# APPROVED FACILITY SCHOOLS CURRICULUM DOCUMENT

## SUBJECT: Mathematics  
Grade: Algebra 1

<table>
<thead>
<tr>
<th>Strand/Concept</th>
<th>Student Expectation</th>
<th>Student Friendly Learning Objective</th>
<th>Level of Thinking</th>
<th>Academic Vocabulary</th>
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</thead>
<tbody>
<tr>
<td><strong>Quadrants</strong></td>
<td>N-Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.</td>
<td>I can use units to understand problems and to guide the solution of multi-step problems.</td>
<td>Comprehension</td>
<td>Choose</td>
</tr>
<tr>
<td><strong>Concept</strong></td>
<td></td>
<td></td>
<td></td>
<td>Consistency</td>
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<tr>
<td>Reason quantitatively and use units to solve problems.</td>
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<td>I can choose and interpret units consistently in formulas.</td>
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<td>Data display</td>
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<td>I can choose and interpret the scale and the origin in graphs and data displays.</td>
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<td>Evaluate</td>
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<td>Formula</td>
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<tr>
<td><strong>Student Friendly Learning</strong></td>
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<td>Graph</td>
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<tr>
<td><strong>Objective</strong></td>
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<td>Interpret</td>
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<tr>
<td><strong>Level of Thinking</strong></td>
<td></td>
<td></td>
<td></td>
<td>Multistep problem</td>
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<tr>
<td><strong>Academic Vocabulary</strong></td>
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<td>Origin</td>
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<td>Scale</td>
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<td>Solution</td>
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<td>Unit</td>
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## TIMELINE: Quarter 1

**Colorado SS:**

- Describe factors affecting take-home pay and calculate the impact.
- Design and use a budget, including income (net take-home pay) and expenses (mortgage, car loans, and living expenses) to demonstrate how living within your means is essential for a secure financial future.
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</table>
| Strand: Seeing Structure in Expressions | A-SSE.1 Interpret expressions that represent a quantity in terms of its context. I  
| Concept: Interpret the structure of expressions.                                  | a. Interpret parts of an expression, such as terms, factors, and coefficients. I M                    | I can interpret expressions that represent a quantity in terms of its context.                         | Application       | Coefficient        |
|                                        |                                                                                     | I can interpret parts of an expression, such as terms, factors, and coefficients.                       |                   | Expression          |
|                                        |                                                                                     |                                                                                                        |                   | Factor              |
|                                        |                                                                                     |                                                                                                        |                   | Interpret           |
|                                        |                                                                                     |                                                                                                        |                   | Part                |
|                                        |                                                                                     |                                                                                                        |                   | Term                |
| **Colorado SS:**                       |                                                                                     |                                                                                                        |                   |                    |
|                                        |                                                                                     |                                                                                                        |                   |                    |
| **Strand:** Creating Equations        | A-CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. I | I can create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear functions. | Application       | Create             |
| **Concept:** Create equations that describe numbers or relationships.               |                                                                                                    |                                                                                                        |                   | Equation            |
|                                        |                                                                                                    |                                                                                                        |                   | Inequality          |
|                                        |                                                                                                    |                                                                                                        |                   | Solve               |
|                                        |                                                                                                    |                                                                                                        |                   | Variable            |
| **Colorado SS:**                       |                                                                                                    |                                                                                                        |                   |                    |
|                                        |                                                                                                    |                                                                                                        |                   |                    |
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| **Strand:** Creating Equations  
**Concept:** Create equations that describe numbers or relationships. | A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. I M | I can create equations in two or more variables to represent relationships between quantities. I can graph equations on coordinate axes with labels and scales. | Application | Coordinate axis  
Create  
Equation  
Graph  
Label  
Quantity  
Relationship  
Represent  
Scale  
Variable |
| **Colorado SS:** | | | | |

| Strand: Creating Equations  
**Concept:** Create equations that describe numbers or relationships. | A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. I | I can represent constraints by equations. I can interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. | Application | Constraint  
Equation  
Inequality  
Interpret  
Modeling situation  
Represent  
Solution  
System of equations  
System of inequalities |
| **Colorado SS:** | | | | |
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| **Strand:** Reasoning with Equations and Inequalities  
**Concept:** Represent and solve equations and inequalities graphically. | A-REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). | I can determine that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). | Comprehension | Graph  
Understand |

