**Coordinate Algebra**

**2012-2013**

**Course:** Coordinate Algebra

**Instructor**:

Tara Whittington

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You may also contact me through my Facebook page at: <https://www.facebook.com/VRHSWhittington>

(770) 459-5185

7:30am-4:00pm

**Office Hours**:

I will be available afterschool from 3:35-4:00 everyday. Please arrive by 3:45 or you will not be allowed to stay. I am also available in the morning from 7:45-8:20 by appointment only.

**Required Texts**: This course does not require a textbook.

**Communication**: You may contact me in the following ways:

1. **Email**: I prefer that you email me with any questions that you may have. I will return emails within 24 hours except on the weekend. I will return all emails sent over the weekend on Monday.

2. **Facebook**: If you follow the link to my Facebook page and “like” it you can send me messages through there. If I am online I will answer any questions that I can as soon as possible but no later than 24 hours after I receive the message.

3. **Phone**: You may call Villa Rica High School at the number listed above and leave a message for me. I will return your call within 24 hours. If at all possible I recommend using another form of communication because I usually get those messages much faster than the phone messages.

**Course Description**:

This course is designed to continue the mathematics education of students that started in their courses in middle school. This course is the first course in a 3 course series in high school. Coordinate Algebra will be followed by Analytic Geometry in the 10th grade, and Advanced Algebra in the 11th grade. The topics covered in this course include: relationships between quantities, solving, graphing, and justifying solutions to linear equations and inequalities, solving and graphing functions, describing data, understanding transformations in the plane, and connecting algebra and geometry though coordinates.

**Learning Outcomes**:

This course is correlated to the following Common Core Georgia Performance Standards:

Reason quantitatively and use units to solve problems.

MCC9‐12.N.Q.1 Use units as a way to understand problems and to guide the solution of multi‐step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

MCC9‐12.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.

MCC9‐12.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Interpret the structure of expressions

MCC9‐12.A.SSE.1 Interpret expressions that represent a quantity in terms of its context.

MCC9‐12.A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients.

MCC9‐12.A.SSE.1b Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r)n as the product of P and a factor not depending on P.

Create equations that describe numbers or relationships

MCC9‐12.A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear ~~and quadratic functions, and simple rational~~ and exponential functions.

MCC9‐12.A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

MCC9‐12.A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non‐viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*

MCC9‐12.A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm’s law V = IR to highlight resistance R.*

Understand solving equations as a process of reasoning and explain the reasoning

MCC9‐12.A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

Solve equations and inequalities in one variable

MCC9‐12.A.REI.3 Solve linear equations and inequalities in one variable, Including equations with coefficients represented by letters.

Solve systems of equations

MCC9‐12.A.REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.

MCC9‐12.A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

Represent and solve equations and inequalities graphically

MCC9‐12.A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

MCC9‐12.A.REI.11 Explain why the x‐coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, ~~polynomial, rational, absolute value~~, exponential, ~~and logarithmic~~ functions.

MCC9‐12.A.REI.12 Graph the solutions to a linear inequality in two variables as a half‐plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half‐planes.

Understand the concept of a function and use function notation

MCC9‐12.F.IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).

MCC9‐12.F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

MCC9‐12.F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. *For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n‐1) for n ≥ 1 (n is greater than or equal to 1).*

Interpret functions that arise in applications in terms of the context

MCC9‐12.F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

MCC9‐12.F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function h(n) gives the number of person‐hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*

MCC9‐12.F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. ~~Analyze functions using different representations~~

MCC9‐12.F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

MCC9‐12.F.IF.7a Graph linear ~~and quadratic~~ functions and show intercepts, maxima, and minima.

MCC9‐12.F.IF.7e Graph exponential ~~and logarithmic functions~~, showing intercepts and end behavior, ~~and trigonometric functions, showing period, midline, and amplitude~~.

MCC9‐12.F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.*

Build a function that models a relationship between two quantities

MCC9‐12.F.BF.1 Write a function that describes a relationship between two quantities.

MCC9‐12.F.BF.1a Determine an explicit expression, a recursive process, or steps for calculation from a context.

MCC9‐12.F.BF.1b Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.*

MCC9‐12.F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

Build new functions from existing functions

MCC9‐12.F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

~~Construct and compare linear, quadratic, and exponential models and solve problems~~

MCC9‐12.F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.

MCC9‐12.F.LE.1a Prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.

MCC9‐12.F.LE.1b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

MCC9‐12.F.LE.1c Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

MCC9‐12.F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input‐output pairs (include reading these from a table).

MCC9‐12.F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, ~~quadratically, or (more generally) as a polynomial function~~.

Interpret expressions for functions in terms of the situation they model MCC9‐12.F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.

