# Pre-AP Algebra 2 Year-at-a-Glance 2018-2019

| Year-at-a-Glance | | | | | |
|---|---|---|---|---|---|
| 1st 9 weeks | | 2nd 9 weeks | 2nd/3rd 9 weeks | 3rc/4th 9 weeks | 4th 9 weeks |
| **Unit 1 Functions and compositions** | **Unit 2 Quadratic Functions** | **Unit 3 Polynomial Functions** | **Unit 4 Exponential/Logarithms** | **Unit 5 Rational/Radical Functions** | **Unit 6 Statistics & Probability** |
| 7 weeks | 4 weeks | 5 weeks | 6 weeks | 7 weeks | 4 weeks |
| • Probability & Counting Methods<br>• Literal Equations<br>• Systems of Equations<br>• Solving Inequalities<br>• Compound inequalities<br>• Systems of inequalities<br>• Solving Absolute Value Equations<br>• Piecewise Functions<br>• Absolute Value Transformations<br>• Operations on Functions<br>• Composition of Functions<br>• Inverse Functions | • Solving quadratics by graphing<br>• Factoring<br>• Solve Quadratics by Isolating<br>• Solving quadratics by factoring<br>• Writing equations given roots<br>• Complex numbers<br>• Solving by completing the square<br>• Solving by quadratic formula and discriminant<br>• Solve nonlinear systems<br>• Characteristics<br>  ▪ Zeros<br>  ▪ Y-int<br>  ▪ Axis of symmetry<br>  ▪ Domain/Range<br>  ▪ Transformations<br>  ▪ Inverse (with domain restrictions) | • Volume Activity<br>• Polynomial Functions<br>• Limits of Polynomial functions<br>• Even-odd functions<br>• Dividing polynomials (long and synthetic)<br>• Write polynomial functions given roots<br>• Graphing polynomials with and w/o calculator<br>• Attributes of Polynomials<br>• Rational Root Theorem<br>• Fundamental Theorem of Algebra | • Exponent Properties<br>• Exponential rules (including negative exponents, product of powers, quotient of powers, properties of powers, rational exponents, )<br>• Skittles exponential growth/decay<br>• Exponential functions (exp growth and decay)<br>• Solving equations & inequalities<br>• Exponential Growth and investing<br>• Logarithmic functions (graphing)<br>• Solve equations<br>• Logarithmic properties<br>• Application problems for exponential growth and decay. | • Rational functions (characteristics and graphing with and without calculator)<br>• Solving rational equations<br>• Simplifying rational expressions<br>• Multiplying/dividing rational expressions<br>• Adding/subtracting rational expressions<br>• Solve Radical and Root Equations<br>• Relate rational exponents and radical expressions | • Create Scatter plots<br>• Use context to pick the correct model for the data (linear, quadratic, exponential, etc).<br>• Make inferences about a population based on a random sample of information<br>• Interpreting Data, Making Inferences, and Justifying Conclusions<br>• Compare and contrast theoretical and empirical probabilities |

**BLUE - Power Standard**
**BLACK - Additional Skills**
**RED - Closing the Achievement Gap**
**Green - Familiarity Only**

Unit 1

Unit 2

Unit 3

Unit 4

Unit 5

Unit 6

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| Unit 1 | Equations, Inequalities, and Functions | Grade Level | Pre-AP Algebra 2 | Approx length | 5 weeks |
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**CPSD Power Standards with Student Learning Objectives**

**HSS.IC.A.2** Compare *theoretical* and *empirical probabilities* using simulations (e.g. such as flipping a coin, rolling a number cube, spinning a spinner, and technology)

**Student-Friendly Objectives:**

- I can use factorial, permutations, and combinations to find the total number of possibilities
- I can compare and contrast theoretical and empirical probabilities

**HSF.IF.B.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

**Student-Friendly Objectives:**

- I can identify key features of a function using a table or a graph.
- I can sketch a graph showing the key features given a verbal description.

**HSF.BF.B.5 22** Relate the domain of a function to its graph • Relate the domain of a function 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.

**Student-Friendly Objectives:**

- I can identify the domain of any graph.
- I can describe the domain in the context of a problem.
- I can write an expression for the domain using correct mathematical notation.