### Colorado SS:

| Strand: Interpreting Functions  
**Concept:** Interpret functions that arise in applications in terms of the context. | F-IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. | I can relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.  
For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. | Application | Describe  
Domain  
Function  
Graph  
Quantitative  
Relate |

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<tr>
<td><strong>Strand:</strong> Interpreting Functions. <strong>Concept:</strong> Analyze functions using different representations.</td>
<td>F-IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</td>
<td>I can compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</td>
<td>Application</td>
<td>Algebra Compare Function Graphic representation Property Represent Table</td>
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### Colorado SS:

<table>
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<tr>
<th>Strand: Building Functions <strong>Concept:</strong> Build a function that models a relationship between two quantities.</th>
<th>F-BF.1 Write a function that describes a relationship between two quantities.</th>
<th>I can write a function that describes a relationship between two quantities.</th>
<th>Comprehension</th>
<th>Determine Calculation Expression Recursive process/sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Determine an explicit expression, a recursive process, or steps for calculation from a context.</td>
<td>I can determine an explicit expression, a recursive process, or steps for calculation from a context (real-world situation).</td>
<td></td>
<td>Application</td>
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| **Strand:** Interpreting Functions  
**Concept:** Understand the concept of a function and use function notation.  
F-IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x). | I can state that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range.  
I recognize when a graph is a function. | Comprehension | Domain  
Element  
Equation  
Function  
Graph  
Input  
Output  
Range of a function  
Set  
Understand |
| **Colorado SS:** | | | | |
| **Strand:** Interpreting Functions  
**Concept:** Understand the concept of a function and use function notation.  
F-IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. | I can use function notation.  
I can evaluate functions for inputs in their domains.  
I can interpret statements that use function notation in terms of a context. | Comprehension  
Application | Domain  
Evaluate  
Function  
Function notation  
Input  
Interpret |
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</table>
| **Strand:** Interpreting Functions | **Concept:** Understand the concept of a function and use function notation.                                                                                                                                                              | I can identify sequences as functions whose domain is a subset of the integers.                      | Comprehension     | Define  
  Domain  
  Function  
  Integer  
  Recognize  
  Recursive  
  process/sequence  
  Sequence  
  Subset |
| F-IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by \( f(0) = f(1) = 1 \), \( f(n+1) = f(n) + f(n-1) \) for \( n \geq 1 \). | \[ f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) \] for \( n \geq 1 \).                                                                                                                                          |                                                                        |                   |                                       |

**Colorado SS:**

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<td>Interpreting Functions</td>
<td>F-IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.</td>
<td>For a function that models a relationship between two quantities, I can interpret key features of graphs and tables in terms of the quantities. I can sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.</td>
<td>Comprehension</td>
<td>Function, Graph, Increasing function, Interpret, Minimum, Model, Quantity, Relationship, Sketch, Table</td>
</tr>
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</table>
| **Strand:** Interpreting Functions  
**Concept:** Interpret functions that arise in applications in terms of a context. | F-IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. IM | I can estimate the rate of change from a graph.  
I can calculate and interpret the average rate of change of a function, presented as a graph or a table over a specified interval. | Comprehension       | Average  
Calculate  
Estimate  
Function  
Graph  
Interpret  
Interval  
Rate of change  
Symbolic representation  
Table |

### Colorado SS:


### Strand: Interpreting Functions  
**Concept:** Analyze functions using different representations.

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</table>
| **Strand:** Interpreting Functions  
**Concept:** Analyze functions using different representations. | F-IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.  
1. Graph linear and quadratic functions and show intercepts, maxima, and minima. I | I can graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.  
I can graph linear and show intercepts. | Application         | Express  
Function  
Graph  
Identify  
Intercept  
Linear function  
Maximum value  
Minimum  
Minimum value  
Quadratic function |

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</table>
| Strand: Building Functions. Concept: Build new functions from existing functions. | F-BF.3 Identify the effect on the graph of replacing \( f(x) \) by \( f(x) + k \), \( f(kx) \), and \( f(x + k) \) for specific values of \( k \) (both positive and negative); find the value of \( k \) given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.* (linear and quadratic functions only) | I can identify the effect on the graph of replacing \( f(x) \) by \( f(x) + k \), \( f(kx) \), and \( f(x + k) \) for specific values of \( k \) (both positive and negative). I can find the value of \( k \) given the graphs. I can experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.* (linear and quadratic functions only) | Comprehension | Experiment
Graph Identify Illustrate Negative Positive Replace Value |