Experiment with transformations in the plane

MCC9‐12.G.CO.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

MCC9‐12.G.CO.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

MCC9‐12.G.CO.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

MCC9‐12.G.CO.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

MCC9‐12.G.CO.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

Use coordinates to prove simple geometric theorems algebraically

MCC9‐12.G.GPE.4 Use coordinates to prove simple geometric theorems algebraically. *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).*

MCC9‐12.G.GPE.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

MCC9‐12.G.GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

MCC9‐12.G.GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

Summarize, represent, and interpret data on a single count or measurement variable

MCC9‐12.S.ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).

MCC9‐12.S.ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, ~~standard deviation~~) of two or more different data sets.

MCC9‐12.S.ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

Summarize, represent, and interpret data on two categorical and quantitative variables

MCC9‐12.S.ID.5 Summarize categorical data for two categories in two‐way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

MCC9‐12.S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

MCC9‐12.S.ID.6a Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.

MCC9‐12.S.ID.6b Informally assess the fit of a function by plotting and analyzing residuals.

MCC9‐12.S.ID.6c Fit a linear function for a scatter plot that suggests a linear association.

Interpret linear models

MCC9‐12.S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

MCC9‐12.S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.

MCC9‐12.S.ID.9 Distinguish between correlation and causation.

**Course Schedule:**

**1st Semester:**

Week 1: Introduction and Unit 1 “Acting Out” Task

Week 2: Unit 1 “Lucy’s Linear Equations and Inequalities” and “Forget the Formula” Tasks

Week 3: Unit 1 “Cara’s Candles” and “The Yo-Yo Problem” Tasks

Week 4: Unit 1 “Paper Folding” Task

Week 5: Unit 1 Review and Unit 1 Exam

Week 6: Unit 2 “Jaden’s Phone Plan” Task

Week 7: Unit 2 “Solving System of Equations Algebraically” and “Summer Job” Tasks

Week 8: Unit 2 “Graphing Inequalities” Task

Week 9: Unit 2 and 9 Weeks Exam

Week 10: Unit 2 Review and Unit 2 Exam

Week 11: Unit 3 “Talk is Cheap” Task

Week 12: Unit 3 “Functioning Well” Task

Week 13: Unit 3 “You’re Toast, Dude!” Task

Week 14: Unit 3 “Community Service, Sequences, and Functions” Task

Week 15: Unit 3 “Building and Combining Functions” Task

Week 16: Unit 3 “High Functioning!” Task

Week 17: Unit 3 Review and Unit 3 Exam

Week 18: Review and Semester Exam

**2nd Semester:**

Week 1: Unit 4 “Math Class” and “If the Shoe Fits!” Tasks

Week 2: Unit 4 “The Basketball Star” and “Public Opinions” Tasks

Week 3: Unit 4 “Leisure Time” and ‘Spaghetti Regression” Tasks

Week 4: Unit 4 “TV/Test Grades” and “Equal Salaries for Equal Work?” Tasks

Week 5: Unit 4 Review and Unit 4 Exam

Week 6: Unit 5 “Introduction to Translations, Reflections, and Rotations” and “Exploring Reflections and Rotations” Tasks

Week 7: Unit 5 “Mirrored Mappings” and “Coordinate Translations” Tasks

Week 8: Unit 5 “Transformations in the Coordinate Plane” Task

Week 9: Unit 5 Review and 9 Weeks Exam

Week 10: Unit 6 ‘New York Learning Task” and “Slopes of Special Pairs of Lines Learning Task”

Week 11: Unit 6 “Geometric Properties on the Plane Performance Task”

Week 12: Unit 6 “Euler’s Village Performance Task”

Week 13: Unit 6 Review and Unit 6 Exam

Week 14: Review for EOCT

Week 15: Review for EOCT

Week 16: EOCT

Week 17: Remediation and Preview of Analytic Geometry

Week 18: Review and Semester Exam

**Class Participation:**

Students are expected to attend class daily and only miss when it is absolutely necessary. Students will be graded on all in class tasks and there will be a participation aspect to their final grade on the task. Please see the rubric for class tasks at the end of this syllabus. If you do not participate and are off task your grade will suffer. Students can see the schedule for all tasks under “Class Schedule.” Being absent does not exempt you from completing a task, you must make an appointment to come after school and complete the task.

**Late Work Policy:**

Please pay attention to due dates in class. Assignments are to be turned in by the beginning of your class period on the day they are due. Anytime after that is considered late and will have 10% taken off the grade for every day that it is late including weekends and holidays. After 10 days a grade of zero will be entered into the grade book and it cannot be made up. Homework that is given and due the next class day will not be accepted late. You must complete the homework and get the practice for it to be useful. You may work ahead to help with time periods when you may have a lot going on. Please contact me if you are having difficulty so that we can work out a plan.

**Grading Policy:**

The following scale will be used to grade all assignments and tasks:

A= 90%-100%

B= 80%-89%

C=70%-79%

F= Below 70

Grades will be calculated using the following percentages:

Standards: 75%(These are the CCGPS standards located under “Learning Outcomes” in this syllabus. These are the topics that you should be able to explain and perform by taking this course. You will receive a numerical grade between 0 and 100 on these standards)

Graded Work: 25%(All tests, quizzes, homework, and Task assignments will be recorded in this section.)

