



WHEELING JESUIT UNIVERSITY

Department of Mathematics - Spring 2019

Course Title:	ALGEBRA REVIEW		
Course No.:	MATH 101-01 (3 crs)	Classroom:	ASC-207
Prerequisite:	None	Class Time:	MWF 10:00-10:50 AM
Faculty:	Fr. Luis A. Tampe, S.J., S.T.D.	Office	Wednesday 2:30 to 5:00 PM
Office:	Donahue 127E	Hours:	(see Bb for more times)
Phone:	304-243-2269 / -2380 (Office)	Email:	ltampe@wju.edu

An algebra student shouts in exasperation, "After I graduate, I'll write an app that'll do all your algebra homework!" The student's mother quips back, "You'll need algebra for that."

Anonymous

Our civilization would collapse without mathematics . . . Algebraic algorithms underpin animated movies, investment strategies and airline ticket prices. And we need people to understand how those things work . . . Quantitative literacy clearly is useful in weighing all manner of public policies, from the Affordable Care Act, to the costs and benefits of environmental regulation, to the impact of climate change. . . . Ours is fast becoming a statistical age . . .

Andrew Hacker

As long as algebra is taught in school, there will be prayer in school.

Cokie Roberts

COURSE DESCRIPTION

This course provides a review of topics from elementary and intermediate algebra, including first order equations, exponents and radicals, polynomials, quadratic expressions, quadratic equations, rational expressions, linear and nonlinear systems of equations, inequalities and the binomial theorem. This course is preparatory and will not satisfy the University's core curriculum requirement in mathematics.

REQUIRED ITEMS

Before the end of the first week of class, please create an account with the online program ALEKS (www.aleks.com). The ALEKS class code is **FEARC-PFREE** for this section of MATH 101. Once you open your ALEKS account, please complete as soon as possible the Tools Tutorial, Initial Knowledge Check, and the Knowledge Check. You also need to purchase a notebook that you will bring to every class and use exclusively for this course. In addition, you will need a calculator or a smart phone with a calculator app to work on the ALEKS Pie topics, the tests, and the final exam. Graphing calculators are not allowed.

STUDENT LEARNING OBJECTIVES

Upon successful completion of MATH 101, you will be able to use the basic algebra skills necessary to succeed in core mathematics courses. More specifically, you will be able to:

1. Solve problems involving factoring, fractions, mixed numbers, and decimals. (M)
2. Solve problems involving basic data analysis and geometric shapes. (M)
3. Solve problems involving plotting, rational and real numbers, and the order of operations. (M)
4. Solve problems involving linear equations and inequalities. (M)
5. Solve problems involving lines and functions, and systems of linear equations. (M)
6. Solve problems involving exponents and polynomials as well as rational expressions. (M)
7. Solve problems involving radicals as well as quadratic equations and functions. (M)
8. Solve problems involving function operations and inverses. (M)
9. Solve problems involving exponential and logarithmic functions. (M)

EVALUATION METHODS

I will use the distribution described below to calculate your final course grade provided you do not violate the academic-integrity policy of Wheeling Jesuit University, engage in a pattern of disruptive classroom behavior, or accrue more than six absences during the semester. Without a prompt explanation and, where possible, documentation, your grade for a required assignment not completed on the scheduled date will be zero. If you have taken all five tests and your final-exam grade is higher than your lowest test score, I will drop that lowest test and make the final exam worth 30% of your course grade as shown in the table below. I will not drop your lowest test grade if you fail to take all five tests. Completing the practice tests can improve your test grades as described below.

Grade Distribution	
If your final-exam grade is lower than your lowest test score	If you take all five tests and your final-exam grade is higher than your lowest test score
30% ALEKS Pie	30% ALEKS Pie
50% Five In-Class Tests	40% Four Highest In-Class Tests
20% In-Class Cumulative Final Exam	30% In-Class Cumulative Final Exam

After rounding off all decimals and under normal circumstances, I will use the scale outlined below to determine your final course grade.

Grading Scale			
94-100	A	83-86	B
90-93	A-	80-82	B-
87-89	B+	77-79	C+
		73-76	C
		70-72	C-
		66-69	D+
		60-65	D
		0-59	F

In addition to good on-time attendance and using your notebook to work consistently on ALEKS during the class period, passing this course requires you to complete successfully five tests, a cumulative final exam, and as many of the topics in the ALEKS Pie as possible. I will periodically notify you through Blackboard of your standing (grade) in the course.