**HSF.BF.B.3** Identify the effect on the graph of replacing *f(x)* by *f(x) + k*, *kf(x)*, *f(kx)* and *f(x + k)* for specific values of *k* (*k*, a constant); • Find the value of $k$ given the graphs of the transformed functions • Experiment with multiple transformations and illustrate an explanation of the effects on the graph with or without technology

**Student-Friendly Objectives:**

- I can describe the effects (value of *k*) on the parent function given the transformed graph.
- I can describe the effects (value of *k*) on the parent function given the transformed function

**HSF.BF.B.4 22** Find inverse functions. Solve an equation of the form y = f(x) for a simple function f that has an inverse and write an expression for the inverse • Verify by composition that one function is the inverse of another (Algebra II) • Read values of an inverse function from a graph or a table, given that the function has an inverse (Algebra II) • Produce an invertible function from a non-invertible function by restricting the domain

**Student-Friendly Objectives:**

- I can find the inverse of a function given an equation, graph, or a table of function values.
- I can use composition to verify two functions are inverses of each other.
- I can restrict the domain of a function that is not "one-to-one" so the inverse is a function.

**HSA.CED.A.4** Rearrange literal equations using the properties of equality

**Student-Friendly Objectives:**

- I can use the properties of equality to rearrange a literal equation fluently

**Learning Indicators of Power Standards**

Students will know…

- Key features of the graph of a function
- Key features using a table of a function
- Know that domain is based on "all possible" *x*-values in a graph
- Various set notations to represent domain values
- Parent functions
  - Constant
  - Linear
  - Absolute value
  - Quadratic
  - Greatest integer (with technology only)
- *f(x) = a[b(x-h)] + k*
- *f(x) + k* is a vertical shift
- *f(x+k)* is a horizontal shift
- *kf(x)* is a vertical stretch or compression and/or a reflection about the

And be able to…

- When appropriate,identify:
  - Intercepts
  - domain/range
  - even or odd
  - Increasing or decreasing intervals
  - Relative maximum and minimum
  - End behavior
  - Symmetry
  - Periodicity
- Sketch a graph showing the key features given a verbal description.
- Identify domain of any graph.
- Describe the domain in the context of a problem.
- Write an expression for the domain using correct mathematical notation.

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| y-axis<br>● *f(kx)* is a horizontal stretch or compression and/or a reflection about the x-axis<br>● Relationship between a function and its inverse<br>● Definition of a one-to-one function<br>● Properties of equality | ● Describe the effects (value of *k*) on the parent function given<br>○ The transformed graph<br>○ The transformed function<br>● Find the inverse function of a given function.<br>● Use composition to verify two functions are inverses.<br>● Find the inverse of a function given a table of values or a graph.<br>● Restrict the domain of a function that is not “one-to-one” so the inverse is a function.<br>● Use to the properties of equality to rearrange a literal equation fluently. |
| **Additional Arkansas State Standards** | |
| None | |

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| Unit 2 | Quadratics | Grade Level | Pre-AP Algebra 2 | Approx Length | 11 weeks |
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**CPSD Power Standards with Student Learning Objectives**

**HSA.SSE.A.2** Use the structure of an expression to identify ways to rewrite it. For example: See that $(x + 3)(x + 3)$ is the same as $(x + 3)^2$ or $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$ , thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.

**Student-Friendly Objectives:**

- I can rewrite an expression using difference of squares.
- I can recognize and use patterns to rewrite expressions.

**HSA.SSE.B.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression • Factor a quadratic expression to reveal the zeros of the function it defines • Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. Note: Students should be able to identify and use various forms of a quadratic expression to solve problems including standard, factored, and vertex forms. • Use the properties of exponents to transform expressions for exponential functions.

**Student-Friendly Objectives:**

- I can select a more useful form of an expression to use in a problem.
- I can rewrite an expression into a more useful form.

**HSA.REI.B.4** Solve quadratic equations (as appropriate to the initial form of the equation) by: • Inspection of a graph • Taking square roots • Completing the square • Using the quadratic formula • Factoring • Recognize complex solutions and write them as a + bi for real numbers a and b

**Student-Friendly Objectives:**

- I can choose an appropriate method for solving a quadratic equation based on the initial form of the equation.
- I can solve a quadratic equation by inspecting a graph.
- I can solve a quadratic equation by taking the square root, completing the square, factoring, or using the Quadratic Formula.
- I can explain why a quadratic equation will have complex solutions.

