Honors Algebra II

Course Instructor & Professional Biography

Keith Zielen

Mr. Zielen is a product of and a supporter of Catholic Education. He attended St. Hedwig's Elementary School, Regis Academy Middle School, and Bishop O'Reilly High School, part of the Diocese of Scranton, in Northeast Pennsylvania. In 2007, Mr. Zielen graduated with a B.S.E. in Secondary Education – Mathematics from Penn State University. While teaching at Holy Redeemer High School in Wilkes-Barre, PA he earned a Masters of Education in Curriculum and Instruction from King's College before moving to the Pittsburgh area in the summer of 2012. He then took a teaching position at Achievement House Cyber Charter School and soon transitioned to Math Department Head and eventually Curriculum Coordinator. He returned to Catholic Education at Cardinal Wuerl North Catholic in 2015. Mr. Zielen supports the drama department as the moderator of set construction and as stage manager for the school musicals. He is also the moderator and sponsor for the Pennsylvania Junior Academy of Science.

Course Description

Algebra II builds on work with linear, quadratic, and exponential functions and allows for students to extend their repertoire of functions to include polynomial, rational, and radical functions. Students work closely with the expressions that define the functions, and continue to expand and hone their abilities to model situations and to solve equations, including solving quadratic equations over the set of complex numbers and solving exponential equations using the properties of logarithms. The Mathematic Practice Standards apply throughout each course and, together with the content standards, prescribe that students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations. Honors Algebra II covers material at a greater depth and faster pace.

Course Resources

"Algebra II – Common Core", Pearson Education, Copyright 2015 (ISBN13: 9780133281163)
TI-84, TI-84+ Graphing Calculators (Student Provided)
Computer w/Internet Access

End of Course Outcomes

Upon completion of the Course, the Students will be able to:

- Extend the properties of exponents to rational exponents
- Reason quantitatively and use units to solve problems
- Perform arithmetic operations with complex numbers
- Use complex numbers in polynomial identities and equations
- Perform operations on vectors
- Interpret the structure of expressions
- Write expressions in equivalent forms to solve problems
- Perform arithmetic operations on polynomials
- Understand the relationship between zeros and factors of polynomial
- Use polynomial identities to solve problems
- Rewrite rational expressions
- Create equations that describe numbers or relationships
- Understand solving equations as a process of reasoning and explain the reasoning
- Solve equations and inequalities in one variable
- Solve systems of equations
- Represent and solve equations and inequalities graphically
- Understand the concept of a function and use functional notation
- Interpret functions that arise in applications in terms of the context
- Analyze functions using different representations
- Build a function that models a relationship between two quantities
- Build new functions from existing functions
- Construct and compare linear, quadratic, and exponential models and solve problems
- Interpret expressions for functions in terms of the situation they model
- Summarize, represent, and interpret data on a single count or measurement variable
- Summarize, represent, and interpret data on two categorical and quantitative variables
- Understand and evaluate random processes underlying statistical experiments
- Make inferences and justify conclusions from ample surveys, experiments, and observational studies
- Understand independence and conditional probability and use them to interpret data
- Use the rules of probability to compute probabilities of a compound events in a uniform probability model
- Use probability to evaluate outcomes of decisions

Course Units by Sequence

- Basic Algebra
- Linear Equations and Functions
- Absolute Value
- Exponents and Polynomials
- Rational Expressions and Equations
- Radical Expressions and Equations
- Quadratic Equations and Functions
- Polynomial Equations and Functions
- Exponential and Logarithmic Functions
- Parent Functions and Transformations
- Statistics and Probability
- Matrices

Major Subject Area Academic Standards Addressed

N.CN.2 Perform arithmetic operations with complex numbers. Use the relation i^2 = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

A.SSE.1 Interpret the structure of expressions. Interpret expressions that represent a quantity in terms of its context.

A.SSE.4 Write expressions in equivalent forms to solve problems. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.*

A.APR.1 Perform arithmetic operations on polynomials. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

A.APR.2 Understand the relationship between zeros and factors of polynomial. Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).

A.APR.6 Rewrite rational expressions. Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.