Five In-Class Tests

The five online, in-class tests are closed book and closed notes. Unless other arrangements are made with me well in advance for a serious reason, you must take each test in our classroom on the scheduled date and time. Two days before each test, you will have access to a practice test covering the same topics. If you obtain at least 70% on a test and your grade on the corresponding practice test is higher than your test grade as determined by ALEKS, I will use the formula below to adjust your test grade.

$$\text{Adjusted Test Grade} = T + \left(\frac{\frac{(P+T)}{2} - T}{5} \right) \text{ if and only if } P > T \geq 70$$

Here P and T are your practice-test and test grades, respectively, as determined by ALEKS. For example, suppose ALEKS calculates that you earned an A (100%) on the third practice

test but only a C– (70%) on the third test. In this case, I will adjust your grade on the third test so that it now becomes a C (73%) as shown below.

$$\text{Adjusted Test Grade} = 70 + \left(\frac{\frac{(100+70)}{2} - 70}{5} \right) = 70 + \left(\frac{85 - 70}{5} \right) = 70 + 3 = 73$$

If ALEKS determines that your grade on a given test is lower than 70% or if it is higher than, or equal to, your grade on the corresponding practice test, I will not adjust your test grade. Please note that bathroom breaks are generally not allowed during test taking.

In-Class Cumulative Final Exam

The online, in-class cumulative final exam is closed book and closed notes. Unless other arrangements are made with me well in advance for a serious reason, you must take the final exam in our classroom on the date and time scheduled by the Registrar's Office for your section. As with each test, you will have access to a practice final exam two days prior to the final. If you obtain at least 70% on the final exam and your grade on the practice final exam is higher than your final-exam grade as determined by ALEKS, I will adjust your final-exam grade using a suitably modified version of the formula described above. If ALEKS determines that your grade on the final exam is lower than 70% or if it is higher than, or equal to, your grade on the practice final exam, I will not adjust your final-exam grade. Bathroom breaks are generally not allowed during the final exam.

ALEKS Pie

The ALEKS Pie contains 345 topics which you must successfully complete by the end of the semester to obtain full credit for this part of your grade. Immediately after 5:00 PM on the last day of finals week, I will record the percentage of the ALEKS Pie you have completed and use it to calculate your final course grade as outlined in the Grade Distribution table above. During the semester, ALEKS will automatically generate Knowledge Checks which you must complete. How well you do on these Knowledge Checks will affect your ALEKS Pie completion. The grades you earn on the practice tests, the tests, and the final exam do not impact your progress completing the topics in the ALEKS Pie.

Class Work

I encourage and fully expect your on-time attendance and focused work in class. To that end, please sit in the same seat for the duration of the semester to expedite my record keeping, use your notebook to work methodically through the topics in the ALEKS Pie during the entire class time, and avoid disruptive behavior, meaning any conduct that diminishes the learning environment of our classroom by distracting me or others—examples include talking, texting, listening to loud and distracting music on your earphones, surfing the web or merely giving the impression of doing so, using a messaging app, frequent tardiness, and recurring

bathroom breaks. You may help each other during class time, but only if you whisper and do not distract your classmates.

Optional Extra-credit Assignments

As an opportunity to write an optional two-page reaction paper, I may suggest watching a particular broadcast, participating in an event, or attending a presentation on campus. Please note that, in the absence of a major documentable emergency, I typically do not accept late papers. Submitting an extra-credit paper on time requires handing in a hard copy during the regularly scheduled class period in which it is due. Please write your papers on the template included in the course's Blackboard page and use Times New Roman 12-point font as well as standard margins. Your paper's line spacing should be no greater than two and no smaller than one and a half. Submitting a handwritten hard copy or a paper containing overly faint, illegible typeface is unacceptable. Unacknowledged sources that are quoted directly or merely paraphrased are entirely inappropriate and will be considered plagiarism. I will add any extra-credit points you earn during the semester to your final-exam grade.

ATTENDANCE POLICY

Regardless of your current year of study at the University (e.g., freshman, sophomore, etc.), more than six absences or a pattern of disruptive behavior—such as frequent tardiness—will become a major factor in determining your final grade and can result in an FA (failure due to excessive absences). I expect you to attend every class and not be late. There may be exceptional circumstances when you must miss a class. If you do miss a class, please see me as soon as possible and log into ALEKS the same week to continue completing your ALEKS Pie for an additional fifty minutes. Please see me following the end of class if you arrive after I have taken attendance to ensure that I have not recorded your tardiness as an absence. Please note that Wheeling Jesuit University does not distinguish between excused and unexcused absences, meaning every absence, regardless of your reasons for missing class, adds to your total number of absences.

Leaving Class Early

If you know ahead of time that you will leave class early, please let me know before I take attendance. In a university setting, letting your professors know that you need to leave class early is considered proper form and common courtesy.

Missing a Test or the Final Exam

If you are absent on the day of a test, you should provide me by the very next class with an explanation and, if possible, appropriate documentation regarding your absence. If you miss the fifth test on the last day of class, you must contact me no later than twelve hours after the

test begins. Failure to take these steps can result in a zero for a missed test. If you are absent on the day of the final exam and do not provide me with an explanation and, if possible, appropriate documentation within twelve hours of the final's listed start time, your grade for the final exam could be zero. Please speak with me well in advance if you know ahead of time that, for a serious reason, you will be absent on the day of a test or the final exam. Failure to contact me in advance could result in a zero for that test or the final. You are responsible for making up missed tests and the final exam as soon as possible.