Since our school grades based on the standard you can expect to get numerous grades on assignments that are turned in. When you take an assessment you will receive an overall grade on the test/quiz that will go under graded work and you will also receive individual standards grades based on your performance that will be recorded under Standards. All assessments will be cumulative and you must continue to show mastery of the standard. If your performance on a standard goes down then your grade for that standard will be adjusted to reflect your current mastery of the standard. Students can expect all assignments to be graded and returned within one week of the due date.

**Online Testing:** The assessments given in this course will be of a variety of types including online, randomized, and projects in order to limit academic dishonesty.

**Conduct & Academic Honesty:**

Students of Carroll County Schools are expected to behave with the utmost academic honesty when completing their assignments. Any student found to be doing actions deemed to be dishonest and against the Academic Honesty Policy will face disciplinary actions. The following actions are some of the examples of violations of the Conduct and Academic Honesty Policy:

Cheating

Plagiarism

Turning in another student’s work as your own

Giving another student your login and password

Violating the Conduct and Academic Honesty Policy can result in the following consequences:

Receiving a grade of zero on an assignment

Receiving no credit for the class

Detention

ISS

OSS

Suspension

Visit: <http://www.writing.northwestern.edu/avoiding_plagiarism.html> for tips on how to avoid plagiarism.

**Acceptable Use Policy (AUP):**

Carroll County Schools has an Internet Acceptable Use Policy, which can be found online at <https://eboard.eboardsolutions.com/Meetings/TempFolder/Policies/4027_IFBG-E(1)_7233_Exhibits.pdf>. Please read and make yourself familiar with the terms under this policy. You and your parent are required to sign a form saying that you understand the policy.

**Student Right to Privacy:**

Please visit the Family Educational Rights and Privacy Act (FERPA) website for more information: <http://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html>.

Student information can only be released to parents, students, educators with legitimate interests in the student, and federal or state officials who require it for legal reasons to comply with state or federal law.

Carroll County Board of Education’s policy on student privacy can be found here: <https://eboard.eboardsolutions.com/ePolicy/Policy.aspx?S=4027&Sch=4027&PC=JR&revNo=1.46&srch=privacy&ktype=Exact>

**Online Communication Guidelines:**

Please email me with any questions that you may have at: [elizabeth.whittington@carrollcountyschools.com](mailto:elizabeth.whittington@carrollcountyschools.com). When sending an email please put your first and last name in the subject line as well as your course name and class period, this will allow me to respond to your questions much faster. Please remember that I may not know exactly what problem you are having but I want to help! In your email please be a descriptive as possible when explaining the problem you are having so that I can get you the help you need as soon as possible. You should expect a response within 24 hours except on the weekend.

Remember when sending an email that you should adhere to certain protocols like not using all caps (which makes it seem as if you are yelling or angry) and proofreading your emails (autocorrect can sometimes be embarrassing).

This is an online formal course and not Facebook or a text message to one of your friends. Please do not use any abbreviations when posting in the discussion forums, in written papers, or in emails. Responses in the discussion forums should be at least a paragraph in length and answer all of the questions that are posed. Also each student should respond to two other student’s postings in the forum. Please check the course calendar to know when the initial postings are due as well as when the responses are due (these will be different days).

**Technology Requirements:**

Students must have access to a computer with Internet to complete some assignments for this course. The media center has computers with Internet access and can be used before or after school and during lunch with a note from the instructor. I also have a computer that you can use in my classroom and it is available before and after school. Please see me in order to sign up. The public library also has computers with Internet that can be used free of charge. This is a great resource if you need to go at night or on the weekends.

In order to assess your readiness for online learning please visit the READI-Readiness for Education At a Distance Indicator. It will tell you strengths and weaknesses as well as providing ways to improve your skills as an online learner.

READI  - [http://goml.readi.info/](javascript:doWindowOpen('http://goml.readi.info','new_frame','width=600,height=420,menubar=1,toolbar=1,scrollbars=1,status=1,location=1,resizable=1',0))  
Username: Teacher Password: Georgia

**Tech Support:**

If you are having any issues accessing course materials or completing assignments please contact me immediately. You cannot wait until the last minute to try and do something. You will not be granted extra time for assignments because of technical difficulties. Make sure you have another computer that you can use if something happens to the main one that you are using. Look under technology requirements for some suggestions of alternative places to use a computer should something happen to yours.

**Copyright Statement:**

All rights reserved. The material in the course if the property of the copyright holder and may not be reproduced, modified, or posted without their consent.

For more information on copyright laws and policies please visit:

<http://lib.byu.edu/sites/copyright/about-copyright/tutorial/>

**ADA Statement:**

I will provide accommodations to students with a current IEP or 504 plan on file with the school.

<http://www.naturalreaders.com/index.htm> Free software to read text

<http://www.khanacademy.org/> Website that has video lessons on many of the topics we will cover as well as practice

<http://quizlet.com/create_set/> Website that lets you create flashcards and use them to study

