

Catoosa County Public Schools

Teaching and Learning Standards

Every Child, Every Day, Without Exception



8th Grade Algebra

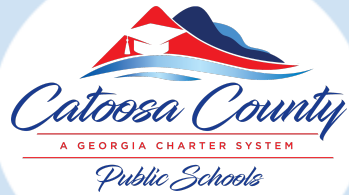
District Essential Standards and Learning Targets

1.1 Apply the properties of integer exponents to generate equivalent numerical expressions.

- I can simplify expressions using product rule.
- I can simplify expressions using quotient rule.
- I can simplify expressions using the power rule.
- I can simplify expressions using zero exponent rule.
- I can simplify expressions using negative exponent rule.
- I can simplify an expression using multiply exponent rules.

5.1 Rewrite algebraic and numeric expressions involving radicals.

- I can identify rational and irrational numbers.
- I can simplify radicals (square and cube roots)
- I can add and subtract radical expressions.
- I can multiply radical expressions.
- I can recognize when sums and products of numbers are rational or irrational.



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3.1 Interpret expressions and parts of an expression, in context, by utilizing formulas or expressions with multiple terms and/or factors.

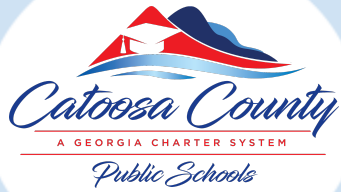
- I can simplify an expression using the distributive property.
- I can simplify an expression by combining like terms.
- I can simplify multistep expressions with distributing and combining like terms.

3.2 Describe and solve linear equations in one variable with one solution ($x = a$), infinitely many solutions ($a = a$), or no solutions ($a = b$). Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).

- I can solve equations by combining like terms.
- I can solve equations by using the distributive property.
- I can solve multi-step equations with variables on both sides.
- I can determine the number of solutions - one, infinitely many, and none.

3.3 Create and solve linear equations and inequalities in one variable within a relevant application.

- I can write an equation from a real world problem.
- I can solve an inequality.
- I can write inequalities from a real world problem.
- I can solve inequalities from a real world problem.
- I can interpret the solution of an equation/ inequality in a real world problem.



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4.1 Use the equation $y = mx$ (proportional) for a line through the origin to derive the equation $y = mx + b$ (non-proportional) for a line intersecting the vertical axis at b .

- I can identify positive, negative, zero, and undefined slope from a graph.
- I can find slope and y-intercept from a graph.
- I can find slope and y-intercept from a table/two points.
- I can find slope and y-intercept from an equation.
- I can identify proportional vs non-proportional relationships.

4.3 Solve systems of linear inequalities by graphing, including systems representing a mathematically applicable situation.

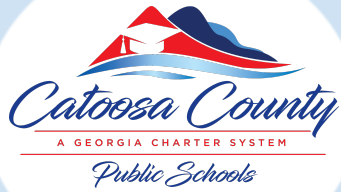
- I can solve a system of linear inequalities in two variables by graphing.
- I can create a system of linear inequalities from a real-world situation.

6.1 Interpret quadratic expressions and parts of a quadratic expression that represent a quantity in terms of its context.

- I can identify parts of a quadratic expression, such as terms, factors, leading coefficient, coefficient, constant, and degree.
- I can interpret parts of a quadratic expression in context.

6.3 Create and solve quadratic equations in one variable and explain the solution in the framework of applicable phenomena.

- I can add and subtract polynomial expressions. (fundamental skill)
- I can multiply polynomial expressions using various strategies. (fundamental skill)
- I can identify and convert fluently between a quadratic equation in standard, vertex, or factored form.
- I can solve a quadratic equation by square roots, factoring, quadratic formula, and completing the square (*if you are not a resource teacher).
- I can create quadratic equations in one variable, given a scenario.



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8.3 Create exponential equations in two variables to represent relationships between quantities, including in mathematically applicable situations; graph equations on coordinate axes with labels and scales.

- I can graph exponential equations with appropriate scales.
- I can create equations of exponential functions given tables, graphs, and real world scenarios.
- I can apply exponential equations through growth and decay situations.

8.2 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles within authentic mathematical problems in two and three dimensions.

- I can use the pythagorean theorem to prove if a triangle is a right triangle.
- I can use the pythagorean theorem to find the hypotenuse.
- I can use the pythagorean theorem to find the missing leg.

8.3 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system in practical, mathematical problems.

