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| **Algebra II TEKS**  **Math College Prep Course Crosswalk for CPC Integrated with Algebra II** | **SPC Learning Outcomes/Objectives** |
| (1)  Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to: |  |
| (A)  apply mathematics to problems arising in everyday life, society, and the workplace; | 29. Translate and solve application problems. |
| (B)  use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution; |  |
| (C)  select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems; |  |
| (D)  communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate; |  |
| (E)  create and use representations to organize, record, and communicate mathematical ideas; |  |
| (F)  analyze mathematical relationships to connect and communicate mathematical ideas; and |  |
| (G)  display, explain, or justify mathematical ideas and arguments using precise mathematical language in written or oral communication. |  |
| (2)  Attributes of functions and their inverses. The student applies mathematical processes to understand that functions have distinct key attributes and understand the relationship between a function and its inverse. The student is expected to: |  |
| (A)  graph the functions *f(x)=*√*x, f(x)=*1*/x, f(x)=x*3*, f(x)=* 3√*x, f(x)=bx, f(x)=|x|,* and *f(x)=logb (x)* where *b* is 2, 10, and *e*, and, when applicable, analyze the key attributes such as domain, range, intercepts, symmetries, asymptotic behavior, and maximum and minimum given an interval | 22. Solve rational equations.  28. Define, recognize and evaluate functions. |
| (B)  graph and write the inverse of a function using notation such as *f* -1 (*x*); |  |
| (C)  describe and analyze the relationship between a function and its inverse (quadratic and square root, logarithmic and exponential), including the restriction(s) on domain, which will restrict its range; and |  |
| (D)  use the composition of two functions, including the necessary restrictions on the domain, to determine if the functions are inverses of each other. |  |
| (3)  Systems of equations and inequalities. The student applies mathematical processes to formulate systems of equations and inequalities, use a variety of methods to solve, and analyze reasonableness of solutions. The student is expected to: | 1. Solve linear equations including equations containing decimals and fractions. 2. Solve linear inequalities, graph the solution set on a number line and write the solution in interval notation. 3. Graph and recognize the equations of vertical and horizontal lines. 4. Graph linear equations in two variables by finding the ***x-*** and ***y-***intercepts and by using the slope-intercept method (). 5. Solve systems of linear equations containing two equations and two variables by graphing, substitution and elimination methods. |
| (A)  formulate systems of equations, including systems consisting of three linear equations in three variables and systems consisting of two equations, the first linear and the second quadratic; |  |
| (B)  solve systems of three linear equations in three variables by using Gaussian elimination, technology with matrices, and substitution; |  |
| (C)  solve, algebraically, systems of two equations in two variables consisting of a linear equation and a quadratic equation; |  |
| (D)  determine the reasonableness of solutions to systems of a linear equation and a quadratic equation in two variables; | 2. Use the order of operations to simplify an expression containing whole numbers.   1. Use the order of operations to simplify an expression containing integers. 2. Use the order of operations to simplify an expression containing rational numbers. 3. Evaluate algebraic expressions. |
| (E)  formulate systems of at least two linear inequalities in two variables; |  |
| (F)  solve systems of two or more linear inequalities in two variables; and |  |
| (G)  determine possible solutions in the solution set of systems of two or more linear inequalities in two variables. |  |
| (4)  Quadratic and square root functions, equations, and inequalities. The student applies mathematical processes to understand that quadratic and square root functions, equations, and quadratic inequalities can be used to model situations, solve problems, and make predictions. The student is expected to: |  |
| (A)  write the quadratic function given three specified points in the plane; |  |
| (B)  write the equation of a parabola using given attributes, including vertex, focus, directrix, axis of symmetry, and direction of opening; |  |
| (C)  determine the effect on the graph of *f(x) =* √*x* when *f(x)* is replaced by *af(x), f(x) + d, f(bx)*, and *f(x* - *c)* for specific positive and negative values of *a, b, c,* and *d*; |  |
| (D)  transform a quadratic function *f(x) = ax*2 *+ bx + c* to the form *f(x) = a(x - h)*2 *+ k* to identify the different attributes of *f(x)*; |  |
| (E)  formulate quadratic and square root equations using technology given a table of data; |  |
| (F)  solve quadratic and square root equations; | 1. Solve polynomial equations by factoring. 2. Define, simplify, add, subtract, multiply and divide (rationalize the denominator) radical expressions. 3. Define, add, subtract, multiply and divide complex numbers. 4. Solve radical equations. 5. Solve quadratic equations by the Square Root Property, completing the square and the quadratic formula. |
| (G)  identify extraneous solutions of square root equations; and | 1. Solve radical equations. |
| (H)  solve quadratic inequalities. |  |
| (5)  Exponential and logarithmic functions and equations. The student applies mathematical processes to understand that exponential and logarithmic functions can be used to model situations and solve problems. The student is expected to: |  |
| (A)  determine the effects on the key attributes on the graphs of *f(x) = bx* and *f(x) = logb (x)* where *b* is 2, 10, and *e* when *f(x)* is replaced by *af(x), f(x) + d,* and *f(x - c)* for specific positive and negative real values of *a, c,* and *d*; |  |
