Any standard highlighted in yellow has been determined by our WCSD teachers, district and state experts as essential for students to master.

Strand 11.A.APR: I can perform arithmetic operations on polynomials, extending beyond the quadratic polynomials (Standard A.APR. 1). I understand the relationship between zeros and factors of polynomials (Standards A.APR.2-3). I can use polynomial identities to solve problems (Standards A.APR.4-5). I can rewrite rational expressions (Standards A.APR.6-7).

Standard 11.A.APR.1: I understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication. I can add, subtract, and multiply polynomials.

Learning Targets	Academic Vocabulary & Notation	Question Stems	Possible Assessments
• I can fluently add, subtract, and multiply two or more polynomials.	• closure, polynomials	• Compare and contrast the multiplication of the expanded form of 234 and 67 to the multiplication of $(2x^3 + 3x + 4)$ and $(6x + 7)$ • What was challenging with this concept?	• District CFAs

Standard 11.A.APR.2: I know and can apply the Remainder Theorem: For a polynomial (x) and a number a, the remainder on division by x - a is p(a), so p(a) = 0 if and only if (x-a) is a factor of p(x).

Learning Targets	Academic Vocabulary & Notation	Question Stems	Possible Assessments
• I can recognize that if p(a) = 0 then (x-a) is a factor of p(x). • I can recognize that if (x-a) is a factor of p(x) then p(a) = 0. • I can use the Remainder Theorem to determine factors of polynomials.	• Remainder Theorem, factor	• If 1 is a root of p(x), explain why p(x) has a factor of (x-1). • What strategy did you use?	• District CFAs

Standard 11.A.APR.3: I can identify zeros of polynomials when suitable factorizations are available and can use the zeros to construct a rough graph of the function defined by the polynomial.			
Learning Targets • I can use the Remainder Theorem to draw a rough graph of a polynomial. • I can recognize that repeated factors indicate multiplicity of roots and graph polynomials with repeated factors.	**Academic Vocabulary & Notation** • Remainder Theorem	**Question Stems** • Given a fourth degree polynomial, how could you have: zero real roots, one real root, two real roots, three real roots, or four real roots?	**Possible Assessments** • District CFAs
Standard 11.A.APR.4: I can prove polynomial identities and use them to describe numerical relationships.			
Learning Targets • I can prove polynomial identities that expand or factor polynomials.	**Academic Vocabulary & Notation** • Properties of algebra	**Question stems** • Write $y = x^4 - 16$ in various equivalent forms and relate each form to its graph. • Justify your answers.	**Possible Assessments** • District CFAs
Standard 11.A.APR.5: I know and can apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.			
Learning Targets • I can fluently expand binomials by hand, recognizing Pascal's Triangle as a tool of efficiency. • I can expand binomials of the form $(ax + by)^n$ using Pascal's Triangle.	**Academic Vocabulary & Notation** • Binomial Theorem, Pascal's Triangle	**Question stems** • Explain how using Pascal's Triangle can be used to expand $(x + y)^n$	**Possible Assessments** • District CFAs

Standard 11.A.APR.6: I can rewrite simple rational expressions in different forms.			
Learning Targets	**Academic Vocabulary & Notation**	**Question stems**	**Possible Assessments**
• I can write a(z)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(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. • I can divide polynomials and recognize when your division is a factor and when you will have non-zero remainders. • I can use long division to rewrite a rational expression in the form g(x) + r(x)/b(x). • I can use a computer algebra system to divide complicated polynomials.	• multiplying polynomials, adding polynomials, subtracting polynomials	• Write a division problem whose result will be: $x^2 + 3x + \frac{2}{x-5}$ •	• District CFAs
Standard 11.A.APR.7: I understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression.			
Learning Targets	**Academic Vocabulary & Notation**	**Question stems**	**Possible Assessments**
• I can add, subtract, multiply, and divide rational expressions. • I can demonstrate that rational expressions are closed under addition, subtraction, multiplication, and non-zero division.	• closure, rational expression	• Compare and contrast the operations addition, subtraction, division, and multiplication on whole numbers to the same operations performed on polynomials. Example: 3/4 + 5/6 and x/x+1 + 8/x+3	• District CFAs