A.CED.2 Create equations that describe numbers or relationship. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*

A.CED.3 Create equations that describe numbers or relationship. 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.*

A.CED.4 Create equations that describe numbers or relationship. 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.*

F.IF.6 Interpret functions that arise in applications in terms of the context. 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.*

F.IF.7 Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*

F.IF.8 Analyze functions using different representations. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

F.BF.1 Build a function that models a relationship between two quantities. Write a function that describes a relationship between two quantities.*

F.BF.3 Build new functions from existing functions. 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.

F.BF.4a Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, f(x) =2(x^3) or f(x) = (x+1)/(x-1) for $x \neq 1$ (x not equal to 1).

S.ID.4 Summarize, represent, and interpret data on a single count or measurement variable. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.*

S.IC.1 Understand and evaluate random processes underlying statistical experiments. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.

S.IC.3 Make inferences and justify conclusions from sample surveys, experiments, and observational studies. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each

S.MD.7 Use probability to evaluate outcomes of decisions. Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

Student Assessments

Students are assessed frequently, both formally and informally. Grades are determined by student performance on tests, quizzes, projects, homework, and binder checks. Grades are not weighted by category, but by the number of points each assessment is assigned. Grading is outlined more specifically in my classroom policies section (see *Grades* on page 7)

Grading

A – 93-100%
B – 85-92%
C – 75-84%
D – 70-74%
F – below 70%

Contact Information

kzielen@cwnchs.org
www.mrzielen.com
Cardinal Wuerl North Catholic High School
1617 Route 228
Cranberry TWP. PA 16066
cwnchs.org

Classroom Procedures and Policies

Start of Class

1. The bell will ring to signal the scheduled start of class. At this time, be in your assigned seat with your class materials on your desk. Your daily class materials include your binder with loose leaf paper, a pencil, a red pen for checking homework, and your school approved TI-83/84 calculator.
2. Begin the warm-up problem or follow instructions given on the board or verbally. There will always be something to do independently while attendance is taken and administrative tasks are completed.
3. Once administrative tasks are completed and sufficient time has been allotted to finish the warm up problem, class will begin with the following prayer:

O God and Father of our Lord and Teacher, Jesus Christ
Grant us diligence and attention to our vocations as student and teacher
That our knowledge and wisdom may increase to the blessing of our neighbor
Amen

Classroom Expectations

- Be respectful toward the teacher and students in the room
- Be in proper dress code
- Do not use your cell phone
- Do not eat or drink (except water in an approved container)
- Raise your hand if you would like to answer or ask a question
- Respect the facilities, do not deface school property or leave garbage in the room. Pick up after yourself.
- Do not pack up early

You will hear me say throughout the year that, "You have the freedom to choose, but you do not have freedom from the consequence of those choices." Making choices that have positive consequences will be celebrated in this class just as much as making choices that have negative consequences will be punished. See the list of consequences and privileges for more detail.

Missing Class Time

- **BATHROOM**: Unless it is a true emergency, wait for an opportune time to use the bathroom. You are responsible for what you miss when you are out of the classroom, so I will strongly discourage leaving the room during our lessons.
- **LOCKER**: Students will not be permitted to leave the room to retrieve forgotten materials.
- **LATE TO CLASS**:
  - There are times when a teacher will need to hold you late after a class. When returning, do not disrupt the class that is in progress.
  - Arriving late to class without a late pass from a teacher will not be tolerated
- **SPORTS/FIELD TRIP/ETC**: If dismissed while a class is in progress, do not be a disruption to the lesson that is in progress. Quietly pack your belongings and exit the room respectfully. If you are dismissed, you are responsible for the work you missed. See the class website if you are unsure what was assigned.
- **ILLNESS**: If you are absent from school due to illness you will be given a short extension so that you can turn in your best work.

Be aware that you may miss part of a lesson when you are out of class. I do recall and summarize concepts throughout each unit, but you will need to be proactive to get caught up. Topics in a math class build upon one another, so please get the necessary help as soon as you can.

Student Binder

- All notes and homework should be completed and organized in your class binder. Each day we will put a new heading on our notes and a similar heading should be added to homework.
- Keep all class materials including returned quizzes and tests in your binder
- Complete all homework in pencil. Notes may be taken in pen. Using different colors or highlighters is encouraged to help promote a clearer understanding of course topics.
- Students will be assessed on their note taking routine in a binder test. See the section on grades for more detail.

