.NQ.B.3.a	Use units of measure as a way to understand and solve problems involving quantities. Identify, label and use appropriate units of measure within a problem.	Listed on the item specification linked to the standard's code
	A1.NQ.B.4	Define and use appropriate quantities for representing a given context or problem.	Listed on the item specification linked to the standard's code
	A1.CED.A.2	Create and graph linear, quadratic and exponential equations in two variables.	Listed on the item specification linked to the standard's code
	A1.IF.B.4	Relate the domain and range of a function to its graph and, where applicable, to the quantitative relationship it describes.	Listed on the item specification linked to the standard's code
	A1.IF.B.5	Determine the average rate of change of a function over a specified interval and interpret the meaning.	Listed on the item specification linked to the standard's code
	A1.IF.B.6	Interpret the parameters of a linear or exponential function in terms of the context.	Listed on the item specification linked to the standard's code
	A1.IF.C.8	Translate between different but equivalent forms of a function to reveal and explain properties of the function and interpret these in terms of a context.	Listed on the item specification linked to the standard's code

Exponents & Exponential Functions

	A1.LQE.A.1.b	Distinguish between situations that can be modeled with linear or exponential functions. Recognize exponential situations in which a quantity grows or decays by a constant percent rate per unit interval.	Listed on the item specification linked to the standard's code
	A1.LQE.A.2	Describe, using graphs and tables, that a quantity increasing exponentially eventually exceeds a quantity increasing linearly or quadratically.	Listed on the item specification linked to the standard's code
	A1.LQE.B.5	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the set of integers	Listed on the item specification linked to the standard's code
	A1.LQE.B.4	Write arithmetic and geometric sequences in recursive and explicit forms, and use them to model situations and translate between the two forms	Listed on the item specification linked to the standard's code
	A1.LQE.A.1.a	Distinguish between situations that can be modeled with linear or exponential functions. Determine that linear functions change by equal differences over equal intervals.	Listed on the item specification linked to the standard's code
	A1.LQE.B.6	Find the terms of sequences given an explicit or recursive formula.	Listed on the item specification linked to the standard's code
	A1.CED.A.1	Create equations and inequalities in one variable and use them to model and/or solve problems.	Listed on the item specification linked to the standard's code

**Click on standard code above to see Item Specifications from DESE and Released Items*

Exponents & Exponential Functions

Instructional Ideas/Notes

		Assessed on Post Test	Instructional Ideas/Prerequisite Knowledge
Priority Standard	A1.LQE.A.3	Yes	Instructional Notes: Task 1: Evaluate expressions containing zero and integer exponents. Simplify expression with zero and integer exponents. Task 2: Evaluate and multiply by powers of 10. Convert between standard notation and scientific notation. Task 3: Use Multiplication Properties of Exponents to evaluate and simplify expressions. Task 4: Use Division Properties of Exponents to evaluate and simplify expressions. Task 5: Solve problems involving exponential growth and decay. Lessons: 3-4, 6-1, 6-3, 6-4

Key Vocabulary

scientific notation	monomial	constant	zero exponent	negative exponent
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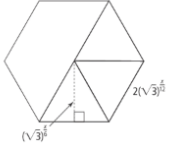
Common Assessments

CFA	CFA	Unit 8 Summative Answer Key
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Proficiency Scale

Proficiency Scale: A score of 3.0 correlates with grade-level proficiency on the priority standard.