**HSF.IF.B.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

**Student-Friendly Objectives:**

- I can identify key features of a function using a table or a graph.
- I can sketch a graph showing the key features given a verbal description.

**HSF.BF.B.3** Identify the effect on the graph of replacing *f(x)* by *f(x)* + *k*, *kf(x)*, *f(kx)* and *f(x + k)* for specific values of *k* (*k*, a constant); • Find the value of *k* given the graphs of the transformed functions • Experiment with multiple transformations and illustrate an explanation of the effects on the graph with or without technology

**Student-Friendly Objectives:**

- I can describe the effects (value of *k*) on the parent function given the transformed graph.
- I can describe the effects (value of *k*) on the parent function given the transformed function

**HSF.BF.B.4** Find inverse functions. Solve an equation of the form y = f(x) for a simple function f that has an inverse and write an expression for the inverse • Verify by composition that one function is the inverse of another (Algebra II) • Read values of an inverse function from a graph or a table, given that the function has an inverse (Algebra II) • Produce an invertible function from a non-invertible function by restricting the domain

**Student-Friendly Objectives:**

- I can find the inverse of a function given an equation, graph, or a table of function values.
- I can use composition to verify two functions are inverses of each other.
- I can restrict the domain of a function that is not “one-to-one” so the inverse is a function.

**HSF.BF.B.5** Relate the domain of a function to its graph • Relate the domain of a function 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.

**Student-Friendly Objectives:**

- I can identify the domain of any graph.
- I can describe the domain in the context of a problem.
- I can write an expression for the domain using correct mathematical notation.

**Learning Indicators of Power Standards**

| Students will know… | And be able to… |
|---|---|
| • Special factoring formulas<br>  ○ Difference of squares | • Recognize and use patterns.<br>• Recognize and rewrite embedded differences of squares. |
| • Key features of the graph of a function | • When appropriate,identify: |

- Key features using a table of a function
- The definition of a complex number
- Zeros are the x-intercepts of a function
- The quadratic formula
    - Discriminant
- Parent functions
    - Constant
    - Linear
    - Absolute value
    - Quadratic
    - Greatest integer (with technology only)
- $f(x) = a[b(x-h)] + k$
- $f(x) + k$ is a vertical shift
- $f(x+k)$ is a horizontal shift
- $kf(x)$ is a vertical stretch or compression and/or a reflection about the y-axis
- $f(kx)$ is a horizontal stretch or compression and/or a reflection about the x-axis
- Relationship between a function and its inverse
- Definition of a one-to-one function
- Know that domain is based on "all possible" $x$-values in a graph
- Various set notations to represent domain values
- Forms of linear functions
    - Standard Form
    - Slope-intercept Form
- Forms of quadratic expressions
    - Standard Form
    - Factored Form
    - Vertex Form
- Forms of exponential functions
    - Standard Form
    - Interest
    - Exponential growth/decay
    - Intercepts
    - domain/range
    - even or odd
    - Increasing or decreasing intervals
    - Relative maximum and minimum
    - End behavior
    - Symmetry
    - Periodicity
- Sketch a graph showing the key features given a verbal description.
- Determine an appropriate method for solving a given quadratic equation.
- Find solutions from a graphed quadratic equation.
- Find solutions by completing the square.
- Find solutions using the quadratic formula.
- Find solutions by taking the square root.
- Explain why a quadratic equation will have complex solutions.
- Describe the effects (value of $k$) on the parent function given
    - The transformed graph
    - The transformed function
- Find the inverse function of a given function.
- Use composition to verify two functions are inverses.
- Find the inverse of a function given a table of values or a graph.
- Restrict the domain of a function that is not "one-to-one" so the inverse is a function.
- Identify domain of any graph.
- Describe the domain in the context of a problem.
- Write an expression for the domain using correct mathematical notation.
- Select and rewrite expressions into more useful forms.

**Additional Arkansas State Standards**

None

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| Unit 3 | Polynomials | Grade Level | Pre-AP Algebra 2 | Approx Length | 7 weeks |
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**CPSD Power Standards with Student Learning Objectives**

**HSA.APR.B.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.

**Student-Friendly Objectives:**

- I can determine the zeros of a polynomial in factored form.
- I can determine the characteristics of the polynomials (intercepts, end behavior, effect of leading coefficient, effect of the multiplicity of factors)
- I can use the characteristics of a polynomial to sketch a rough graph.
- I can use long division to find the zero(s) of a function.
- I can use synthetic division to find the zero(s) of a function.
- I can find all 3 complex roots of a 3rd degree polynomial given one rational root. (Use synthetic division and quadratic knowledge)

**HSF.IF.B.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

**Student-Friendly Objectives:**

- I can identify key features of a function using a table or a graph.
- I can sketch a graph showing the key features given a verbal description.