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</table>
| **Strand:** Linear, Quadratic, and Exponential Models | **F-LE.1** Distinguish between situations that can be modeled with linear functions and with exponential functions. | I can distinguish between situations that can be modeled with linear functions. | Comprehension | Constant rate  
Difference  
Distinguish  
Equal  
Exponential function  
Factor  
Interval  
Linear function  
Model  
Prove  
Quantity  
Recognize  
Unit interval |
| **Concept:** Construct and compare linear, quadratic, and exponential models and solve problems. | a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. | I can prove that linear functions grow by equal differences over equal intervals. | Synthesize | |
| | b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. | I can recognize situations in which one quantity changes at a constant rate per unit interval relative to another. | Comprehension | |

**Colorado SS:** Model personal financial situations.

- Analyze the impact of interest rates on a personal financial plan.
- Evaluate the costs and benefits of credit.
- Analyze various lending sources, services, and financial institutions.
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<tr>
<td>Strand: Linear, Quadratic, and Exponential Models</td>
<td>F-LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (table).</td>
<td>I can construct linear functions (arithmetic sequences) given a graph, verbal description and input-output pairs (table).</td>
<td>Application</td>
<td>Arithmetic sequence, Construct Graph, Input-output pair, Linear function, Relationship Table</td>
</tr>
<tr>
<td>Concept: Construct and compare linear, quadratic, and exponential models and solve problems.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strand: Linear, Quadratic, and Exponential Models</td>
<td>F-LE.5 Interpret the parameters in a linear or exponential function in terms of a context.</td>
<td>I can interpret the parameters in a linear function in terms of a context.</td>
<td>Application</td>
<td>Interpret Linear function Parameter</td>
</tr>
<tr>
<td>Concept: Interpret expressions for functions in terms of the situation they model.</td>
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| Strand: Interpret linear models  
Concept: Interpret linear models. | S-ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. | I can interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. | Application | Constant term  
Data  
Intercept  
Interpret  
Linear model  
Rate of change  
Slope |

**Colorado SS:**
## RESOURCES AND NOTES FOR QUARTER 1:

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<td>N-Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. M</td>
<td>I can use units to understand problems and to guide the solution of multi-step problems. I can choose and interpret units consistently in formulas. I can choose and interpret the scale and the origin in graphs and data displays.</td>
<td>Comprehension</td>
<td>Choose Consistency Data display Formula Graph Interpret Multistep problem Origin Scale Solution Understand Unit</td>
</tr>
<tr>
<td>Concept: Reason quantitatively and use units to solve problems.</td>
<td>N-Q.2 Define appropriate quantities for the purpose of descriptive modeling. M</td>
<td>I can define appropriate quantities for the purpose of descriptive modeling.</td>
<td>Comprehension</td>
<td>Define Descriptive Modeling Quantity</td>
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**Colorado SS:** Describe factors affecting take-home pay and calculate the impact.

Design and use a budget, including income (net take-home pay) and expenses (mortgage, car loans, and living expenses) to demonstrate how living within your means is essential for a secure financial future.
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| Strand: Quantities                                   | N-Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. IM | I can choose a level of accuracy appropriate to limitations on measurement when reporting quantities. | Application       | Choose  
| Concept: Reason quantitatively and use units to solve problems. |                                                                                      |                                                                     |                   | Level of accuracy  
|                                                      |                                                                                      |                                                                     |                   | Limitation 
|                                                      |                                                                                      |                                                                     |                   | Measurement  
|                                                      |                                                                                      |                                                                     |                   | Quantity  
|                                                      |                                                                                      |                                                                     |                   | Report  

**Colorado SS:**

| Strand: Interpreting Categorical and Quantitative Data | S-ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots). IM | I can represent data with plots on the real number line (dot plots, histograms, and box plots). | Application | Box plot  
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------------|------------------|
| Concept: Summarize, represent, and interpret data on a single count or measurement variable. |                                                                                               |                                                                                                 |             | Data            
|                                                      |                                                                                               |                                                                                                 |             | Dot plot        
|                                                      |                                                                                               |                                                                                                 |             | Histogram       
|                                                      |                                                                                               |                                                                                                 |             | Plot            
|                                                      |                                                                                               |                                                                                                 |             | Real number Line  
|                                                      |                                                                                               |                                                                                                 |             | Represent        

