Federal Way Public Schools

Standards-Based Education
Priority Standards

IB Algebra 2X

PS 1 Define and identify types of real numbers and algebraic properties.

PS 2 Perform operations with real numbers.

PS 3 Apply properties of exponents to evaluating expressions.

PS 4 Convert real numbers to scientific notation.

PS 5 Solve one variable equation.

PS 6 Solve equations with inequalities.

PS 7 Solve absolute value equations.

PS 8 Use algebra to solve contextual problems.

PS 9 Graph linear functions.

PS 10 Evaluate whether an algebraic relation is a function; and if so, if it is linear.

PS 11 Determine the equation of lines given varied parameters.

PS 12 Determine the domain and range of functions and evaluate functions for specific domain values.

PS 13 Solve systems of equations in two variables including systems with infinitely many and no solutions.

PS 14 Solve systems of equations in three variables including systems with infinitely many and no solutions.

PS 15 Solve systems of inequalities in two variables.

PS 16 Solve systems using determinants and Cramer's rule.

PS 17 Factor monomials from a polynomial.

PS 18 Factor trinomials.

PS 19 Simplify rational polynomials.

PS 20 Solve equations and contextual problems involving rational expressions and variation.

PS 21 Convert between exponential and logarithmic forms of a function.

PS 22 Expand, condense, and simplify logarithmic expressions using basic properties of exponential and logarithmic functions.

PS 23 Solve problems that can be represented by exponential and logarithmic functions and equations.

PS 24 Solve higher order polynomials in quadratic form.

PS 25 Find the constant of variation for direct, inverse and joint relationships and Solve problems that can be represented by direct, inverse and joint relationships.

PS 26 Test for symmetry with respect to the x-axis, y-axis and origin.

PS 27 Determine maximum/minimum, line of symmetry, and y-intercept of a quadratic function in standard, vertex or factored form.

PS 28 Graph a circle and label all pertinent features.

PS 29 Graph an ellipse and label all pertinent features.

PS 30 Graph a hyperbola and label all pertinent features.

PS 31 Find the potential roots using rational roots theorem.

PS 32 Use Descartes' rule of signs.

PS 33 Compute permutations and combinations and use combinations and permutations to solve problems involving probabilities.

PS 34 Apply the fundamental counting principle and the ideas of order and replacement to calculate probabilities of single and compound events.

PS 35 Find the terms for arithmetic and geometric series.

PS 36 Find the partial sums for arithmetic and geometric series.

PS 37 Find the infinite sum for geometric series.

PS 38 Demonstrate appropriate degree of automaticity in computation (speed and accuracy).

PS 39 Use appropriate methods in calculation.

PS 40 Apply Algebraic and Geometric properties in context.

PS 41 Explore mathematical concepts applied to rational numbers, ratios and their representations.

PS 42 Apply appropriate mathematical strategies to a variety of problems and contextual problems.

PS 43 A.SSE.1 - Interpret expressions that represent a quantity in terms of its context. A) Interpret parts of an expression, such as terms, factors, and coefficients. 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.

PS 44 A.SSE.1 - Interpret expressions that represent a quantity in terms of its context. A) Interpret parts of an expression, such as terms, factors, and coefficients. 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.

PS 45 A.SSE.4 - Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.★

PS 46 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.

PS 47 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.

PS 48 A.APR.6 - Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.

PS 49 A.APR.7 - (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

PS 50 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.

PS 51 A.CED.2 - Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

PS 52 A.CED.3 - Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

PS 53 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.

PS 54 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.★

PS 55 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.★

PS 56 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.★

PS 57 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.★

PS 58 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. A) Graph linear and quadratic functions and show intercepts, maxima, and minima. B) Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. C) Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. D) (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. E) Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

PS 59 F.BF.1 - Write a function that describes a relationship between two quantities. A) Determine an explicit expression, a recursive process, or steps for calculation from a context. B) Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model. C) (+) Compose functions. For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time.

PS 60 F.BF.3 - 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. 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.

PS 61 F.BF.4 - Find inverse functions. A) Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, f(x) =2 x3 or f(x) = (x+1)/(x–1) for $x \neq 1$. B) (+) Verify by composition that one function is the inverse of another. C) (+) Read values of an inverse function from a graph or a table, given that the function has an inverse. D) (+) Produce an invertible function from a non-invertible function by restricting the domain.

PS 62 F.LE.4 - For exponential models, express as a logarithm the solution to abct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.

PS 63 N.CN.2 - Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

PS 64 N.CN.7 - Solve quadratic equations with real coefficients that have complex solutions.

PS 65 S.ID.4 - Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

PS 66 S.IC.3 - Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

PS 67 S.IC.4 - Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.

PS 68 S.IC.5 - Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.

PS 69 S.IC.6 - Evaluate reports based on data.