Exponents & Exponential Functions

Score	Learning Goal	Sample Tasks
Score 4.0	<p>In addition to Score 3.0, in-depth inferences or applications that go beyond what was taught. For example, the student may:</p> <ul style="list-style-type: none"> Justifies understanding of the properties of rational exponents as an extension of the properties of integer exponents; critiques the reasoning of others' representation when solving problems involving expressions with rational exponents or radicals; attends to the precision answers appropriate to the context of the problem; analyzes units as a means to determine appropriate use of rates. Analyzes how linear and exponential functions change per unit interval; translate between the explicit and recursive forms of sequences; creates mathematical models to make sense of real-world problems. 	<p>5. The diagram below shows a hexagon-shaped tile used for flooring. Each hexagon tile has an area of $18\sqrt{3}$ in.². Solve for x. Then find the exact length of each side of the hexagon. (<i>Hint: Six equilateral triangles make one hexagon.</i>) $x = \underline{12}$; side length = $\underline{2\sqrt{3}}$ in.</p> 
3.5 In addition to 3.0 performance, in-depth inferences and applications with partial success.		
Score 3.0	<p>The student exhibits no major errors or gaps in the learning goal (complex ideas and processes). The student will:</p> <ul style="list-style-type: none"> Rewrites expressions with rational exponents or radicals using the properties of exponents; reasons abstractly and contextually when solving multi-step problems involving quantities; attends to precision by accurately rounding to an appropriate measure based on the context of a situation. Constructs quadratic and exponential functions given multiple representations; writes arithmetic and geometric sequences recursively; recognizes that sequences are functions whose domain is a subset of the set of integers; recognizes that linear functions model arithmetic sequences and exponential functions model geometric sequences. 	<p>4. What is the solution of $9^x - 8 = 3^{4x} - 12$?</p> <p>(A) $-\frac{2}{3}$ (B) $\frac{4}{3}$ (C) 2 (D) -2</p>
2.5 No major errors or gaps in 2.0 content and partial knowledge of 3.0 content.		
Score 2.0	<p>The student exhibits no major errors or gaps in the simpler details and processes. The student will:</p> <ul style="list-style-type: none"> Rewrites expressions with rational exponents or radicals using the properties of exponents; uses appropriate units, scales and labels to correctly represent data; solves problems involving multiple quantities within and between systems of measurements, represents numbers in an appropriate form, such as scientific notation. Based on the context of a situation. Recognize and distinguishes between situations that can be modeled with linear or exponential functions; writes explicit functions that generate arithmetic and geometric sequences; Determine whether a function is written in explicit or recursive form. 	<p>2. The formula $A = 6V^{\frac{2}{3}}$ relates the surface area A, in square units, of a cube to the volume V, in cubic units. What is the volume, in cubic inches, of a cube with surface area 486 in.²? $\underline{729}$ in.³</p>

Exponents & Exponential Functions

1.5 Partial understanding of the 2.0 content with major errors or gaps in 3.0 content.

Score 1.0	With help, a partial understanding of the 2.0 content and some of the 3.0 content. <ul style="list-style-type: none">• Identifies equivalent radicals and rational exponent expressions; uses conversion rates within a system to solve problems involving multiple quantities.• Constructs linear functions; calculate terms of a given sequence.	1. How can you write $\sqrt[3]{n^4}$ using rational exponents? <input checked="" type="radio"/> A $n^{\frac{4}{3}}$ <input type="radio"/> B n^4 <input type="radio"/> C n^{20} <input type="radio"/> D $\frac{n^4}{n^5}$
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Functions

Grade: 8-10 Subject: Math Dates: 4/25-5/13 Text: _____

Standards

Unit Title	Functions		Expectation Unwrapped
Priority Standard	A1.IF.B.3	Using tables, graphs and verbal descriptions, interpret key characteristics of a function that models the relationship between two quantities.	<ul style="list-style-type: none"> The student will interpret key characteristics of a function that models the relationship between two quantities using tables. The student will interpret key characteristics of a function that models the relationship between two quantities using graphs. The student will interpret key characteristics of a function that models the relationship between two quantities using verbal descriptions.
	A1.IF.A.2	Use function notation to evaluate functions for inputs in their domain, and interpret statements that use function notation in terms of a context.	<ul style="list-style-type: none"> The student will use function notation to evaluate functions for inputs in their domains. The student will interpret statements involving the inputs and outputs of a function in terms of a context.
Supporting Standards	A1.NQ.B.3.a	Use units of measure as a way to understand and solve problems involving quantities. Identify, label and use appropriate units of measure within a problem.	Listed on the item specification linked to the standard's code
	A1.NQ.B.4	Define and use appropriate quantities for representing a given context or problem.	Listed on the item specification linked to the standard's code
	A1.CED.A.2	Create and graph linear, quadratic and exponential equations in two variables.	Listed on the item specification linked to the standard's code
	A1.IF.A.1.a	Understand that a function from one set (domain) to another set (range) assigns to each element of the domain exactly one element of the range. Represent a function using function notation.	Listed on the item specification linked to the standard's code
	A1.IF.A.1.b	Understand that a function from one set (domain) to another set (range) assigns to each element of the domain exactly one element of the range. Understand that the graph of a function labeled f is the set of all ordered pairs (x, y) that satisfy the equation $y=f(x)$.	Listed on the item specification linked to the standard's code
	A1.IF.B.4	Relate the domain and range of a function to its graph and, where applicable, to the quantitative relationship it describes.	Listed on the item specification linked to the standard's code
A1.IF.C.7	Graph functions expressed symbolically and identify and interpret key features of the graph.	Listed on the item specification linked to the standard's code	

