# Coal City Unit District #1
# Pre-Calculus
# Math Curriculum

**MA.PC:1** **Students will use polynomial identities to solve problems. (APR.5)**

- MA.PC:1-1 Expand a binomial raised to a power using Pascal's Triangle or the Binomial Theorem.
- MA.PC:1-2 Find the coefficient of the given term in the binomial expansion.

**MA.PC:2** **Students will interpret functions. (IF.4, 7c, 7d, 7e, 8)**

- MA.PC:2-1 Find intervals where a function is increasing and decreasing and find the relative maximum and minimum.
- MA.PC:2-2 Determine whether a function is odd or even by using a graphing calculator and algebraically.
- MA.PC:2-3 Graph rational functions by finding and showing the vertical, and horizontal/slant asymptotes. State the behavior at these asymptotes using limits. State the end behavior asymptotes.
- MA.PC:2-4 Find the real and complex zeros of polynomials.
- MA.PC:2-5 Graph logarithmic functions and exponential functions, showing intercepts and end behavior.
- MA.PC:2-6 Change the base of a logarithm to solve problems.
- MA.PC:2-7 Graph trigonometric functions, including reciprocal functions, showing period, midline, and amplitude.

**MA.PC:3** **Students will build functions and use them to solve problems. (BF.1b, 1c, 2, 3, 4, 4b)**

- MA.PC:3-1 Combine two functions by adding, subtracting, multiplying or dividing.
- MA.PC:3-2 Solve problems using composite functions.
- MA.PC:3-3 Find the inverse function of rational, polynomial, and radical functions. Find the domain of the new function.
- MA.PC:3-4 Verify by composition that one rational, polynomial, or radical function is the inverse of another.
- MA.PC:3-5 Find the equation of an even or odd function that is reflected across the x- axis or the y-axis.
- MA.PC:3-6 Given a function, write the new function that is obtained by a sequence of transformations done on this function including shifts and stretches.
- MA.PC:3-7 Find a given term in an arithmetic or geometric sequence.
- MA.PC:3-8 Find the sum of an arithmetic, geometric, or infinite series.

**MA.PC:4** **Students will construct and compare linear, quadratic, and exponential models to solve problems. (LE. 1, 3, 4)**

MA.PC:4-1 Use linear and quadratic regression to find an equation that best fits the data.
MA.PC:4-2 Use a linear, quadratic, exponential models to solve problems and make predictions.

**MA.PC:5** **Students will create equations. (CED. 1, 3)**

MA.PC:5-1 Solve rational inequalities by combining fractions.
MA.PC:5-2 Solve rational equations with extraneous roots.

**MA.PC:6** **Students will solve and simplify vectors. (N-VM)**

MA.PC:6-1 Solve problems using vectors involving both magnitude and direction.
MA.PC:6-2 Find the resultant vector showing both magnitude and direction.
MA.PC:6-3 Convert polar coordinates to rectangular coordinates and vice versa.

**MA.PC:7** **Students will apply and use trigonometric functions. (TF 7, 8)**

MA.PC:7-1 Apply trigonometric identities to verify trigonometric equations.
MA.PC:7-2 Use trigonometry to solve complex application problems.
MA.PC:7-3 Find the values of the sine, cosine, and tangent of multiples of 30, 45, and 90 by memorizing the unit circle.
MA.PC:7-4 Use the addition and subtraction formulas for tangent to solve problems.

**MA.PC:8** **Students will solve systems of equations. (A-REI.8)**

MA.PC:8-1 Represent a system of linear equations as a single matrix and solve using technology.
MA.PC:8-2 Use technology to solve a system of equations with 3 variables using matrices that have infinite solutions or no solution.

**MA.PC:9** **Students will be able to compute probability. (CP6, CP9)**

MA.PC:9-1 Use permutations to compute probabilities of compound events.
MA.PC:9-2 Use combinations to compute probabilities of compound events and solve problems.