| (B)  formulate exponential and logarithmic equations that model real-world situations, including exponential relationships written in recursive notation; |  |
| (C)  rewrite exponential equations as their corresponding logarithmic equations and logarithmic equations as their corresponding exponential equations; |  |
| (D)  solve exponential equations of the form *y = abx* where *a* is a nonzero real number and *b* is greater than zero and not equal to one and single logarithmic equations having real solutions; and |  |
| (E)  determine the reasonableness of a solution to a logarithmic equation. |  |
| (6)  Cubic, cube root, absolute value and rational functions, equations, and inequalities. The student applies mathematical processes to understand that cubic, cube root, absolute value and rational functions, equations, and inequalities can be used to model situations, solve problems, and make predictions. The student is expected to: |  |
| (A)  analyze the effect on the graphs of *f(x) = x*3 and *f(x)* = 3√*x* when *f(x)* is replaced by *af(x), f(bx), f(x - c)*, and *f(x)* + *d* for specific positive and negative real values of *a, b, c,* and *d*; |  |
| (B)  solve cube root equations that have real roots; | 1. Define, simplify, add, subtract, multiply and divide (rationalize the denominator) radical expressions. 2. Solve radical equations. |
| (C)  analyze the effect on the graphs of *f(x) = |x|* when *f(x)* is replaced by *af(x), f(bx)*, *f(x-c)*, and *f(x)* + *d* for specific positive and negative real values of *a, b, c,* and *d*; |  |
| (D)  formulate absolute value linear equations; | 1. Solve absolute value equations. |
| (E)  solve absolute value linear equations; | 1. Solve absolute value equations. |
| (F)  solve absolute value linear inequalities; |  |
| (G)  analyze the effect on the graphs of f(x) = 1/x when *f(x)* is replaced by *af(x), f(bx)*, *f(x*-*c)*, and *f(x)* + *d* for specific positive and negative real values of *a, b, c,* and *d*; |  |
| (H)  formulate rational equations that model real-world situations; |  |
| (I)  solve rational equations that have real solutions; | 1. Define, simplify, multiply, divide, add and subtract rational expressions. 2. Solve rational equations. |
| (J)  determine the reasonableness of a solution to a rational equation; | 1. Define, simplify, multiply, divide, add and subtract rational expressions. |
| (K)  determine the asymptotic restrictions on the domain of a rational function and represent domain and range using interval notation, inequalities, and set notation; and |  |
| (L)  formulate and solve equations involving inverse variation. |  |
| (7) Number and algebraic methods. The student applies mathematical processes to simplify and perform operations on expressions and to solve equations. The student is expected to: |  |
| (A)  add, subtract, and multiply complex numbers; | 1. Define, add, subtract, multiply and divide complex numbers. |
| (B)  add, subtract, and multiply polynomials; | 1. Define, add, subtract, multiply and divide whole numbers. 2. Define, add, subtract, multiply and divide integers. 3. Define, add, subtract, multiply and divide rational numbers. 4. Simplify algebraic expressions by using the Distributive Property and combining like terms.   17. Simplify expressions using exponent rules.  18. Define, add, subtract, multiply and divide polynomials. |
| (C)  determine the quotient of a polynomial of degree three and of degree four when divided by a polynomial of degree one and of degree two; | 1. Define, add, subtract, multiply and divide polynomials. |
| (D)  determine the linear factors of a polynomial function of degree three and of degree four using algebraic methods; | 1. Define, add, subtract, multiply and divide polynomials. 2. Factor polynomials. |
| (E)  determine linear and quadratic factors of a polynomial expression of degree three and of degree four, including factoring the sum and difference of two cubes and factoring by grouping; | 1. Define, add, subtract, multiply and divide polynomials. 2. Factor polynomials. 3. Solve polynomial equations by factoring. |
| (F)  determine the sum, difference, product, and quotient of rational expressions with integral exponents of degree one and of degree two; | 1. Use ratios and proportions to solve application problems. 2. Change percentages to decimals and fractions, decimals to fractions and percentages, and fractions to decimals and percentages. 3. Solve application problems involving percentages.   21. Define, simplify, multiply, divide, add and subtract rational expressions. |
| (G)  rewrite radical expressions that contain variables to equivalent forms; | 1. Define, simplify, add, subtract, multiply and divide (rationalize the denominator) radical expressions.   25. Solve radical equations. |
| (H)  solve equations involving rational exponents; and | 1. Use ratios and proportions to solve application problems.   23. Define, simplify, add, subtract, multiply and divide (rationalize the denominator) radical expressions.  25. Solve radical equations. |
| (I)  write the domain and range of a function in interval notation, inequalities, and set notation. | 1. Solve linear inequalities, graph the solution set on a number line and write the solution in interval notation. |
| (8)  Data. The student applies mathematical processes to analyze data, select appropriate models, write corresponding functions, and make predictions. The student is expected to: |  |
| (A)  analyze data to select the appropriate model from among linear, quadratic, and exponential models; | 1. Define, recognize and evaluate functions. |
| (B)  use regression methods available through technology to write a linear function, a quadratic function, and an exponential function from a given set of data; and |  |
| C)  predict and make decisions and critical judgments from a given set of data using linear, quadratic, and exponential models. | 1. Translate and solve application problems. |