Functions

	A1.LQE.A.1.a	Distinguish between situations that can be modeled with linear or exponential functions. Determine that linear functions change by equal differences over equal intervals.	Listed on the item specification linked to the standard's code
	A1.LQE.A.3	Construct linear, quadratic and exponential equations given graphs, verbal descriptions or tables.	Listed on the item specification linked to the standard's code

*Click on standard code above to see Item Specifications from DESE and Released Items

Instructional Ideas/Notes

		Assessed on Post Test	Instructional Ideas/Prerequisite Knowledge
Priority Standard	A1.IF.B.3	Yes	Instructional Notes: Task 1: Evaluating Function Task 2: Determine Domain and range Task 3: Graphing Function from a table Task 4: Distinguish whether a pattern is linear, quadratic, or exponential from a table Task 5: Sequences: recognize, expand, and write arithmetic and geometric Task 6: Transformations of linear, quadratic, and exponential Lessons: 3-1, 3-2, 5-2, 6-2, 8-5
	A1.IF.A.2	Yes	

Key Vocabulary

coordinate plane	X- and y- axis	origin	ordered pair	relation
mapping	domain	range	independent variable	dependent variable
function	vertical line test	discrete	continuous	function notation
line symmetry	slope	maximum	minimum	increasing

Functions





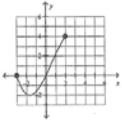
decreasing	x-intercept	y-intercept		
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Common Assessments

CFA	CFA	Unit 9 Summative Answer Key
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Proficiency Scale

Proficiency Scale: A score of 3.0 correlates with grade-level proficiency on the priority standard.