**HSF.BF.B.5** Relate the domain of a function to its graph • Relate the domain of a function 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.

**Student-Friendly Objectives:**

- I can identify the domain of any graph.
- I can describe the domain in the context of a problem.
- I can write an expression for the domain using correct mathematical notation.

**Learning Indicators of Power Standards**

| Students will know… | And be able to… |
|---|---|

| | |
|---|---|
| • A polynomial with factor ($x$ - $a$) has a real zero at $a$<br>• Characteristics of polynomials<br>  ○ intercepts<br>  ○ end behavior<br>  ○ odd/even/neither<br>  ○ degree<br>  ○ effect of leading coefficient<br>  ○ effect of the multiplicity of factors<br>• Key features of the graph of a function<br>• Key features using a table of a function<br>• Know that domain is based on "all possible" $x$-values in a graph<br>• Various set notations to represent domain values | • Find the zeros of a polynomial given its factored form.<br>• Determine the characteristics of the polynomials.<br>• Use the characteristics of the polynomial to construct a rough graph.<br>• Given a zero, use long division to find remaining factor(s) or zero(s).<br>• Given a zero, use synthetic division to find remaining factor(s) or zero(s).<br>• When appropriate,identify:<br>  ○ Intercepts<br>  ○ domain/range<br>  ○ even or odd<br>  ○ Increasing or decreasing intervals<br>  ○ Relative maximum and minimum<br>  ○ End behavior<br>  ○ Symmetry<br>  ○ Periodicity<br>  ○ etc.<br>• Sketch a graph showing the key features given a verbal description.<br>• Identify domain of any graph.<br>• Describe the domain in the context of a problem.<br>• Write an expression for the domain using correct mathematical notation. |
| **Additional Arkansas State Standards** | |
| None | |

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| Unit 4 | Exponential and Logarithmic Functions | Grade Level | Pre-AP Algebra 2 | Approx Length | 3 weeks |
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**CPSD Power Standards with Student Learning Objectives**

**HSN.RN.A.2** Rewrite expressions involving radicals and rational exponents using the properties of exponents

**Student-Friendly Objectives:**

- I can rewrite expressions using rational exponents and radicals.
- I can evaluate and/or simplify expressions by using properties of exponents.

**HSA.SSE.B.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression • Factor a quadratic expression to reveal the zeros of the function it defines • Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. Note: Students should be able to identify and use various forms of a quadratic expression to solve problems including standard, factored, and vertex forms. • Use the properties of exponents to transform expressions for exponential functions.

**Student-Friendly Objectives:**

- I can select a more useful form of an expression to use in a problem.
- I can rewrite an expression into a more useful form.

**HSF.IF.B.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

**Student-Friendly Objectives:**

- I can identify key features of a function using a table or a graph.
- I can sketch a graph showing the key features given a verbal description.

**HSF.BF.B.3** Identify the effect on the graph of replacing *f(x)* by *f(x)* + *k*, *kf(x)*, *f(kx)* and *f(x + k)* for specific values of *k* (*k*, a constant); • Find the value of $k$ given the graphs of the transformed functions • Experiment with multiple transformations and illustrate an explanation of the effects on the graph with or without technology

**Student-Friendly Objectives:**

- I can describe the effects (value of *k*) on the parent function given the transformed graph.
- I can describe the effects (value of *k*) on the parent function given the transformed function.

**HSF.BF.B.4 22** Find inverse functions. Solve an equation of the form y = f(x) for a simple function f that has an inverse and write an expression for the inverse • Verify by composition that one function is the inverse of another (Algebra II) • Read values of an inverse function from a graph or a table, given that the function has an inverse (Algebra II) • Produce an invertible function from a non-invertible function by restricting the domain

**Student-Friendly Objectives:**

- I can find the inverse of a function given an equation, graph, or a table of function values.
- I can use composition to verify two functions are inverses of each other.
- I can restrict the domain of a function that is not "one-to-one" so the inverse is a function

**HSF.BF.B.5** Relate the domain of a function to its graph • Relate the domain of a function 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.