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| **Strand:** Interpreting Categorical and Quantitative Data  
**Concept:** Summarize, represent, and interpret data on a single count or measurement variable. | S-ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. | I can use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. | Application | Center  
Compare  
Data Distribution  
Data set  
Mean  
Median  
Shape  
Spread  
Standard deviation  
Statistics |
| **Strand:** Interpreting Categorical and Quantitative Data  
**Concept:** Summarize, represent, and interpret data on a single count or measurement variable. | S-ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). | I can interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). | Application | Center  
Data set  
Difference  
Extreme data Point  
Interpret  
Outlier  
Shape |

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</table>
| Strand: Interpreting Categorical and Quantitative Data  
Concept: Summarize, represent, and interpret data on two categorical and quantitative variables. | S-ID.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data. | I can summarize categorical data for two categories in two-way frequency tables.  
I can interpret joint, marginal and conditional relative frequencies in the context of the data.  
I can recognize possible associations and trends in the data. | Comprehension  
Application | Association  
Categorical data  
Conditional Relative data  
Frequency Interpret  
Joint relative frequency  
Marginal Relative frequency  
Recognize  
Relative Frequency  
Summarize  
Trend  
Two-way frequency Table |

**Colorado SS:**
# APPROVED FACILITY SCHOOLS CURRICULUM DOCUMENT

## SUBJECT: Mathematics  
**Grade:** Algebra 1

<table>
<thead>
<tr>
<th>Strand/Concept</th>
<th>Student Expectation</th>
<th>Student Friendly Learning Objective</th>
<th>Level of Thinking</th>
<th>Academic Vocabulary</th>
</tr>
</thead>
</table>
| **Strand:** Interpreting Categorical and Quantitative Data  
**Concept:** Summarize, represent, and interpret data on two categorical and quantitative variables.  
  a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data.  
  Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.  
  b. Informally assess the fit of a function by plotting and analyzing residuals.  
  c. Fit a linear function for a scatter plot that suggests a linear association. | S-ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.  
 a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data.  
 *Use given functions or chooses a function suggested by the context. Emphasize linear, quadratic, and exponential models.*  
 b. Informally assess the fit of a function by plotting and analyzing residuals.  
 c. Fit a linear function for a scatter plot that suggests a linear association. | I can fit a function to the data.  
 I can use functions fitted to data to solve problems in the context of the data.  
 I can informally assess the fit of a function by plotting and analyzing residuals.  
 I can fit a linear function for a scatter plot that suggests a linear association. | Comprehension  
 Application  
 Application  
 Application | Data  
 Describe  
 Relate  
 Represent  
 Scatter plot  
 Variable |

### Colorado SS:

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### APPROVED FACILITY SCHOOLS CURRICULUM DOCUMENT

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**Grade:** Algebra 1

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</table>
| **Strand:** Interpreting Categorical and Quantitative Data | S-ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. I  
   a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. **Use given functions or chooses a function suggested by the context. Emphasize linear, quadratic, and exponential models.**  
   b. Informally assess the fit of a function by plotting and analyzing residuals. I M  
   c. Fit a linear function for a scatter plot that suggests a linear association. I M | I can fit a function to the data.  
I can use functions fitted to data to solve problems in the context of the data.  
I can informally assess the fit of a function by plotting and analyzing residuals. **Use given functions or choose a function suggested by the context. Emphasize linear models.** | Comprehension | Data  
Describe  
Relate  
Represent  
Scatter plot  
Variable |

**Colorado SS:**
### APPROVED FACILITY SCHOOLS CURRICULUM DOCUMENT

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</table>
| Strand: Interpreting Categorical and Quantitative Data  
Concept: Interpret linear models. | S-ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. **IM** | I can interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. | Application | Constant term  
Data  
Intercept  
Interpret  
Linear model  
Rate of change  
Slope |
| Strand: Interpreting Categorical and Quantitative Data  
Concept: Interpret linear models. | S-ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit. **IM** | I can use technology to compute and interpret the correlation coefficient of a linear fit. | Application | Compute  
Correlation Coefficient  
Interpret  
Linear fit |
| Strand: Interpreting Categorical and Quantitative Data  
Concept: Interpret linear models. | S-ID.9 Distinguish between correlation and causation. **IM** | I can distinguish between correlation and causation. | Application | Causation  
Correlation  
Distinguish |