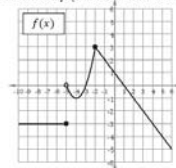
Score	Learning Goal	Sample Tasks																																						
Score 4.0	<p>In addition to Score 3.0, in-depth inferences or applications that go beyond what was taught. For example, the student may:</p> <p>Interprets statements that use function notation in terms of a context; interprets the parameters of an exponential function; compares properties of functions given different representations contextually</p>	<p>6. (1pt) Draw a line to match the table to the correct type of function.</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; padding: 2px;">x</td><td style="border: 1px solid black; padding: 2px;">-2</td><td style="border: 1px solid black; padding: 2px;">-1</td><td style="border: 1px solid black; padding: 2px;">0</td><td style="border: 1px solid black; padding: 2px;">1</td><td style="border: 1px solid black; padding: 2px;">2</td> <td rowspan="3" style="padding-left: 20px; vertical-align: middle;">Linear</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">y</td><td style="border: 1px solid black; padding: 2px;">1</td><td style="border: 1px solid black; padding: 2px;">2</td><td style="border: 1px solid black; padding: 2px;">4</td><td style="border: 1px solid black; padding: 2px;">8</td><td style="border: 1px solid black; padding: 2px;">16</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">x</td><td style="border: 1px solid black; padding: 2px;">-2</td><td style="border: 1px solid black; padding: 2px;">-1</td><td style="border: 1px solid black; padding: 2px;">0</td><td style="border: 1px solid black; padding: 2px;">1</td><td style="border: 1px solid black; padding: 2px;">2</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">y</td><td style="border: 1px solid black; padding: 2px;">-6</td><td style="border: 1px solid black; padding: 2px;">-3</td><td style="border: 1px solid black; padding: 2px;">0</td><td style="border: 1px solid black; padding: 2px;">3</td><td style="border: 1px solid black; padding: 2px;">6</td> <td rowspan="3" style="padding-left: 20px; vertical-align: middle;">Quadratic</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">x</td><td style="border: 1px solid black; padding: 2px;">-2</td><td style="border: 1px solid black; padding: 2px;">-1</td><td style="border: 1px solid black; padding: 2px;">0</td><td style="border: 1px solid black; padding: 2px;">1</td><td style="border: 1px solid black; padding: 2px;">2</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">y</td><td style="border: 1px solid black; padding: 2px;">-8</td><td style="border: 1px solid black; padding: 2px;">-9</td><td style="border: 1px solid black; padding: 2px;">-8</td><td style="border: 1px solid black; padding: 2px;">0</td><td style="border: 1px solid black; padding: 2px;">7</td> </tr> </table> <p style="text-align: center; margin-top: 10px;">2.5 No major errors or gaps in 2.0 content and partial knowledge of 3.0 content.</p>	x	-2	-1	0	1	2	Linear	y	1	2	4	8	16	x	-2	-1	0	1	2	y	-6	-3	0	3	6	Quadratic	x	-2	-1	0	1	2	y	-8	-9	-8	0	7
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y	-8	-9	-8	0	7																																			
Score 3.0	<p>The student exhibits no major errors or gaps in the learning goal (complex ideas and processes). The student will:</p> <p>Interprets parameters of exponential functions; compares properties of two functions given different representations; Interpret key characteristics of a function using various forms to model relationships between two quantities.</p>	<p>1. (2pts) Draw lines to match each graph to the correct table or function.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <table style="margin-left: auto; margin-right: auto; margin-top: 10px;"> <tr> <td style="border: 1px solid black; padding: 2px;">x</td><td style="border: 1px solid black; padding: 2px;">0</td><td style="border: 1px solid black; padding: 2px;">1</td><td style="border: 1px solid black; padding: 2px;">2</td><td style="border: 1px solid black; padding: 2px;">3</td><td style="border: 1px solid black; padding: 2px;">4</td> <td style="padding: 0 10px;">$f(x) = 2^x$</td> <td style="border: 1px solid black; padding: 2px;">x</td><td style="border: 1px solid black; padding: 2px;">-2</td><td style="border: 1px solid black; padding: 2px;">-1</td><td style="border: 1px solid black; padding: 2px;">0</td><td style="border: 1px solid black; padding: 2px;">1</td><td style="border: 1px solid black; padding: 2px;">2</td> <td style="padding: 0 10px;">$f(x) = -x^2 + 3$</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">y</td><td style="border: 1px solid black; padding: 2px;">7</td><td style="border: 1px solid black; padding: 2px;">2</td><td style="border: 1px solid black; padding: 2px;">-1</td><td style="border: 1px solid black; padding: 2px;">-2</td><td style="border: 1px solid black; padding: 2px;">-1</td> <td></td> <td style="border: 1px solid black; padding: 2px;">y</td><td style="border: 1px solid black; padding: 2px;">9</td><td style="border: 1px solid black; padding: 2px;">3</td><td style="border: 1px solid black; padding: 2px;">1</td><td style="border: 1px solid black; padding: 2px;">$\frac{1}{3}$</td><td style="border: 1px solid black; padding: 2px;">$\frac{1}{9}$</td> <td></td> </tr> </table>	x	0	1	2	3	4	$f(x) = 2^x$	x	-2	-1	0	1	2	$f(x) = -x^2 + 3$	y	7	2	-1	-2	-1		y	9	3	1	$\frac{1}{3}$	$\frac{1}{9}$											
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y	7	2	-1	-2	-1		y	9	3	1	$\frac{1}{3}$	$\frac{1}{9}$																												
Score 2.0	<p>The student exhibits no major errors or gaps in the simpler details and processes. The student will:</p> <p>Understands that the domain and range values of a function corresponding to (x, y) values on the Cartesian coordinate plane; interprets the parameters of a linear function; Recognizes and understands the definition of function, domain and range; represents situations with function notation; represents a linear function in various forms using symbolic function notation</p>	<p>5. (1pt) Give the domain and range of the relation.</p> <div style="text-align: center; margin: 10px 0;">  </div> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding-right: 20px;">F D: $-2 \leq x \leq 4$; R: $-3 \leq y \leq 2$</td> <td>H D: $-3 \leq x \leq 2$; R: $0 \leq y \leq 4$</td> </tr> <tr> <td style="padding-right: 20px;">G D: $-3 \leq x \leq 2$; R: $-3 \leq y \leq 6$</td> <td>I D: $-3 \leq x \leq 2$; R: $-2 \leq y \leq 4$</td> </tr> </table>	F D: $-2 \leq x \leq 4$; R: $-3 \leq y \leq 2$	H D: $-3 \leq x \leq 2$; R: $0 \leq y \leq 4$	G D: $-3 \leq x \leq 2$; R: $-3 \leq y \leq 6$	I D: $-3 \leq x \leq 2$; R: $-2 \leq y \leq 4$																																		
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1.5 Partial understanding of the 2.0 content with major errors or gaps in 3.0 content.																																								

Functions

**Score
1.0**

With help, a partial understanding of the 2.0 content and some of the 3.0 content.
Evaluates a given function for a specified value in the domain

#10-14 (1pt each) Evaluate and simplify each expression using the given functions below. Show all work. Exact answers only. (This means fractions and not rounded decimal answers when it applies.)



$g(x)$	
x	-2 -1 0 1 2
y	-5 -2 1 4 7

$$h(x) = -x^2 + 4 \qquad k(x) = \frac{1}{3}x + 5$$

10. $h(2) =$

12. $g(-1) + f(-7) =$

14. If $f(x) = -1$,
find the value(s) of x ?

11. $f(-5) =$

13. $k(4) =$