

**Unit/Bundle 1: Functions (5-6 weeks/2-3 weeks block)**

<b>KY.HS.F.1c Understand properties and key features of functions and the different ways functions can be represented. 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.</b>	<b>Priority Standard</b>
<b>KY.HS.F.4b Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). ★ Graph square root, cube root and absolute value functions.</b>	<b>Priority Standard</b>
<b>KY.HS.F.8a Understand the effects of transformations on the graph of a function. a). Identify the effect on the graph of replacing <math>f(x)</math> by <math>f(x) + k</math>, <math>k f(x)</math>, <math>f(kx)</math> and <math>f(x + k)</math> for specific values of <math>k</math> (both positive and negative); find the value of <math>k</math> given the graphs.</b>	<b>Priority Standard</b>
KY.HS.N.5 Define appropriate units in context for the purpose of descriptive modeling. ★	Supporting Standard
KY.HS.N.6 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. ★	Supporting Standard
KY.HS.A.1b interpret expressions that represent a quantity in terms of its context. ★ Interpret complicated expressions, given a context, by viewing one or more of their parts as a single entity.	Supporting Standard
KY.HS.A.2 Use the structure of an expression to identify ways to rewrite it and consistently look for opportunities to rewrite expressions in equivalent forms.	Supporting Standard
KY.HS.A.12 Create equations and inequalities in one variable and use them to solve problems.	Supporting Standard
KY.HS.A.15 Rearrange formulas to solve a literal equation, highlighting a quantity of interest, using the same reasoning as in solving equations.	Supporting Standard
KY.HS.F.1 Understand properties and key features of functions and the different ways functions can be represented. d). Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. e). Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	Supporting Standard
KY.HS.F.6 b Write a function that describes a relationship between two quantities. ★ Combine standard function types using arithmetic operations.	Supporting Standard
KY.HS.F.8 b Understand the effects of transformations on the graph of a function. Experiment with cases and illustrate an explanation of the effects on the graph using technology.	Supporting Standard

KY.HS.F.9a Find inverse functions. a). Given the equation of an invertible function, find the inverse.	Supporting Standard
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## Benchmark #1 (Unit 1) Traditional Schedule

### Unit/Bundle 2: Polynomials (9-10 weeks/4-6 weeks block)

KY.HS.A.7 Identify roots of polynomials when suitable factorizations are available. Know these roots become the zeros (x-intercepts) for the corresponding polynomial function.	Priority Standard
KY.HS.A.19a Solve quadratic equations in one variable. a. Solve quadratic equations by taking square roots, 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 $b$ .	Priority Standard
KY.HS.F.1c Understand properties and key features of functions and the different ways functions can be represented. 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.	Priority Standard
KY.HS.N.5 Define appropriate units in context for the purpose of descriptive modeling. ★	Supporting Standard
KY.HS.N.6 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. ★	Supporting Standard
KY.HS.N.7 Understanding properties of complex numbers. a). Know there is a complex number $i$ such that $i^2 = -1$ and every complex number has the form $a + bi$ with $a$ and $b$ real. b.) Use the relation $i^2 = -1$ and the commutative, associative and distributive properties to add, subtract and multiply complex numbers.	Supporting Standard
KY.HS.N.9 Solve quadratic equations with real coefficients that have complex solutions.	Supporting Standard
KY.HS.A.1b interpret expressions that represent a quantity in terms of its context. ★ Interpret complicated expressions, given a context, by viewing one or more of their parts as a single entity.	Supporting Standard
KY.HS.A.2 Use the structure of an expression to identify ways to rewrite it and consistently look for opportunities to rewrite expressions in equivalent forms.	Supporting Standard
KY.HS.A.3a Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the	Supporting Standard

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expression. ★ a. Write the standard form of a given polynomial and identify the terms, coefficients, degree, leading coefficient and constant term	Standard
KY.HS.A.12 Create equations and inequalities in one variable and use them to solve problems.	Supporting Standard
KY.HS.A.13 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Supporting Standard
KY.HS.A.15 Rearrange formulas to solve a literal equation, highlighting a quantity of interest, using the same reasoning as in solving equations	Supporting Standard
KY.HS.F.1 Understand properties and key features of functions and the different ways functions can be represented. d). Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. e). Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	Supporting Standard
KY.HS.F.4 c Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator) . ★ Graph polynomial functions, identifying zeros when suitable factorizations are available and showing end behavior	Supporting Standard
KY.HS.F.6 b Write a function that describes a relationship between two quantities. ★ Combine standard function types using arithmetic operations.	Supporting Standard
KY.HS.F.8 a Understand the effects of transformations on the graph of a function. a). Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$ , $k f(x)$ , $f(kx)$ and $f(x + k)$ for specific values of $k$ (both positive and negative); find the value of $k$ given the graphs. b). Experiment with cases and illustrate an explanation of the effects on the graph using technology.	Supporting Standard
KY.HS.F.9a Find inverse functions. a. Given the equation of an invertible function, find the inverse.	Supporting Standard