**Student-Friendly Objectives:**

- I can identify the domain of any graph.
- I can describe the domain in the context of a problem.
- I can write an expression for the domain using correct mathematical notation.

**Learning Indicators of Power Standards**

Students will know…

- The relationship between expressions with rational exponents and radical expressions
- A rational exponent is a power over a root (index)
- Forms of linear functions
  - Standard Form
  - Slope-intercept Form
- Forms of quadratic expressions
  - Standard Form
  - Factored Form
  - Vertex Form
- Forms of exponential functions
  - Standard Form
  - Interest
  - Exponential growth/decay
- Key features of the graph of a function
- Key features using a table of a function

And be able to…

- Evaluate and/or simplify expressions with exponents.
- Convert from rational exponent form to radicals with powers in order to evaluate and simplify expressions and vice versa.
- Select and rewrite expressions into more useful forms.
- When appropriate,identify:
  - Intercepts
  - domain/range
  - even or odd
  - Increasing or decreasing intervals
  - Relative maximum and minimum
  - End behavior
  - Symmetry
  - Periodicity
- Sketch a graph showing the key features given a verbal description.
- Describe the effects (value of *k*) on the parent function given
  - The transformed graph

| | |
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| ● Parent functions<br>○ Constant<br>○ Linear<br>○ Absolute value<br>○ Quadratic<br>○ Greatest integer (with technology only)<br>● *f(x) = a[b(x-h)] + k*<br>● *f(x) + k* is a vertical shift<br>● *f(x+k)* is a horizontal shift<br>● *kf(x)* is a vertical stretch or compression and/or a reflection about the y-axis<br>● *f(kx)* is a horizontal stretch or compression and/or a reflection about the x-axis<br>● Relationship between a function and its inverse<br>● Definition of a one-to-one function<br>● Know that domain is based on "all possible" *x*-values in a graph<br>● Various set notations to represent domain values | ○ The transformed function<br>● Find the inverse function of a given function.<br>● Use composition to verify two functions are inverses.<br>● Find the inverse of a function given a table of values or a graph.<br>● Restrict the domain of a function that is not "one-to-one" so the inverse is a function.<br>● Identify domain of any graph.<br>● Describe the domain in the context of a problem.<br>● Write an expression for the domain using correct mathematical notation. |
| **Additional Arkansas State Standards** | |
| None | |

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| Unit 5 | Rational and Radical Functions | Grade Level | Pre-AP Algebra 2 | Approx Length | 3 weeks |
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**CPSD Power Standards with Student Learning Objectives**

**HSN.RN.A.2** Rewrite expressions involving radicals and rational exponents using the properties of exponents

**Student-Friendly Objectives:**

- I can rewrite expressions using rational exponents and radicals.
- I can evaluate and/or simplify expressions by using properties of exponents.

**HSA.SSE.B.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression • Factor a quadratic expression to reveal the zeros of the function it defines • Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. Note: Students should be able to identify and use various forms of a quadratic expression to solve problems including standard, factored, and vertex forms. • Use the properties of exponents to transform expressions for exponential functions.

**Student-Friendly Objectives:**

- I can select a more useful form of an expression to use in a problem.
- I can rewrite an expression into a more useful form.

**HSF.IF.B.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

**Student-Friendly Objectives:**

- I can identify key features of a function using a table or a graph.
- I can sketch a graph showing the key features given a verbal description.

**HSF.BF.B.3** Identify the effect on the graph of replacing *f(x)* by *f(x)* + *k*, *kf(x)*, *f(kx)* and *f(x + k)* for specific values of *k* (*k*, a constant); • Find the value of $k$ given the graphs of the transformed functions • Experiment with multiple transformations and illustrate an explanation of the effects on the graph with or without technology

**Student-Friendly Objectives:**

- I can describe the effects (value of *k*) on the parent function given the transformed graph.
- I can describe the effects (value of *k*) on the parent function given the transformed function.

**HSF.BF.B.4** Find inverse functions. Solve an equation of the form y = f(x) for a simple function f that has an inverse and write an expression for the inverse • Verify by composition that one function is the inverse of another (Algebra II) • Read values of an inverse function from a graph or a table, given that the function has an inverse (Algebra II) • Produce an invertible function from a non-invertible function by restricting the domain

**Student-Friendly Objectives:**

- I can find the inverse of a function given an equation, graph, or a table of function values.
- I can use composition to verify two functions are inverses of each other.
- I can restrict the domain of a function that is not "one-to-one" so the inverse is a function

**HSF.BF.B.5** Relate the domain of a function to its graph • Relate the domain of a function 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.