Student Athletes

If you are a student athlete, please provide me with your travel and game schedule ahead of time. For obvious reasons, this requirement becomes essential if your game schedule conflicts with any of our course's tests or with the final exam. Please note that student athletes in particular need to be vigilant about missing class since Wheeling Jesuit University does not distinguish between excused and unexcused absences.

DROPING OR WITHDRAWING FROM THE COURSE

The last day of the Add/Drop period for this semester is Friday January 11, 2019. The last day to withdraw from a course with a grade of a W is Tuesday March 26, 2019.

DISABILITY STATEMENT

Wheeling Jesuit University offers students with documented disabilities individual accommodations on a case-by-case basis with confidentiality in compliance with the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act of 1973. Ultimately, all students are responsible for their own academic achievement and must attend classes, complete course assignments, and fulfill all university requirements for their chosen field of study. It is up to students with disabilities to seek out available assistance on campus and to utilize individualized accommodations. In order to receive accommodations under Section 504 and ADA, students with disabilities must self-identify to the University, provide current (within three years) and comprehensive documentation concerning the nature and extent of the disability, and communicate their needs to the Disability Services Director located in the ground level of Ignatius Hall, Room G24, or call 304-243-4484 before each semester begins.

ACADEMIC INTEGRITY STATEMENT

As an integral part of this course, I will strictly enforce the academic integrity policy of Wheeling Jesuit University (see www.wju.edu/academics/catalogs/). Sanctions for academic offenses include a “reduction in grade or a failing grade” on the assignment, test, or exam in which the offense occurred. Depending on the violation’s severity, the penalty can also include failing the course regardless of one’s previous grades. Cheating during an exam or test—for example, by using unauthorized sources—will result in a zero for that exam or test. Failing to cite all sources in a written assignment also constitutes a serious violation of academic integrity. These offenses can result in suspension and even dismissal from the University. I will inform the Faculty Academic Integrity Officer of each violation by filing an *Academic Integrity Citation Form* which will be added to the offending student’s record. Although not intended to be an exhaustive list, the following constitute acts of academic dishonesty: plagiarism, deceit, cheating, fabricating data, the use of fictitious sources, the use of devices or sources not authorized by your instructor, presenting as one’s own the work of another person, and allowing someone to copy your paper, exam answers, or other work.

STUDENT EMAIL ACCOUNT AND BLACKBOARD

Please check your Wheeling Jesuit University email account every day since it is the primary means of communication used by this institution. I will use it to inform you of changes to our class schedule or to share other course-related information. You should also routinely check our course’s Blackboard page since it will contain your attendance record, course standing, and links relevant to MATH 101.

USE OF ELECTRONIC DEVICES IN CLASS

During class, please keep cell phones and other such devices in their silent mode. Unless approved by me beforehand, please do not videotape or record our class time. You may use a calculator or a smart phone with a calculator app to work on practice problems in class and during tests and the final exam. Computers in our classroom should only be used to work on completing your ALEKS Pie. Please do not surf the web, use a messaging app, or work on other material during the class period.

ACADEMIC RESOURCE CENTER

The Academic Resource Center (ARC) is a totally free academic-support service available to all enrolled Wheeling Jesuit University students and staffed almost exclusively by WJU students recommended for employment by WJU faculty. The ARC is located in Bishop Hodges Library and is open five days a week: Sundays (6:00-8:00 PM) and Mondays-Thursdays (1:00-9:00 PM). Please visit the ARC's website (readily accessible on the Cardinal homepage under "Quick Links" or as the first listing under "Student Services") to learn about the ARC's services (emphasizing writing, math, and the sciences) and to schedule appointments.

SUCCEEDING IN THIS COURSE

Your chances of succeeding in this course and fruitfully understanding the assigned topics are greatly enhanced if you aim to: **(1)** arrive on time for every class; **(2)** use your notebook to work methodically and consistently through the topics in ALEKS, spending a minimum of four hours each week on focused practice and on completing the ALEKS Pie; **(3)** abide by the norms of academic integrity; and **(4)** avail yourself, as needed, of my help and of the services provided by the Academic Resource Center or ARC (located in the Bishop Hodges Library; 304-243-4473), Disability Services (Ignatius Hall G24; 304-243-4484), the Health Center (McDonough 219; 304-243-2275), and the Counseling Center (Ignatius Hall G23; 304-243-2081). I am happy to help you: please call (304-243-2269) or email (ltampe@wju.edu) me if you have questions. I encourage you to use the link in our course's Blackboard page to make an online appointment to see me in my office (Donahue 127E). Please be proactive: let me know as soon as possible of any special circumstances or difficulties that could potentially affect your class attendance or even your final course grade.