**Colorado SS:**

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## APPROVED FACILITY SCHOOLS CURRICULUM DOCUMENT

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</table>
| **Strand:** Creating Equations  
**Concept:** Create equations that describe numbers or relationships. | A-CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. M | I can create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear functions. | Application | Create  
Equation  
Exponential function  
Inequality  
Solve  
Variable |
| **Colorado SS:** | | | | |
| **Strand:** Creating Equations  
**Concept:** Create equations that describe numbers or relationships. | A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. M | I can represent constraints by equations or inequalities, and by systems of equations and/or inequalities. I can interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. | Application  
Evaluation | Constraint  
Equation  
Inequality  
Interpret  
Modeling Situation  
Represent  
Solution  
System of equations  
System of inequalities |
| **Colorado SS:** | | | | |
**Strand/Concept**

- **Strand:** Reasoning with Equations and Inequalities
- **Concept:** Understand solving equations as a process of reasoning and explain the reasoning.

**Student Expectation**

- A-REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. I M

**Student Friendly Learning Objective**

- I can justify each step in solving an equation using properties of equality.
- I can construct a viable argument to justify the solution to an equation.

**Level of Thinking**

- Comprehension
- Evaluation

**Academic Vocabulary**

- Argument
- Assumption
- Construct
- Equality
- Equation
- Explain
- Justify
- Number
- Simple equation
- Solution
- Solve
- Viable argument

---

**Colorado SS:**

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**Strand:** Reasoning with Equations and Inequalities

**Concept:** Solve equations and inequalities in one variable.

**Student Expectation**

- A-REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. I M

**Student Friendly Learning Objective**

- I can solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

**Level of Thinking**

- Comprehension

**Academic Vocabulary**

- Coefficient
- Equation
- Inequality
- Linear equation
- Solve
- Variable

---

**Colorado SS:**
## Strand: Reasoning with Equations and Inequalities

**Content:** Represent and solve equations and inequalities graphically.

### A-REI.11 Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. IM

**Student Friendly Learning Objective:**
I can explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$. I can find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear.

**Level of Thinking:** Analysis

**Academic Vocabulary:** Approximate, Explain, Graph

---

### Strand: Reasoning with Equations and Inequalities

**Concept:** Represent and solve equations and inequalities graphically.

### A-REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes. IM

**Student Friendly Learning Objective:**
I can graph the solutions to a linear inequality in two variables as a half-plane. I can graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

**Level of Thinking:** Application

**Academic Vocabulary:** Graph
### APPROVED FACILITY SCHOOLS CURRICULUM DOCUMENT

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</table>
| **Strand:** Reasoning with Equations and Inequalities  
**Concept:** Solve systems of equations. | A-REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. | I can prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. | Analysis | Equation  
Multiple  
Produce  
Prove  
Replace |

**Colorado SS:**

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</thead>
</table>
| **Strand:** Reasoning with Equations and Inequalities  
**Concept:** Solve systems of equations. | A-REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. | I can solve systems of linear equations exactly (algebraically) and approximately (graphically), focusing on pairs of linear equations in two variables. | Application | Approximate  
Focus  
Graph  
Linear equation  
Pair  
Solve  
System of linear equations  
Variable |