OneNote

- All class resources will be available in our shared class notebook in OneNote. All students must be able to access the desktop version of OneNote. If you are unable to sync our notes to your computer, please let me know as soon as possible and get technical help if I am unable to solve the problem.
- Class resources that will appear in OneNote may include class notes, homework problems and solutions, videos, and study guides.
- This is a resource and is not intended to replace the act of note-taking during class. If you miss a definition or even a whole day of school, you may copy from our online notes, but unless special directions are given during class, you should not access OneNote during our instructional time in class.

Homework

- Math is a skill. In the same way you practice for a sport or a play every day, I expect that you practice mathematics daily.
- Since homework is to be completed in pencil, when checking your work, circle the number of the problem you missed with your red pen and write the correct answer.
- Try to identify where you went wrong, if you are unsure, ask when we review the assignment.
- Redo that problem as soon as you can, keep trying until you can solve it on your own.
- Most days there will be a specific homework assignment, but an unspoken homework assignment each night is to re-do homework problems that gave you trouble. If you adopt this routine, I can promise you will not struggle when reviewing for tests.
- I may collect homework assignments. Each assignment should have your name and start on a new sheet of loose leaf paper. You should copy the original problems and any diagrams, show your work, and box or circle your answer.
- I do not assign homework problems that you are incapable of solving. If you think you don't know what to do:
    - Begin by copying the original problem and any related diagrams or pictures
    - Look in our notes for an example like the problem you see
    - Try something…even if you don't know what the next step will be.
    - You should ***never*** leave problems blank
- I may grade the entire assignment, check select problems, or merely scan to make sure that it is complete. I will return all collected assignments within 1-2 class days.
- We may review the problems in each night's assignments before or after I collect the assignment.
- At the end of each quarter, I will add 5 points as a "forgiveness grade." I understand that everyone has a bad day and misses a homework assignment. If you don't have any bad days, you'll reap the rewards of extra credit points!

Perhaps my most frequent discussion with students [soapbox] regarding homework sounds like the following:

> *It's easy to fall into the habit of skipping one or two homework problems each night because there is a 'trick' to them and it's easier and quicker to get an explanation in class than to work towards a solution. Many times this problem makes sense when explained, but if you never go back and try the problem again – you may not actually do that type of problem by yourself until you are forced to on a test. You want to practice the toughest problems several times before you are tested.*

Tests/Quizzes

- I will provide you with a review for each test to help you know what I expect from you. This can also be used to gauge how long the test may take you. If you think you will need extra time, please ask at least a day in advance so that this can be coordinated with your study hall proctor. No additional time will be granted on the day of a test without prior arrangements.
- Tests will have two parts. About half the test will be completed without use of a calculator. The other half will require the use of a calculator. This is intended to model the new format of the Math SAT and to promote numerical literacy.
- If you miss a test, you will be expected to take the make-up when you return. 5 points will be deducted from the score for each day you do not take the make-up without excuse.

Grades

I will not use category weighting in my gradebook. Rather, assignments are weighted by the number of points they are assigned. To calculate your average, you simply add all the points you have earned and divide by the total number of points possible.

- **Tests/Quizzes/Projects**
  - We will have about 3 tests each quarter. Tests are worth 100 points.
  - Quizzes are shorter and cover less material than tests. Quizzes may be announced or unannounced and are worth fewer than 100 points, though the actual amount may vary from quiz to quiz.
  - Projects will vary in nature but will have some component of in-class work coupled with out-of-class work. Projects will be worth points proportional to the requirements of the project as determined by the teacher.

- **Homework**
  - Homework assignments are worth 5 points. We typically have 20 assignments each quarter (give or take) so homework has about the same weight as a major test. Most of the time, homework is checked for completeness, but some assignments may be collected and graded for correctness. I will not announce which assignments will be collected. You should complete each homework to the best of your ability.
  - In lieu of checking or collecting homework, I may instead quiz you on the problems you were asked to complete on an assignment. This usually follows a review of that night's homework assignment.
  - I do not accept late work. I post assignment solutions online and once we have reviewed the assignment, you lose the opportunity to ask timely questions. It may seem strict, but I want to strongly encourage completion of assignments on-time.

- **Binder Checks**
  - Three to five times each quarter, an unannounced binder quiz will be given to all students. Students should keep their notes current with the class and not wait to copy missing notes or complete missing homework.