**Student-Friendly Objectives:**

- I can identify the domain of any graph.
- I can describe the domain in the context of a problem.
- I can write an expression for the domain using correct mathematical notation.

**Learning Indicators of Power Standards**

Students will know…

- The relationship between expressions with rational exponents and radical expressions
- A rational exponent is a power over a root (index)
- Forms of linear functions
  - Standard Form
  - Slope-intercept Form
- Forms of quadratic expressions
  - Standard Form
  - Factored Form
  - Vertex Form
- Forms of exponential functions
  - Standard Form
  - Interest
  - Exponential growth/decay
- Key features of the graph of a function

And be able to…

- Evaluate and/or simplify expressions with exponents.
- Convert from rational exponent form to radicals with powers in order to evaluate and simplify expressions and vice versa.
- Select and rewrite expressions into more useful forms.
- When appropriate,identify:
  - Intercepts
  - domain/range
  - even or odd
  - Increasing or decreasing intervals
  - Relative maximum and minimum
  - End behavior
  - Symmetry
  - Periodicity
- Sketch a graph showing the key features given a verbal description.

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| ● Key features using a table of a function<br>● Parent functions<br>  ○ Constant<br>  ○ Linear<br>  ○ Absolute value<br>  ○ Quadratic<br>  ○ Greatest integer (with technology only)<br>● *f(x) = a[b(x-h)] + k*<br>● *f(x) + k* is a vertical shift<br>● *f(x+k)* is a horizontal shift<br>● *kf(x)* is a vertical stretch or compression and/or a reflection about the y-axis<br>● *f(kx)* is a horizontal stretch or compression and/or a reflection about the x-axis<br>● Relationship between a function and its inverse<br>● Definition of a one-to-one function<br>● Know that domain is based on "all possible" *x*-values in a graph<br>● Various set notations to represent domain values | ● Describe the effects (value of *k*) on the parent function given<br>  ○ The transformed graph<br>  ○ The transformed function<br>● Find the inverse function of a given function.<br>● Use composition to verify two functions are inverses.<br>● Find the inverse of a function given a table of values or a graph.<br>● Restrict the domain of a function that is not "one-to-one" so the inverse is a function.<br>● Identify domain of any graph.<br>● Describe the domain in the context of a problem.<br>● Write an expression for the domain using correct mathematical notation. |
| **Additional Arkansas State Standards** | |
| None | |

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| Unit 6 | Interpreting Data, Making Inferences, and Justifying Conclusions | Grade Level | Pre-AP Algebra 2 | Approx Length | 3 weeks |
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**CPSD Power Standards with Student Learning Objectives**

**HSF.IF.B.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

**Student-Friendly Objectives:**

- I can identify key features of a function using a table or a graph.
- I can sketch a graph showing the key features given a verbal description.

**HSF.BF.B.5** Relate the domain of a function to its graph • Relate the domain of a function 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.

**Student-Friendly Objectives:**

- I can identify the domain of any graph.
- I can describe the domain in the context of a problem.
- I can write an expression for the domain using correct mathematical notation.

**Learning Indicators of Power Standards**

| Students will know… | And be able to… |
|---|---|
| • Forms of linear functions<br>• Forms of power functions<br>• Forms of exponential functions<br>• Key features of the graph of a function<br>• Key features using a table of a function<br>• Domain is restricted based on the real-world situation<br>• Various set notations to represent domain values<br>• Data can be represented graphically in a scatter plot | • Select and rewrite expressions into more useful forms<br>• Sketch a graph showing the key features given a verbal description<br>• Identify domain in the context of a problem<br>• Describe the domain in the context of a problem<br>• Write an expression for the domain using correct mathematical notation |

**Additional Arkansas State Standards**

- HSS.ID.B.6 Represent data on two *quantitative variables* on a scatter plot, and describe how the variables are related. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Note: Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.
- HSS.IC.A.1 Recognize statistics as a process for making inferences about population parameters based on a random sample from that population.
- HSS.IC.B.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies Explain how randomization relates to sample surveys, experiments, and observational studies