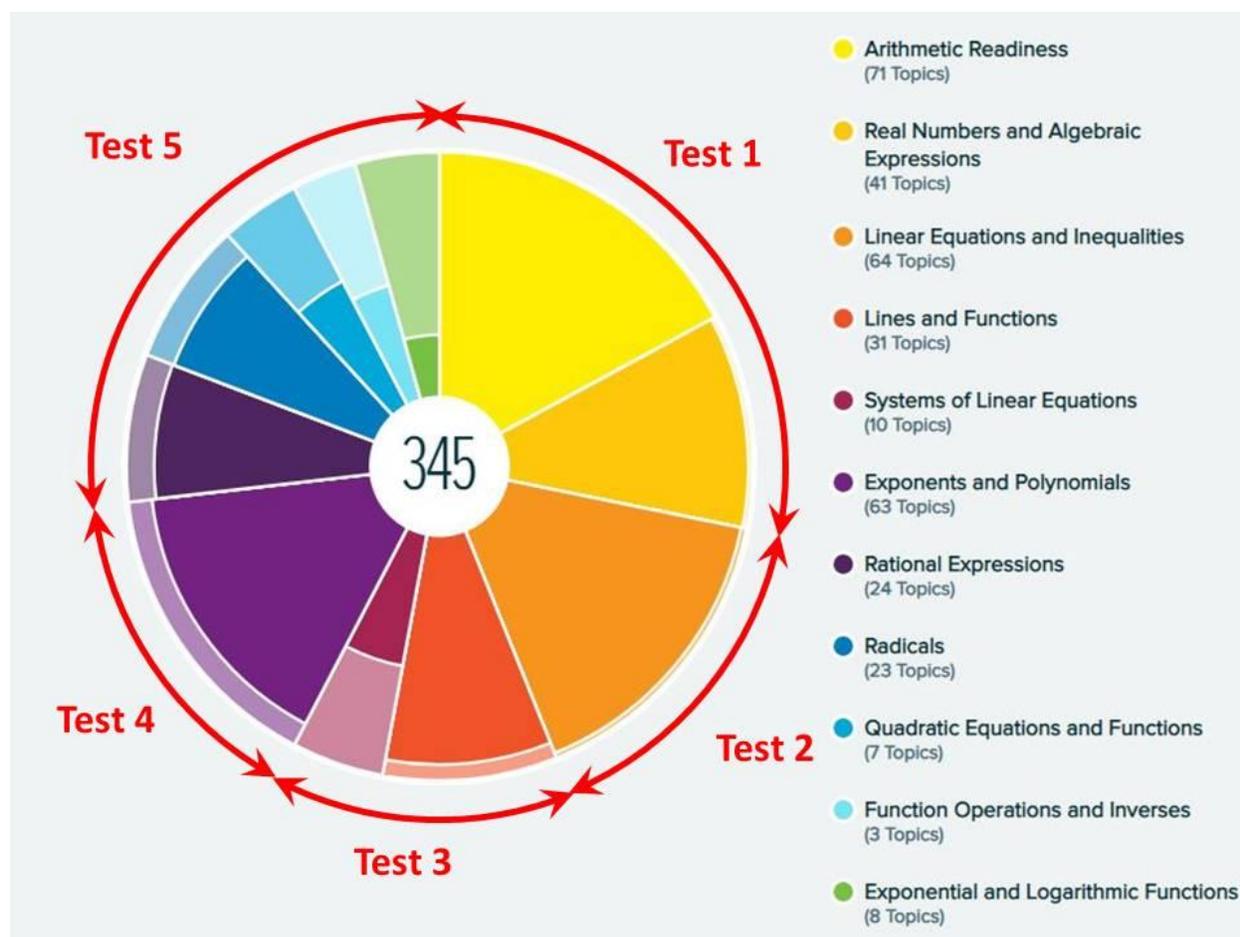
TITLE IX STATEMENT

Wheeling Jesuit University seeks to provide an environment that is free of bias, discrimination, and harassment. If you have been the victim of sexual harassment, misconduct, or assault we encourage you to report this. If you report this to a faculty member, she or he must notify our college's Title IX coordinator about the basic facts of the incident (you may choose whether you or anyone involved is identified by name). For more information about your options at WJU, please go to <http://wju.edu/titleix/>.

COURSE OUTLINE

A summary of important dates is included below. A detailed list of the course's topics is included further below. Because the test dates may vary during the course of the semester, please contact your classmates in the event of an absence to ensure that you are up to date on the schedule. If during the semester you advance through the topics of the ALEKS Pie much faster than your classmates, please contact me about taking the remaining tests earlier than scheduled.

Important Dates — Spring 2019		
January	Mon 7 Fri 11	Start of Semester Last Day to Add/Drop
February	Wed 6 Mon 11 Fri 22	Test 1 Advisory Grades Due Test 2
March	4 – 10 Fri 15 Tues 26	Spring Break Test 3 Last Day to Withdraw with a Grade of W
April	Tues 2 Wed 3 18 – 22 Fri 26 Mon 29	Research Day – No Classes Test 4 Easter Break Test 5 – Last Day of Classes Final Exam 11:00 AM to 1:30 PM
May	Thurs 2	ALEKS Pie 5:00 PM



As detailed below, this course covers a total of 345 topics. The  symbol designates subjects that are accessible to visually impaired students using a screen reader.