**Colorado SS:**
# APPROVED FACILITY SCHOOLS CURRICULUM DOCUMENT

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**Grade:** Algebra 1

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**RESOURCES AND NOTES FOR QUARTER 2:**
<table>
<thead>
<tr>
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<th>Academic Vocabulary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strand:</strong> The Real Number System</td>
<td>N-RN. 1 Explain how the definition of the meaning of rational exponents follows from</td>
<td>I can explain how the definition of the meaning of rational exponents follows from extending the</td>
<td>Comprehension</td>
<td>Explain</td>
</tr>
<tr>
<td><strong>Concept:</strong> Extend the properties of</td>
<td>extending the properties of integer exponents to those values, allowing for a</td>
<td>properties of integer exponents to those values, allowing for a notation for radicals in terms of</td>
<td></td>
<td>Integer</td>
</tr>
<tr>
<td>exponents to rational exponents.</td>
<td>notation for radicals in terms of rational exponents. <em>For example, we define</em></td>
<td>rational exponents. <em>For example, we define</em></td>
<td></td>
<td>Property</td>
</tr>
<tr>
<td></td>
<td>$5^{\frac{1}{3}}$ to be the cube root of 5 because we want $(5^{\frac{1}{3}})^3$ to</td>
<td>$5^{\frac{1}{3}}$ to be the cube root of 5 because we want $(5^{\frac{1}{3}})^3$ to hold, so $(5^{\frac{1}{3}})^3$ must equal 5.</td>
<td></td>
<td>Radical</td>
</tr>
<tr>
<td></td>
<td>hold, so $(5^{\frac{1}{3}})^3$ must equal 5.</td>
<td></td>
<td></td>
<td>Value</td>
</tr>
</tbody>
</table>

**Colorado SS:**

| Strand: The Real Number System         | N-RN. 2 Rewrite expressions involving radicals and rational exponents using the    | I can rewrite expressions involving radicals and rational exponents using the properties of exponents. | Comprehension     | Exponent            |
| **Concept:** Extend the properties of | properties of exponents.                                                        |                                                                                                      |                   | Expression          |
| exponents to rational exponents.       |                                                                                     |                                                                                                      |                   | Radical             |

**Colorado SS:**
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<tbody>
<tr>
<td>Strand: Interpreting Functions</td>
<td>F-IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. C</td>
<td>I can graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.</td>
<td>Application</td>
<td>Cube root function</td>
</tr>
<tr>
<td>Concept: Analyze functions using different representations.</td>
<td>b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.</td>
<td>I can graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.</td>
<td>Application</td>
<td>Express</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Function</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Graph</td>
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<td></td>
<td></td>
<td></td>
<td>Piecewise-defined function</td>
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<td>Square root function</td>
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<td>Step function</td>
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<td>Symbolic representation</td>
</tr>
</tbody>
</table>

Colorado SS:
### Strand/Concept
- Seeing Structure in Expressions
- Write expressions in equivalent forms to solve problems.

### Student Expectation
A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. I

c. Use the properties of exponents to transform expressions for exponential functions. For example the expression $1.15^t$ can be rewritten as $(1.15^{1/12})^{12t} = 1.01212t$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%. I M

### Student Friendly Learning Objective
- I can choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
- I can use the properties of exponents to transform expressions for exponential functions. For example the expression $1.15^t$ can be rewritten as $(1.15^{1/12})^{12t} = 1.01212t$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.

### Level of Thinking
- Application
- Application

### Academic Vocabulary
- Choose
- Equivalent
- Explain
- Expression
- Produce
- Property
- Quantity

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<td>F-IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. C</td>
<td>I can graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.</td>
<td>Application</td>
<td>Amplitude</td>
</tr>
<tr>
<td></td>
<td>e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. M</td>
<td>I can graph exponential functions, showing intercepts and end behavior.</td>
<td></td>
<td>End behavior</td>
</tr>
<tr>
<td></td>
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<td>Exponential function</td>
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<td>Express</td>
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<td>Graph</td>
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<td>Intercept</td>
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<td>Logarithmic function</td>
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<td>Period</td>
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<td>Symbolic</td>
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<td>representation</td>
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<td>Trigonometric function</td>
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**Grade:** Algebra 1

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</table>
| **Strand:** Linear, Quadratic, and Exponential Models  
**Concept:** Construct and compare linear, quadratic, and exponential models and solve problems.  
F-LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. M  
 a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. M  
 c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. IM | I can distinguish between situations that can be modeled with linear functions and with exponential functions.  
I can prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.  
I can recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. (exponential functions) | Comprehension | Constant percent rate  
Decay  
Difference  
Distinguish  
Equal  
Exponential function  
Factor  
Growth rate  
Interval  
Linear function  
Model  
Prove  
Quantity  
Recognize  
Unit interval |