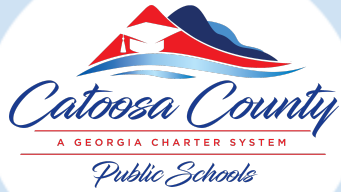
- I can use Pythagorean Theorem to find the distance between two points on a coordinate plane.
- I can use the Pythagorean Theorem to find the unknown distance in real-world problems.

A 3.2 Apply the distance formula, midpoint formula, and slope of line segments to solve real-world problems.

- I can apply the distance formula to solve real world problems.
- I can use/calculate the slope of line segments to solve real world problems.
- I can apply the midpoint formula to solve real world problems.

5.2 Within realistic situations, identify and describe examples of functions that are linear or nonlinear. Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

- I can determine if a function is linear/non-linear (graph).
- I can determine if a function is increasing/decreasing (graph).
- I can model (graph) functions that are linear/non-linear and increasing/decreasing given a real-world situation. (e.g. - Dist/Time Graphs)



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5.4 Compare properties (rate of change and initial value) of two functions used to model an authentic situation each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

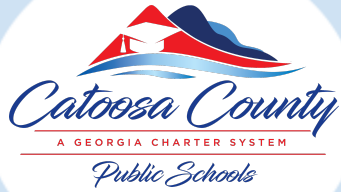
- I can identify a relation as a function or not a function.
- I can compare functions by their equations.
- I can compare functions by their graphs.
- I can compare functions by their tables.
- I can compare functions by word problems.
- I can compare properties of functions by rate of change/initial value.

5.8 Graph and analyze linear functions expressed in various algebraic forms and show key characteristics of the graph to describe applicable situations.

- I can graph the equation $y=mx+b$
- I can explain rate of change and initial value by its relationship to a graph.
- I can explain rate of change and initial value by describing its relationship to a table.
- I can explain rate of change and initial value by describing its relationship to an equation.

7.1 Interpret and solve relevant mathematical problems leading to two linear equations in two variables.

- I can solve a system of equations by graphing; including one solution, no solutions, and infinitely many solutions.
- I can solve a system of equations by elimination.
- I can solve a system of equations by substitution.
- I can write a system of equations to represent a real world situation.
- I can interpret the solution of a system of equations.



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2.5 Analyze the difference between linear functions and nonlinear functions by informally analyzing the graphs of various parent functions (linear, quadratic, exponential, absolute value, square root, and cube root parent curves).

- I can analyze the differences between linear functions and nonlinear functions.
- I can identify and distinguish between graphs of various parent functions (linear, quadratic, exponential, absolute value, square root, and cube root).

7.2 Identify the effect on the graph generated by a quadratic function when replacing $f(x)$ with $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs.

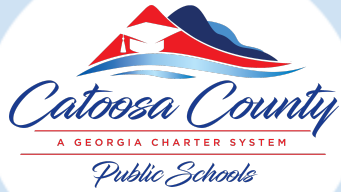
- I can identify the vertex of a quadratic function.
- I can identify the transformation of a quadratic function given an equation or a graph.
- I can use transformations to create functions in vertex form given a graph.

7.3 Graph and analyze the key characteristics of quadratic functions.

- I can graph quadratic functions by hand and with technology (**include standard, vertex and intercept/factored form).
- I can identify the key characteristics of quadratic functions. (vertex, x and y intercepts, domain and range, increasing and decreasing intervals, positive and negative intervals, maximum and minimum values, and end behavior).

7.4 Relate the domain and range of a quadratic function to its graph and, where applicable, to the quantitative relationship it describes.

- I can identify appropriate domains and ranges given context.
- I can identify specific heights or times using the function $h(t)$.



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7.7 Estimate, calculate, and interpret the average rate of change of a quadratic function and make comparisons to the average rate of change of linear functions.

- I can use the graphs of linear and quadratic functions to estimate the rate of change (slope).
- I can calculate rates of change given graphs, tables, and ordered pairs of linear and quadratic functions.
- I can compare rates of change using algebraic methods and differences from tables over equal intervals.

9.2 Graph and analyze the key characteristics of simple exponential functions based on mathematically applicable situations.

- I can graph exponential functions using the key features by hand and using technology (Domain, range, intercepts, average rate of change, intervals of increase and decrease, asymptotes and end behavior).
- I can find the appropriate domain of exponential functions in context.
- I can compare linear and exponential functions by calculating their average rate of change.
- I can express key features in interval notation and set-builder notation using inequalities.

10.1 Use statistics appropriate to the shape of the data distribution to compare and represent center (median and mean) and variability (interquartile range, standard deviation) of two or more distributions by hand and using technology.

- I can compare the measures of center and spread/variability.