Arithmetic Readiness (71 topics) – Test 1

Whole Numbers (10 topics)

- Writing expressions using exponents 
- Introduction to exponents 
- Order of operations with whole numbers 
- Order of operations with whole numbers and grouping symbols 
- Order of operations with whole numbers and exponents: Basic 
- Factors 
- Prime numbers 
- Prime factorization 
- Greatest common factor of 2 numbers 
- Least common multiple of 2 numbers 

Fractions (14 topics)

- Equivalent fractions 
- Simplifying a fraction 
- Addition or subtraction of fractions with the same denominator 

- Addition or subtraction of fractions with different denominators
- Fractional part of a circle
- Product of a unit fraction and a whole number
- Product of a fraction and a whole number: Problem type 1
- Introduction to fraction multiplication
- Fraction multiplication
- The reciprocal of a number
- Division involving a whole number and a fraction
- Fraction division
- Order of operations with fractions: Problem type 1
- Order of operations with fractions: Problem type 2

Mixed Numbers (8 topics)

- Writing an improper fraction as a mixed number
- Writing a mixed number as an improper fraction
- Addition of mixed numbers with the same denominator and carry
- Mixed number subtraction with the same denominator and renaming
- Addition of mixed numbers with different denominators and renaming
- Subtraction of mixed numbers with different denominators and renaming
- Mixed number multiplication
- Mixed number division

Decimals (19 topics)

- Decimal place value: Tenths and hundredths
- Rounding decimals
- Converting a decimal to a proper fraction in simplest form: Advanced
- Word problem with addition of 3 or 4 decimals and whole numbers
- Word problem with subtraction of a whole number and a decimal: Regrouping with zeros
- Multiplying a decimal by a whole number
- Decimal multiplication: Problem type 1
- Multiplication of a decimal by a power of ten
- Word problem with decimal addition and multiplication
- Division of a decimal by a whole number
- Division of a decimal by a 2-digit decimal
- Division of a decimal by a power of ten
- Word problem with decimal subtraction and division
- Converting a fraction to a terminating decimal: Basic
- Converting a fraction to a terminating decimal: Advanced
- Converting a fraction to a repeating decimal: Basic
- Converting a fraction to a repeating decimal: Advanced
- Converting a mixed number to a terminating decimal: Basic
- Converting a mixed number to a terminating decimal: Advanced

Converting Between Fractions, Decimals, and Percentages (3 topics)

- Converting between percentages and decimals
- Converting a percentage to a fraction in simplest form
- Converting a fraction to a percentage: Denominator of 20, 25, or 50

Data Analysis (5 topics)

- Mode of a data set
- Average of two numbers
- Mean of a data set
- Mean and median of a data set

- Weighted mean 

Geometry (12 topics)

- Perimeter of a polygon 
- Perimeter of a square or a rectangle 
- Area of a square or a rectangle 
- Area of a triangle 
- Area of a parallelogram 
- Area of a trapezoid
- Circumference and area of a circle 
- Volume of a rectangular prism 
- Volume of a cylinder 
- Surface area of a cube or a rectangular prism 
- Surface area of a cylinder 
- Finding supplementary and complementary angles 

Real Numbers and Algebraic Expressions (41 topics) – Test 1

Plotting and Ordering (8 topics)

- Fractional position on a number line 
- Plotting integers on a number line
- Plotting rational numbers on a number line
- Writing a signed number for a real-world situation 
- Using a common denominator to order fractions 
- Ordering integers 
- Square root of a perfect square 
- Absolute value of a number 

Operations with Rational Numbers (16 topics)

- Integer addition: Problem type 1 
- Integer addition: Problem type 2 
- Integer subtraction: Problem type 1 
- Integer subtraction: Problem type 2 
- Integer subtraction: Problem type 3 
- Word problem with addition or subtraction of integers 
- Integer multiplication and division 
- Multiplication of 3 or 4 integers 
- Identifying numbers as integers or non-integers 
- Identifying numbers as rational or irrational 
- Signed fraction addition or subtraction: Basic 
- Signed fraction addition or subtraction: Advanced 
- Signed fraction multiplication: Basic 
- Signed fraction multiplication: Advanced 
- Signed decimal addition and subtraction with 3 numbers 
- Operations with absolute value: Problem type 2 

Exponents and Order of Operations (4 topics)

- Exponents and integers: Problem type 1 
- Exponents and signed fractions 
- Order of operations with integers 
- Order of operations with integers and exponents 

Evaluating Expressions (2 topics)

- Evaluating a linear expression: Integer multiplication with addition or subtraction 

- Evaluating a quadratic expression: Integers

Properties of Real Numbers (11 topics)

- Combining like terms: Whole number coefficients
- Combining like terms: Integer coefficients
- Introduction to properties of addition
- Properties of addition
- Understanding the distributive property
- Distributive property: Whole number coefficients
- Distributive property: Integer coefficients
- Properties of real numbers
- Using distribution and combining like terms to simplify: Univariate
- Using distribution with double negation and combining like terms to simplify: Multivariate
- Combining like terms in a quadratic expression

