

- PS1 Algebraic Analysis of Polynomials  
Students will understand that all polynomials form a system analogous to the integers ([A.ARP.1](#)), know and apply the Binomial Theorem for the expansion of  $(x + y)^n$  ([A.ARP.5](#)).
- PS 2 Graphical Analysis of Polynomials  
Students will graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior ([F.IF.7](#)). Students will 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 ([A.APR.3](#)) and know and apply the Remainder Theorem ([A.APR.2](#)).
- PS 3 Rational Functions  
Students will understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division ([A.APR.7](#)) and rewrite simple rational expressions in different forms ([A.APR.6](#)). Students will also solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise ([A.REI.2](#)). HONORS ONLY: Students will graph rational functions, identifying zeros, asymptotes, and point discontinuities when suitable factorizations are available, and showing end behavior ([F.IF.7d](#)).
- PS 4 Radical, Abs. Value, and Other Functions  
Students will 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 ([F.BF.3](#)). Students will solve simple radical equations ([A.REI.2](#)) and graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions ([F.IF.7b](#)).
- PS 5 Geometry  
Students will identify 2D cross-sections and 3D figures formed by rotations of 2D objects ([G.GMD.4](#)). Students will describe geometric figures and solve design problems by applying geometric methods ([G.MG.1.3](#)) and apply concepts of density ([G.MG.2](#)). HONORS ONLY: Students will give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures (Standard [G.GMD.2](#)).
- PS 6 Series  
Students will understand the formula for the sum of a series and use the formula to solve problems as well as derive the formula for the sum of a finite arithmetic series, finite geometric series, and infinite geometric series ([A.SSE.4, a, b](#)).

**PS 7** Logarithms

Students will understand that for exponential models, express as a logarithm the solution to  $ab^{(ct)} = d$  where  $a$ ,  $c$ , and  $d$  are numbers and the base  $b$  is 2, 10, or  $e$ ; evaluate the logarithm using technology ([F.LE.4](#)). HONORS ONLY: Students will understand the inverse relationship between exponents and logarithms, and use this relationship to solve problems involving logarithms and exponents ([Standard F.BF.5](#)).

**PS 8** Trigonometry

Students will understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle ([F.TF.1](#)), explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers ([F.TF.2](#)), and use special triangles to determine geometrically the values of sine, cosine, tangent ([F.TF.3](#)). Students will also derive and apply formulas for area, law of sines, and law of cosines ([G.SRT.9-11](#)). HONORS ONLY: Students will extend the domain of trigonometric functions using the unit circle ([Standard F.TF.4](#)), model periodic phenomena with trigonometric functions ([Standards F.TF.6-7](#)), and prove and apply trigonometric identities ([Standard F.TF.9](#)).

**PS 9** Polar and Parametric Equations

HONORS ONLY: Students will perform arithmetic operations with complex numbers ([Standard N.CN.3](#)), represent complex numbers and their operations on the complex plane ([Standard N.CN.4-6](#)), and use complex numbers in polynomial identities and equations ([Standard N.CN.10](#)).

**PS 10** Statistics

Students will understand that statistics allow inferences to be made about population parameters based on a random sample from that population ([S.IC.1](#)), recognize the purposes of and differences among sample surveys, experiments, and observational studies ([S.IC.3](#)), and use data from a sample survey to estimate a population mean or proportion and develop a margin of error through the use of simulation models for random sampling ([S.IC.4](#)).