**Unit/Bundle 3: Matrices & Systems (4-5 weeks/2 weeks block)**

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<b>KY.HS.A.21 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.</b>	<b>Priority Standard</b>
KY.HS.A.13 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Supporting Standard
KY.HS.A.14 Create a system of equations or inequalities to represent constraints within a modeling context. Interpret the solution(s) to the corresponding system as viable or nonviable options within the context.	Supporting Standard
KY.HS.A.24 Justify that the solutions of the equations $f(x) = g(x)$ are the x-coordinates of the points where the graphs of $y = f(x)$ and $y = g(x)$ intersect. Find the approximate solutions graphically, using technology or tables. ★	Supporting Standard
KY.HS.N.14 Use matrices to represent and manipulate data.	Supporting Standard
KY.HS.N.15 Perform operations with matrices. a). Add, subtract and multiply matrices of appropriate dimensions. b). Multiply matrices by scalars to produce new matrices.	Supporting Standard
KY.HS.N.5 Define appropriate units in context for the purpose of descriptive modeling. ★	Supporting Standard
KY.HS.N.6 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. ★	Supporting Standard

**Benchmark #1 (Units 1 - 3) Block Schedule**

**Unit/Bundle 4: Radicals & Rationals (4-5 weeks/3 weeks block)**



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<p><b>KY.HS.A.17b Solve and justify equations in one variable. Justify the solutions and give examples showing how extraneous solutions may arise.</b>  <b>b). Solve radical equations in one variable.</b></p>	<p><b>Priority Standard</b></p>
<p><b>KY.HS.F.1d Understand properties and key features of functions and the different ways functions can be represented. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.</b></p>	<p><b>Priority Standard</b></p>
<p>KY.HS.A.17a Solve and justify equations in one variable. Justify the solutions and give examples showing how extraneous solutions may arise.  a). Solve rational equations written as proportions in one variable.</p>	<p>Supporting Standard</p>
<p>KY.HS.F.1c Understand properties and key features of functions and the different ways functions can be represented.  c).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.  e) .Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).</p>	<p>Supporting Standard</p>
<p>KY.HS.F.4b Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator) . ★ Graph square root, cube root and absolute value functions.</p>	<p>Supporting Standard</p>
<p>KY.HS.F.8 Understand the effects of transformations on the graph of a function.  a). Identify the effect on the graph of replacing <math>f(x)</math> by <math>f(x) + k</math>, <math>k f(x)</math>, <math>f(kx)</math> and <math>f(x + k)</math> for specific values of <math>k</math> (both positive and negative); find the value of <math>k</math> given the graphs.  b). Experiment with cases and illustrate an explanation of the effects on the graph using technology.</p>	<p>Supporting Standard</p>
<p>KY.HS.F.9a Find inverse functions.  a). Given the equation of an invertible function, find the inverse.</p>	<p>Supporting Standard</p>