Linear Equations and Inequalities (64 topics) – Test 2

One-Step Linear Equations (8 topics)

- Additive property of equality with whole numbers
- Additive property of equality with decimals
- Additive property of equality with integers
- Multiplicative property of equality with whole numbers
- Multiplicative property of equality with fractions
- Multiplicative property of equality with decimals
- Multiplicative property of equality with integers
- Multiplicative property of equality with signed fractions

Multi-Step Linear Equations (12 topics)

- Using two steps to solve an equation with whole numbers
- Additive property of equality with a negative coefficient
- Solving a two-step equation with integers
- Solving a two-step equation with signed decimals
- Solving a linear equation with several occurrences of the variable: Variables on the same side and distribution
- Solving a linear equation with several occurrences of the variable: Variables on both sides and distribution
- Solving a linear equation with several occurrences of the variable: Variables on both sides and two distributions
- Solving a two-step equation with signed fractions
- Solving a linear equation with several occurrences of the variable: Variables on both sides and fractional coefficients
- Solving a linear equation with several occurrences of the variable: Fractional forms with binomial numerators
- Solving equations with zero, one, or infinitely many solutions
- Solving a proportion of the form $x/a = b/c$

Solving Formulas for a Variable (7 topics)

- Solving for a variable in terms of other variables using addition or subtraction: Basic
- Solving for a variable in terms of other variables using addition or subtraction: Advanced
- Solving for a variable in terms of other variables using multiplication or division: Basic
- Solving for a variable in terms of other variables using multiplication or division: Advanced
- Solving for a variable in terms of other variables using addition or subtraction with division
- Solving for a variable inside parentheses in terms of other variables
- Solving for a variable in terms of other variables in a linear equation with fractions

Writing Expressions and Equations (3 topics)

- Writing a one-step expression for a real-world situation
- Translating a phrase into a two-step expression
- Translating a sentence into a one-step equation

Applications (11 topics)

- Solving a fraction word problem using a linear equation of the form $Ax = B$
- Solving a word problem with two unknowns using a linear equation
- Solving a decimal word problem using a linear equation with the variable on both sides
- Solving a one-step word problem using the formula $d = rt$
- Solving a word problem involving rates and time conversion
- Converting between temperatures in Fahrenheit and Celsius
- Finding the side length of a rectangle given its perimeter or area
- Finding a side length given the perimeter and side lengths with variables
- Finding the perimeter or area of a rectangle given one of these values
- Finding an angle measure of a triangle given two angles
- Finding the value for a new score that will yield a given mean

Applications Involving Percentages (7 topics)

- Finding a percentage of a whole number without a calculator: Basic
- Applying the percent equation: Problem type 1
- Applying the percent equation: Problem type 2
- Writing a ratio as a percentage without a calculator
- Finding the sale price without a calculator given the original price and percent discount
- Finding the original price given the sale price and percent discount
- Finding simple interest without a calculator

Writing and Graphing Inequalities (6 topics)

- Translating a sentence by using an inequality symbol
- Writing an inequality for a real-world situation
- Graphing a linear inequality on the number line
- Writing an inequality given a graph on the number line
- Translating a sentence into a compound inequality
- Graphing a compound inequality on the number line

Linear Inequalities and Applications (6 topics)

- Additive property of inequality with whole numbers
- Solving a two-step linear inequality: Problem type 1
- Solving a two-step linear inequality: Problem type 2
- Solving a compound linear inequality: Graph solution, basic
- Solving a compound linear inequality: Interval notation
- Solving a decimal word problem using a two-step linear inequality

Absolute Value Equations (3 topics)

- Introduction to solving an absolute value equation
- Solving an absolute value equation: Problem type 1
- Solving an absolute value equation: Problem type 2

Absolute Value Inequalities (1 topic)

- Solving an absolute value inequality: Problem type 3

Lines and Functions (31 topics) – Test 3*Ordered Pairs (5 topics)*

- Reading a point in the coordinate plane
- Plotting a point in the coordinate plane
- Table for a linear equation
- Identifying solutions to a linear equation in two variables
- Finding a solution to a linear equation in two variables

Graphing and Intercepts (8 topics)

- Graphing a linear equation of the form $y = mx$
- Graphing a line given its equation in slope-intercept form: Integer slope
- Graphing a line given its equation in slope-intercept form: Fractional slope
- Graphing a line given its equation in standard form
- Graphing a vertical or horizontal line
- Finding x- and y-intercepts of a line given the equation: Advanced 
- Graphing a line given its x- and y-intercepts
- Graphing a line by first finding its x- and y-intercepts

Slope (3 topics)

- Finding slope given the graph of a line on a grid
- Finding slope given two points on the line 
- Graphing a line through a given point with a given slope

Equations of Lines (9 topics)