**Colorado SS:** Model personal financial situations.  
- Analyze the impact of interest rates on a personal financial plan.  
- Evaluate the costs and benefits of credit.  
- Analyze various lending sources, services, and financial institutions.
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</table>
| **Strand:** Linear, Quadratic, and Exponential Models  
**Concept:** Construct and compare linear, quadratic, and exponential models and solve problems. | F-LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. | I can observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or as a polynomial function. (compare the rate and growth of exponential functions with other polynomial functions.) | Application | Graph  
Increasing function  
Increasing pattern  
Linear  
Observe  
Polynomial function  
Quantity  
Table |
| **Strand:** Linear, Quadratic, and Exponential Models  
**Concept:** Interpret expressions for functions in terms of the situation they model. | F-LE.5 Interpret the parameters in a linear or exponential function in terms of a context. | I can interpret the parameters in an exponential function in terms of a context. | Interpret  
Exponential function  
Linear function  
Parameter |
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**Concept:** Summarize, represent, and interpret data on two categorical and quantitative variables. | S-ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.  
**C** a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. **Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.** | I can represent data on two quantitative variables on a scatter plot, and describe how the variables are related.  
I can fit a function to the data.  
I can use functions fitted to data to solve problems in the context of the data. **Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.** | Comprehension | Data  
Describe  
Exponential model  
Fit  
Function  
Quantitative  
Relate  
Represent  
Scatter plot  
Solve |

**Colorado SS:**
## APPROVED FACILITY SCHOOLS CURRICULUM DOCUMENT

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</table>
| Strand: Seeing Structure in Expressions  
Concept: Interpret the structure of expressions. | A-SSE.1 Interpret expressions that represent a quantity in terms of its context.  
b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret \( P(1 + r)^n \) as the product of \( P \) and a factor not depending on \( P \).* | I can interpret expressions that represent a quantity in terms of its context.  
I can interpret complicated expressions by viewing one or more of their parts as a single entity.  
*For example, interpret \( P(1 + r)^n \) as the product of \( P \) and a factor not depending on \( P \).* | Application | Interpret Part |

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<tbody>
<tr>
<td>Strand: Seeing Structure in Expressions</td>
<td>A-SSE.2 Use the structure of an expression to identify ways to rewrite it. <em>For example, see</em> $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, <em>thus recognizing it as a difference of squares that can be factored as</em> $(x^2 - y^2)(x^2 + y^2)$</td>
<td>I can use the structure of an expression to identify ways to rewrite it. <em>For example, see</em> $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, <em>thus recognizing it as a difference of squares that can be factored as</em> $(x^2 - y^2)(x^2 + y^2)$</td>
<td>Application</td>
<td>Expression Identify Structure</td>
</tr>
<tr>
<td>Concept: Interpret the structure of expressions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strand: Seeing Structure in Expressions</td>
<td>A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. I a. Factor a quadratic expression to reveal the zeros of the function it defines. I M</td>
<td>I can choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. I can factor a quadratic expression to reveal the zeros of the function it defines. I M</td>
<td>Application</td>
<td>Choose Define Equivalent Expression Factor Produce Quadratic expression Quantity Zero of a function</td>
</tr>
<tr>
<td>Concept: Write expressions in equivalent forms to solve problems.</td>
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<tbody>
<tr>
<td><strong>Strand:</strong> Arithmetic with Polynomials and Rational Expressions</td>
<td>A-APR.1 Understand that polynomials form a system analogous to the integers; namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.</td>
<td>I can explain why polynomials are closed under addition, subtraction and multiplication.</td>
<td>Comprehension</td>
<td>Anologous Form Integer Operation Understand</td>
</tr>
<tr>
<td><strong>Concept:</strong> Perform arithmetic operations on polynomials.</td>
<td></td>
<td>I can add, subtract and multiply polynomials.</td>
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<tr>
<td><strong>Colorado SS:</strong></td>
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<tr>
<td><strong>Strand:</strong> Arithmetic with Polynomials and Rational Expressions</td>
<td>A-APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.</td>
<td>I can identify zeros of polynomials when suitable factorizations are available.</td>
<td>Comprehension</td>
<td>Construct Define Factoring Function Graph Identify Polynomial Zero of a polynomial</td>
</tr>
<tr>
<td><strong>Concept:</strong> Understand the relationship between zeros and factors of polynomials.</td>
<td></td>
<td>I can use the zeros to construct a rough graph of the function defined by the polynomial.</td>
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### APPROVED FACILITY SCHOOLS CURRICULUM DOCUMENT