The binder quizzes and homework grade are earned by meeting class expectations.
They are meant to be grade boosters, so don't lose these easy points!

Gradebook

As a method of my own organization, when I enter a grade into the gradebook, I use a "suffix code" as a way to add a note to a grade. You may see the following:

- XX.01 – This means the grade can be made up
  - Ex: 0.01 as a test grade will (temporarily) average like a 0 but can be completed without penalty
    - I do this because it is important to make up missing work as soon as possible, and when students and parents see the impact a 0% can have on a grade, they are more aware that something needs to be completed.
  - Ex: 2.01 as a homework grade means I am awarding partial credit, but will allow resubmission
- XX.02 – This means that the grade is a result of a re-test or an allowed re-submission, replacing a prior grade
  - A note is usually added to the grade indicating the original score
- XX.03 – This means that the grade was adjusted in some way
  - Ex: 60.03 might mean that a test score was very low, but was adjusted because a student turned in an assignment to make up some of the lost points
- IP – "In Progress" – Similar to a 0.01, but does not average into a student's grade.
- EX – "Exempt" – Used to note when an assignment/quiz/test does not need to be completed
  - Ex: A transfer student may have EX in the gradebook for tests/quizzes administered before joining

Extra Help

- I am available after school on Tuesdays for our Math Café. You are welcome to join to simply work on that night's homework or you can bring specific questions with you, but please be patient if there are others who want help too.
- I regularly stay on other days of the week as needed, please ask in advance if you would like to meet with me and we can determine a common time to work.

Calculators

- Cardinal Wuerl North Catholic High School requires all students to purchase a graphing calculator. We believe this is an essential learning tool which allows our students think about math in a more critical way and helps students make connections between math concepts.
- The graphing calculator that we will be modeling during our lessons and that we recommend for all students is the Texas Instruments 84+ graphing calculator (preferably battery operated). The base cost for these is no more than $100. More expensive upgraded versions are completely optional.
- Please put your name on your calculator in multiple places. On the back, the sliding cover, and inside the battery compartment where the ink will not rub off. This will help us get it back to you if you misplace it. Also, try not to misplace your calculator.

Textbooks

You have a numbered textbook assigned to you. You are expected to return the book in the same condition that it was in when issued to you at the beginning of the year. Keep all textbooks covered. Homemade covers with brown paper grocery bags are more durable than any other covers you could purchase.

Contacting Your Teacher

If you need to contact your teacher, please email kzielen@cwnchs.org. Emails come straight to my phone so it's the best option for a quick response.

We will also establish a text message based communication system using *Remind*. A separate sheet will explain how this service works.

Classroom Consequences and Privileges

	1st Offense	2nd Offense	Additional Offenses
Late to class	Warning, Email Home	Morning Detention	Administrative Detention
Failure to focus on the start-of-class activity	Warning, Email Home, Reduction of HW Grade	Morning Detention, Reduction of HW Grade	Morning Detention, Reduction of HW Grade, Behavior Plan Referral
Missing class materials	Warning, Email Home	Reduction of HW grade	
Out of dress code	Uniform violation notice submit to administration		
Cell phone use	Phone confiscated, email home	Phone confiscated, Morning Detention	Phone confiscated, Administrative Detention
Food/drink in classroom	Warning, Email Home	Morning Detention	Administrative Detention
Disrupting the class	Warning, Email Home	Morning Detention	Administrative Detention, Behavior Plan Referral
Disrespect toward students/teacher	Morning Detention, Email Home	Administrative Detention, Behavior Plan Referral	
Packing up early	Warning, Email Home	Morning Detention	
Cheating	Email Home, 0% for assignment/test, Morning Detention	Administrative Detention, 0% for assignment/test, Behavior Plan Referral	

*Morning detention is held the following day from 7:20AM until 7:50AM with Mr. Zielen

**Failure to attend morning detention will result in an Administrative Detention.*

Privileges:

For having a "clean record" at the end of each quarter, a student may request one of the following rewards:

- An addition of 0.5-1.5 points to the end-of-quarter grade if close to the next letter grade. (e.g. a student with a 92% could be *bumped* up to 93% to earn an A as a reward)
- An exemption of one homework assignment for the recently finished quarter or the upcoming quarter
- A positive note home/letter of recommendation
- Drop the lowest quiz grade for the recently finished quarter
- Alternative request if approved by the teacher