- Finding the slope and y-intercept of a line given its equation in the form $y = mx + b$ 
- Finding the slope and y-intercept of a line given its equation in the form $Ax + By = C$ 
- Graphing a line by first finding its slope and y-intercept
- Writing an equation in slope-intercept form given the slope and a point 
- Writing an equation of a line given the y-intercept and another point
- Writing the equation of the line through two given points 
- Writing the equations of vertical and horizontal lines through a given point 
- Finding slopes of lines parallel and perpendicular to a line given in the form $Ax + By = C$ 
- Writing equations of lines parallel and perpendicular to a given line through a point 

Applications (2 topics)

- Writing an equation and drawing its graph to model a real-world situation: Advanced
- Application problem with a linear function: Finding a coordinate given the slope and a point 

Scatter Plots and Lines of Best Fit (1 topic)

- Scatter plots and correlation

Function Evaluation and Applications (3 topics)

- Evaluating functions: Linear and quadratic or cubic 
- Evaluating a piecewise-defined function 
- Variable expressions as inputs of functions: Problem type 1 

Systems of Linear Equations (10 topics) – Test 3*Systems of Linear Equations (6 topics)*

- Identifying solutions to a system of linear equations 
- Classifying systems of linear equations from graphs
- Graphically solving a system of linear equations
- Solving a system of linear equations using substitution 
- Solving a system of linear equations using elimination with multiplication and addition 
- Solving a 2x2 system of linear equations that is inconsistent or consistent dependent 

Graphing Linear Inequalities (3 topics)

- Graphing a linear inequality in the plane: Vertical or horizontal line
- Graphing a linear inequality in the plane: Slope-intercept form
- Graphing a linear inequality in the plane: Standard form

Systems of Linear Inequalities (1 topic)

- Graphing a system of two linear inequalities: Basic

Exponents and Polynomials (63 topics) – Test 4*Product, Power, and Quotient Rules (11 topics)*

- Understanding the product rule of exponents 
- Introduction to the product rule of exponents 
- Product rule with positive exponents: Multivariate 
- Understanding the power rules of exponents 
- Introduction to the power of a power rule of exponents 
- Introduction to the power of a product rule of exponents 
- Power rules with positive exponents: Multivariate products 
- Power rules with positive exponents: Multivariate quotients 
- Power and product rules with positive exponents 
- Introduction to the quotient rule of exponents 
- Quotient of expressions involving exponents 

Negative Exponents (15 topics)

- Evaluating expressions with exponents of zero 
- Power of 10: Negative exponent 
- Evaluating an expression with a negative exponent: Whole number base 
- Evaluating an expression with a negative exponent: Positive fraction base 
- Evaluating an expression with a negative exponent: Negative integer base 
- Rewriting an algebraic expression without a negative exponent 
- Introduction to the product rule with negative exponents 
- Product rule with negative exponents 
- Quotient rule with negative exponents: Problem type 1 
- Quotient rule with negative exponents: Problem type 2 
- Power of a power rule with negative exponents 
- Power rules with negative exponents 
- Power and quotient rules with negative exponents: Problem type 1 
- Power and quotient rules with negative exponents: Problem type 2 
- Power, product, and quotient rules with negative exponents 

Scientific Notation (2 topics)

- Scientific notation with positive exponent 
- Scientific notation with negative exponent 

Polynomial Addition, Subtraction, and Multiplication (10 topics)

- Degree and leading coefficient of a univariate polynomial 
- Simplifying a sum or difference of two univariate polynomials 
- Simplifying a sum or difference of three univariate polynomials 
- Multiplying a univariate polynomial by a monomial with a positive coefficient 
- Multiplying a multivariate polynomial by a monomial 
- Multiplying binomials with leading coefficients of 1 
- Multiplying binomials in two variables 
- Multiplying conjugate binomials: Univariate 
- Squaring a binomial: Univariate 
- Multiplication involving binomials and trinomials in two variables 

Polynomial Division (3 topics)

- Dividing a polynomial by a monomial: Univariate 
- Polynomial long division: Problem type 1
- Synthetic division

Factoring Using the GCF (4 topics)

- Introduction to the GCF of two monomials 

- Greatest common factor of two multivariate monomials 
- Factoring out a monomial from a polynomial: Univariate 
- Factoring out a monomial from a polynomial: Multivariate 

Factoring by Grouping (4 topics)

- Factoring a univariate polynomial by grouping: Problem type 1 
- Factoring a univariate polynomial by grouping: Problem type 2 
- Factoring a multivariate polynomial by grouping: Problem type 1 
- Factoring a multivariate polynomial by grouping: Problem type 2 

Factoring Quadratic Trinomials (4 topics)

- Factoring a quadratic with leading coefficient 1 
- Factoring a quadratic with leading coefficient greater than 1: Problem type 1 
- Factoring a quadratic with leading coefficient greater than 1: Problem type 2 
- Factoring a quadratic in two variables with leading coefficient greater than 1 

Factoring Special Products (6 topics)