**SUBJECT:** Mathematics  
**Grade:** Algebra 1

<table>
<thead>
<tr>
<th>Strand/Concept</th>
<th>Student Expectation</th>
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**RESOURCES AND NOTES FOR QUARTER 3:**
## Approved Facility Schools Curriculum Document

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**Grade:** Algebra 1

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</thead>
</table>
| Strand: Seeing Structure in Expressions  
Concept: Write expressions in equivalent forms to solve problems. | A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.  
b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. | I can choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.  
I can complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. | Application | Choose  
Equivalent  
Expression  
Produce  
Property  
Quantity |

**Colorado SS:**

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6/16/15
## Strand/Concept: Interpreting Functions

**Concept:** Interpret functions that arise in applications in terms of the context.

### Student Expectation

F-IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. **M**

### Student Friendly Learning Objective

I can interpret key features of graphs and tables (intercepts, maximums, minimums, symmetries, increasing, decreasing, etc).

I can sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

### Level of Thinking

- Comprehension
- Application

### Academic Vocabulary

- Function
- Graph
- Increasing function
- Interpret
- Minimum
- Model
- Quantity
- Relationship
- Sketch
- Table

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**Colorado SS:**
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| **Strand:** Interpreting Functions.  
**Concept:** Analyze functions using different representations. | F-IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. M  
a. Graph linear and quadratic functions and show intercepts, maxima, and minima. M | I can graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. | Application | Amplitude  
Express  
Function  
Graph |
| **Strand:** Interpreting Functions.  
**Concept:** Analyze functions using different representations. | F-IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. IM  
a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. IM | I can write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.  
I can use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. | Application | Complete the square  
Extreme value  
Factor  
Graph  
Interpret  
Quadratic function  
Symmetry  
Zero of a function |

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## APPROVED FACILITY SCHOOLS CURRICULUM DOCUMENT

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</table>
| **Strand:** Interpreting Categorical and Quantitative Data  
**Concept:** Summarize, represent, and interpret data on two categorical and quantitative variables. | S-ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. M  
   a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. M | I can represent data on two quantitative variables on a scatter plot, and describe how the variables are related.  
I can fit a function to the data.  
I can use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. | Comprehension | Data  
Describe  
Relate  
Represent  
Scatter plot  
Variable |

### Colorado SS:

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<tr>
<td>Strand: The Real Number System</td>
<td>N-RN.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational. I M</td>
<td>I can explain why the sum or product of two rational numbers is rational.</td>
<td>Application</td>
<td>Explain Irrational number Non-zero Product Rational number</td>
</tr>
<tr>
<td>Concept: Use properties of rational and irrational numbers.</td>
<td></td>
<td>I can explain why the sum of a rational number and an irrational number is irrational.</td>
<td>Application</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>I can explain why the product of a nonzero rational number and an irrational number is irrational.</td>
<td>Application</td>
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Colorado SS:

| Strand: The Real Number System             | N-RN.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational. I M | I can explain why the sum or product of two rational numbers is rational.                                                                 | Application       | Explain Irrational number Non-zero Product Rational number |
| Concept: Use properties of rational and irrational numbers. |                                                                                      | I can explain why the sum of a rational number and an irrational number is irrational.                                                             | Application       |                                      |
|                                            |                                                                                      | I can explain why the product of a nonzero rational number and an irrational number is irrational.                                                   | Application       |                                      |

Colorado SS:
## Mathematics

### Grade: Algebra 1

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| Reasoning with Equations and Inequalities | A-REI.4 Solve quadratic equations in one variable. I M  
  a. Use the method of completing the square to transform any quadratic equation in \( x \) into an equation of the form \((x - p)^2 = q\) that has the same solutions. Derive the quadratic formula from this form. I M  
  b. Solve quadratic equations by inspection (e.g., for \( x^2 = 49 \)), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as \( a \pm bi \) for real numbers \( a \) and \( b \). I M | Solve quadratic equations in one variable. | Application | Complete the square  
  Complex solution  
  Derive  
  Equation  
  Factoring  
  Form  
  Inspection  
  Quadratic equation  
  Quadratic formula  
  Recognize  
  Solve  
  Transform |
| Concept: Solve equations and inequalities in one variable. | | | |

### Colorado SS:

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**RESOURCES AND NOTES FOR QUARTER 4:**