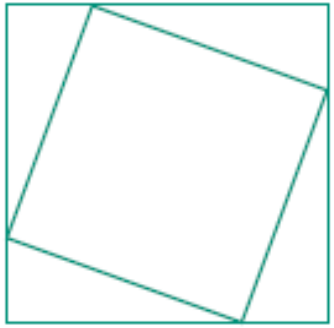
Juneau School District
Math Core Standards
Algebra II

AF-CS1	**Students can solve equations and inequalities.**
	* Students solve systems of linear equations and inequalities (in two or three variables) by substitution, with graphs, and with matrices. Draw the region in the plane that is the solution set for the inequality $(x-1)(x+2y)>0$.
	* Students solve equations and inequalities involving absolute value. Sketch the graph of each function. $y=\left\|\frac{1}{x}\right\|$. $y=-\frac{2}{3}\|x-2\|-5$.
AF-CS2	**Students solve and graph quadratic equations.**
	* Use factoring, completing the square, or the quadratic formula to solve and graph quadratic equations. In the figure shown below, the area between the two squares is 11 square inches. The sum of the perimeters of the two squares is 44 inches. Find the length of a side of the larger square. 

AF-CS2	* Graph quadratic functions and determine the maxima, minima, and zeros of the function. Find a quadratic function of x that has zeros at $x = -1$ and $x = 2$. Find a cubic equation of x that has zeros at $x = -1$ and $x = 2$ and nowhere else.
	* Demonstate and explain the effect that changing a coefficient has on the graph of quadratic functions; that is, students can determine how the graph of a parabola changes as a,b, and c vary in the equation $y = a(x - b)^2 + c$.
	* Recognize whether the graph of the equation is a circle, ellipse, parabola, or hyperbola. Students can then graph the equation.
AF-CS3	**Students can demonstrate how real and complex numbers are related.**
	* Add, substract, multiply, and divide complex numbers. Write $\frac{1+i}{1-2i}$ in the form of $a + bi$, where a and b are real numbers.
	* Plot complex numbers as points in the plane.
AF-CS4	**Students can perform operations on polynomials.**
	* Factor polynomials representing the difference of squares, perfect square trinomials, and the sum and difference of two cubes. Factor $x^3 + 8$.
	* Divide polynomials Divide $x^4 - 3x^2 + 3x$ by $x^2 + 2$, and write the answer in the form: $\text{polynomial} + \frac{\text{linear polynomial}}{x^2 + 2}$.
	* Factor higher order polynomials using the remainder and factor theorems.

AF-CS5	**Students know the laws of rational exponents and radical functions.**
AF-CS6	**Students apply simple laws of logarithms and exponential functions.**
	* Use and understand the inverse relationship between exponents and logarithms to solve problems involving logarithms and exponents. Solve: $2^x = 5(13^{2x-5})$.
	* Understand the definition of logarithms to translate between logarithms in any base.
	* Understand and use the properties of logarithms to simplify logarithmic numeric expressions and to identify their approximate values. 1. Find the largest integer that is less than: $\log_{10}(1{,}256)$ $\log_{10}(.029)$ 2. $\frac{1}{2}\log_2 64 = ?$
	* Understand exponential functions, and use these functions in problems involving exponential growth and decay. The number of bacteria in a colony was growing exponentially. At 1 p.m. yesterday the number of bacteria was 100, and at 3 p.m. yesterday it was 4,000. How many bacteria were there in the colony at 6 p.m. yesterday?
AF-CS7	**Students add, subtract, multiply, divide, reduce and evaluate rational expressions**
	* Add, Subtract, multiply, divide, reduce and evaluate with monomial and polynomial denominators.

AF-CS7	* Simplify complicated rational expressions, including those with negative exponents in the denoninator. Simplify $\frac{(x^2-x)^2}{x(x-1)^{-2}(x^2+3x-4)}$.
	* Graph rational functions
AF-CS8	**Students solve problems involving functional concepts.**
	* Identify inverse funtions and perform arithmetic operations on functions. Which of the following functions are their own inverse functions? Use at least two different methods to answer this question and explain your methods: $f(x)=\frac{2}{x}$ $g(x)=x^3+4$ $h(x)=\frac{2+\ln(x)}{2-\ln(x)}$ $j(x)=\sqrt[3]{\frac{x^3+1}{x^3-1}}$
	* Use properties from number systems to justify steps in combining and simplifying functions.
	* Understand the domains and ranges of functons.
AF-CS9	**Students understand and use combinations and computations.**
	* Use fundamental counting principles to compute combinations and permutations.
	* Use combinations and permutations to compute probabilities.
AF-CS10	**Students identify and apply arithmetic series and both finite and infinte geometric series.**
	* Know the binomial theorem and use it to expand binomial expressions that are raised to positive integer powers. What is the third term of $(2x-1)^6$? What is the general term? What is a simplified expression for the sum?

AF-CS10	* Apply the method of mathematical induction to prove general statements about positive integers. Use mathematical induction to prove that for any integer $n \geq 1$, $1 + 3 + 5 + \ldots + (2n - 1) = n^2$.
	* Find the general term and the sums of arithmetic series and of both finite and infinite geometric series. Find the sum of the arithmetic series: $13 + 16 + 19 + \ldots + 94$. Find the sum of the geometric series: $\frac{3^5}{5^2} + \frac{3^6}{5^3} + \frac{3^7}{5^4} + \ldots + \frac{3^{32}}{5^{29}}$.