- Factoring a perfect square trinomial with leading coefficient 1 
- Factoring a difference of squares in one variable: Basic 
- Factoring a difference of squares in one variable: Advanced 
- Factoring a product of a quadratic trinomial and a monomial 
- Factoring with repeated use of the difference of squares formula 
- Factoring a sum or difference of two cubes 

Solving Quadratic Equations by Factoring (3 topics)

- Solving an equation written in factored form 
- Finding the roots of a quadratic equation with leading coefficient 1 
- Finding the roots of a quadratic equation with leading coefficient greater than 1 

Pythagorean Theorem (1 topic)

- Pythagorean Theorem 

Rational Expressions (24 topics) – Test 5

Simplifying Rational Expressions (5 topics)

- Evaluating a rational function: Problem type 1 
- Evaluating a rational function: Problem type 2 
- Domain of a rational function: Excluded values 
- Simplifying a ratio of polynomials: Problem type 1 
- Simplifying a ratio of polynomials: Problem type 2 

Multiplication and Division (4 topics)

- Multiplying rational expressions involving multivariate monomials 
- Multiplying rational expressions involving quadratics with leading coefficients of 1 
- Dividing rational expressions involving multivariate monomials 
- Dividing rational expressions involving quadratics with leading coefficients of 1 

Addition and Subtraction (6 topics)

- Introduction to the LCM of two monomials 
- Least common multiple of two monomials 
- Adding rational expressions with common denominators and binomial numerators 
- Adding rational expressions with linear denominators without common factors: Basic 
- Adding rational expressions with linear denominators without common factors: Advanced 
- Adding rational expressions involving different quadratic denominators 

Complex Fractions (3 topics)

- Complex fraction without variables: Problem type 1 
- Complex fraction without variables: Problem type 2 

- Complex fraction with negative exponents: Problem type 1

Rational Equations (2 topics)

- Solving a rational equation that simplifies to linear: Denominator $x+a$
- Solving a rational equation that simplifies to linear: Unlike binomial denominators

Ratios (3 topics)

- U.S. Customary unit conversion with whole number values
- Metric distance conversion with whole number values
- Converting between metric and U.S. Customary unit systems

Applications (1 topic)

- Solving for a variable in terms of other variables in a rational equation: Problem type 1

Radicals (23 topics) – Test 5

Roots of Perfect Powers (3 topics)

- Square root of a rational perfect square
- Square root of a perfect square monomial
- Cube root of an integer

Radical Functions (2 topics)

- Table for a square root function
- Domain of a square root function: Advanced

Rational Exponents (3 topics)

- Converting between radical form and exponent form
- Rational exponents: Non-unit fraction exponent with a whole number base
- Rational exponents: Negative exponents and fractional bases

Simplifying Expressions (4 topics)

- Simplifying the square root of a whole number less than 100
- Simplifying a radical expression with an even exponent
- Introduction to simplifying a radical expression with an odd exponent
- Simplifying a radical expression with an odd exponent

Addition and Subtraction (2 topics)

- Square root addition or subtraction
- Simplifying a sum or difference of higher roots

Multiplication (2 topics)

- Square root multiplication: Advanced
- Special products of radical expressions: Conjugates and squaring

Division and Rationalization (4 topics)

- Rationalizing a denominator: Quotient involving square roots
- Rationalizing a denominator: Square root of a fraction
- Rationalizing a denominator using conjugates: Integer numerator
- Rationalizing a denominator using conjugates: Square root in numerator

Radical Equations (3 topics)

- Solving a radical equation that simplifies to a linear equation: One radical, basic
- Solving a radical equation that simplifies to a linear equation: Two radicals
- Algebraic symbol manipulation with radicals

Quadratic Equations and Functions (7 topics) – Test 5

Quadratic Equations (7 topics)

- Solving a quadratic equation using the square root property: Exact answers, basic
- Solving a quadratic equation using the square root property: Exact answers, advanced
- Completing the square
- Solving a quadratic equation by completing the square: Exact answers

- Applying the quadratic formula: Exact answers 
- Discriminant of a quadratic equation 
- Solving an equation that can be written in quadratic form: Problem type 1 

Function Operations and Inverses (3 topics) – Test 5

Functions Operations (3 topics)

- Sum, difference, and product of two functions 
- Quotient of two functions: Basic 
- Determining whether an equation defines a function: Basic 

Exponential and Logarithmic Functions (8 topics) – Test 5

Graphing Exponential Functions (2 topics)

- Graphing an exponential function and its asymptote: $f(x) = a(b)^x$
- The graph, domain, and range of an exponential function

Logarithmic Functions (2 topics)

- Graphing a logarithmic function: Basic
- The graph, domain, and range of a logarithmic function

Properties of Logarithms (3 topics)

- Basic properties of logarithms 
- Expanding a logarithmic expression: Problem type 1 
- Change of base for logarithms: Problem type 1 

Logarithmic and Exponential Equations and Applications (1 topic)

- Solving a multi-step equation involving a single logarithm 