**South Plains College**

**Learning Outcomes College Prep Course**

Successful completion of this course should reflect mastery of the following objectives:

**(Developmental Algebra Concepts)**

1. Define, add, subtract, multiply and divide whole numbers.
2. Use the order of operations to simplify an expression containing whole numbers.
3. Define, add, subtract, multiply and divide integers.
4. Use the order of operations to simplify an expression containing integers.
5. Define, add, subtract, multiply and divide rational numbers.
6. Use the order of operations to simplify an expression containing rational numbers.
7. Use ratios and proportions to solve application problems.
8. Change percentages to decimals and fractions, decimals to fractions and percentages, and fractions to decimals and percentages.
9. Solve application problems involving percentages.
10. Evaluate algebraic expressions.
11. Simplify algebraic expressions by using the Distributive Property and combining like terms.

**(Beginning Algebra Concepts)**

1. Solve linear equations including equations containing decimals and fractions.
2. Solve linear inequalities, graph the solution set on a number line and write the solution in interval notation.
3. Graph and recognize the equations of vertical and horizontal lines.
4. Graph linear equations in two variables by finding the ***x-*** and ***y-***intercepts and by using the slope-intercept method ().
5. Solve systems of linear equations containing two equations and two variables by graphing, substitution and elimination methods.
6. Simplify expressions using exponent rules.
7. Define, add, subtract, multiply and divide polynomials.
8. Factor polynomials.
9. Solve polynomial equations by factoring.

**(Intermediate Algebra Concepts)**

1. Define, simplify, multiply, divide, add and subtract rational expressions.
2. Solve rational equations.
3. Define, simplify, add, subtract, multiply and divide (rationalize the denominator) radical expressions.
4. Define, add, subtract, multiply and divide complex numbers.
5. Solve radical equations.
6. Solve quadratic equations by the Square Root Property, completing the square and the quadratic formula.
7. Solve absolute value equations.
8. Define, recognize and evaluate functions.
9. Translate and solve application problems.