**Benchmark #2 (Units 1 - 4) Traditional Schedule**

**Unit/Bundle 5: Exponentials & Logarithms (3-4 weeks/2 weeks block)**

<p><b>KY.HS.F.4 d Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). ★ Graph exponential and logarithmic functions, showing intercepts and end behavior.</b></p>	<p><b>Priority Standard</b></p>
<p><b>KY.HS.F.10 Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents with the use of technology.</b></p>	<p><b>Priority Standard</b></p>
<p>KY.HS.N.5 Define appropriate units in context for the purpose of descriptive modeling. ★</p>	<p>Supporting Standard</p>
<p>KY.HS.N.6 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. ★</p>	<p>Supporting Standard</p>
<p>KY.HS.A.1b interpret expressions that represent a quantity in terms of its context. ★ Interpret complicated expressions, given a context, by viewing one or more of their parts as a single entity.</p>	<p>Supporting Standard</p>
<p>KY.HS.A.2 Use the structure of an expression to identify ways to rewrite it and consistently look for opportunities to rewrite expressions in equivalent forms.</p>	<p>Supporting Standard</p>
<p>KY.HS.A.12 Create equations and inequalities in one variable and use them to solve problems.</p>	<p>Supporting Standard</p>
<p>KY.HS.A.15 Rearrange formulas to solve a literal equation, highlighting a quantity of interest, using the same reasoning as in solving equations.</p>	<p>Supporting Standard</p>
<p>KY.HS.F.1 Understand properties and key features of functions and the different ways functions can be represented.  c). 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.  d). Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.  e). Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).</p>	<p>Supporting Standard</p>
<p>KY.HS.F.3 Understand average rate of change of a function over an interval. a). Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. b). Estimate the rate of change from a graph. ★</p>	<p>Supporting Standard</p>
<p>KY.HS.F.8 a Understand the effects of transformations on the graph of a function. a. Identify the effect on the graph of replacing <math>f(x)</math> by <math>f(x) + k</math>, <math>k f(x)</math>, <math>f(kx)</math> and <math>f(x + k)</math> for specific values of <math>k</math> (both positive and negative); find the value of <math>k</math> given the graphs. b). Experiment with cases and illustrate an explanation of the effects on the graph using technology.</p>	<p>Supporting Standard</p>

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KY.HS.F.9a Find inverse functions. a). Given the equation of an invertible function, find the inverse.	Supporting Standard
KY.HS.F.13 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	Supporting Standard

**Unit/Bundle 6: Statistics (5-6 weeks/2-3 weeks block)**

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<b>KY.HS.SP.15 a Understand the concept of independence. a. Understand that two events A and B are independent if the probability of A and B occurring together is the product of their individual probabilities, <math>P(A) \times P(B)</math></b>	<b>Priority Standard</b>
<b>KY.HS.SP.19 b Use permutations and combinations to compute probabilities. Perform calculations using the appropriate counting technique, including simple probabilities.</b>	<b>Priority Standard</b>
KY.HS.SP.1 Represent the distribution of data with plots on the real number line (stem plots, dot plots, histograms and box plots).	Supporting Standard
KY.HS.SP.2 Use statistics appropriate to the shape of the numerical data distribution to compare center (median, mean) and spread (interquartile range when comparing medians and standard deviation when comparing means) of different data distributions.	Supporting Standard
KY.HS.SP.3 Interpret differences in shape, center and spread in the context of the distributions of the numerical data, accounting for the presence and possible effects of extreme data points (outliers).	Supporting Standard
KY.HS.SP.5 Summarize categorical data for two or more categories in frequency tables. Calculate and interpret joint, marginal and conditional relative frequencies (probabilities) in the context of the data, recognizing possible associations and trends in the data.	Supporting Standard
KY.HS.SP.9 Understand statistics as a process for making inferences and justifying conclusions about population parameters based on a random sample from that population.	Supporting Standard
KY.HS.SP.10 Decide if a specified model is consistent with the results from a simulation.	Supporting Standard
KY.HS.SP.11 Recognize the purposes of and differences among sample surveys, experiments and observational studies; explain how randomization relates to each.	Supporting Standard
KY.HS.SP.12 Use data from a sample survey to estimate a population mean or proportion and explain how bias may be involved in the process.	Supporting Standard
KY.HS.SP.13 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between estimates or statistics are significant.	Supporting Standard
KY.HS.SP.14 Describe events as subsets of a sample space. Use characteristics (or categories) of the outcomes, such as, • as unions, "A or B," that are mutually exclusive events and • as unions, "A or B," that are non-mutually exclusive events and • as intersections, "A and B," and • as complements of other events, "not A." to calculate basic probabilities.	Supporting Standard
KY.HS.SP.15 c Understand the concept of independence. Recognize and explain the concept of independence in everyday language and everyday situations.	Supporting Standard
KY.HS.SP.16 a Understand the concept of conditional probability.	Supporting Standard



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<p>a). Understand the conditional probability of A given B as <math>P(A \text{ and } B)/P(B)</math>.  c). Recognize and explain the concept of conditional probability in everyday language and everyday situations.  d). Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A and interpret the answer in terms of the model.</p>	<p>Standard</p>
<p>KY.HS.SP.19a Use permutations and combinations to compute probabilities. a. Distinguish between situations that can be modeled using counting techniques, including Fundamental Counting Principle, permutations and combinations.</p>	<p>Supporting Standard</p>
<p>KY.HS.N.5 Define appropriate units in context for the purpose of descriptive modeling. ★</p>	<p>Supporting Standard</p>
<p>KY.HS.N.6 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. ★</p>	<p>Supporting Standard</p>