

Class: Eric Errthum - MATH050: Summer 2020

Class Code: NC3JE-4WEDT

Subject: Pre-Algebra

Instructor: Prof. Errthum

Class Dates: 05/04/2020 - 06/05/2020

Class Content: 341 topics / 329 accessible topics

Accessible Topic - Topics accessible to visually impaired students using a screen reader.

Whole Numbers (28 Topics)

Place Value, Expanded Form, and Numeral Translation (4 Topics)

- Whole number place value: Problem type 1
- Whole number place value: Problem type 2
- Numeral translation: Problem type 1
- Numeral translation: Problem type 2

Addition and Subtraction (1 Topic)

- Word problem with addition or subtraction of whole numbers

Multiplication and Division (6 Topics)

- Multiplication as repeated addition
- Multiplication by 10, 100, and 1000
- Multiplication with trailing zeros: Problem type 1
- Word problem with multiplication or division of whole numbers
- Word problem with multiplication and addition or subtraction of whole numbers
- Word problem with division of whole numbers and rounding: Problem type 2

Ordering, Rounding, and Estimating (8 Topics)

- Even and odd numbers
- Introduction to inequalities
- Ordering large numbers
- Rounding to tens or hundreds
- Rounding to hundreds or thousands
- Rounding to thousands, ten thousands, or hundred thousands
- Estimating a sum of whole numbers: Problem type 2
- Estimating a difference of whole numbers: Problem type 2

Exponents and Order of Operations (9 Topics)

- Writing expressions using exponents
- Introduction to exponents
- Power of 10: Positive exponent
- Introduction to parentheses
- Introduction to order of operations
- Order of operations with whole numbers
- Order of operations with whole numbers and grouping symbols
- Order of operations with whole numbers and exponents: Basic
- Understanding the distributive property

Integers (16 Topics)

Plotting, Ordering, and Absolute Value (4 Topics)

- Plotting integers on a number line

- Writing a signed number for a real-world situation [🔗](#)
- Ordering integers [🔗](#)
- Absolute value of a number [🔗](#)

Operations with Integers(12 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 [🔗](#)
- Operations with absolute value: Problem type 2 [🔗](#)
- Integer multiplication and division [🔗](#)
- Multiplication of 3 or 4 integers [🔗](#)
- Exponents and integers: Problem type 1 [🔗](#)
- Exponents and integers: Problem type 2 [🔗](#)
- Order of operations with integers and exponents [🔗](#)

Algebraic Expressions and Equations (33 Topics)

Evaluating Expressions (5 Topics)

- Evaluating an algebraic expression: Whole number addition or subtraction [🔗](#)
- Evaluating an algebraic expression: Whole number multiplication or division [🔗](#)
- Evaluating an algebraic expression: Whole numbers with two operations [🔗](#)
- Evaluating a linear expression: Integer multiplication with addition or subtraction [🔗](#)
- Evaluating a quadratic expression: Integers [🔗](#)

Distributive Property and Combining Like Terms (8 Topics)

- Multiplying a constant and a linear monomial [🔗](#)
- Distributive property: Whole number coefficients [🔗](#)
- Distributive property: Integer coefficients [🔗](#)
- Combining like terms: Whole number coefficients [🔗](#)
- Combining like terms: Integer coefficients [🔗](#)
- 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 [🔗](#)

One-Step Linear Equations (5 Topics)

- Additive property of equality with whole numbers [🔗](#)
- Additive property of equality with integers [🔗](#)
- Solving for a variable in terms of other variables using addition or subtraction: Basic [🔗](#)
- Multiplicative property of equality with whole numbers [🔗](#)
- Multiplicative property of equality with integers [🔗](#)

Multi-Step Linear Equations (9 Topics)

- Identifying solutions to a linear equation in one variable: Two-step equations [🔗](#)
- 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 [🔗](#)
- Introduction to solving an equation with parentheses [🔗](#)
- Introduction to solving an equation with variables on the same side [🔗](#)
- 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 for a variable in terms of other variables using addition or subtraction: Advanced [🔗](#)

Applications (6 Topics)

- Writing a one-step expression for a real-world situation 
- Translating a phrase into a one-step expression 
- Translating a phrase into a two-step expression 
- Translating a sentence into a one-step equation 
- Translating a sentence into a multi-step equation 
- Solving a word problem with two unknowns using a linear equation 

Fractions (43 Topics)

Prime Numbers, Factors, and Multiples (7 Topics)

- Factors 
- Prime numbers 
- Greatest common factor of 2 numbers 
- Least common multiple of 2 numbers 
- Finding the next terms of an arithmetic sequence with whole numbers 
- Finding the next terms of a geometric sequence with whole numbers 
- Finding patterns in shapes 

Equivalent Fractions (5 Topics)

- Introduction to fractions 
- Understanding equivalent fractions
- Equivalent fractions 
- Introduction to simplifying a fraction 
- Simplifying a fraction 

Plotting and Ordering Fractions (3 Topics)

- Fractional position on a number line 
- Ordering fractions with the same denominator 
- Ordering fractions with the same numerator 

Multiplication and Division (10 Topics)

- 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 
- Signed fraction multiplication: Basic 
- Word problem involving fractions and multiplication 
- Multi-step word problem involving fractions and multiplication 
- The reciprocal of a number 
- Division involving a whole number and a fraction 
- Fraction division 

Addition and Subtraction (7 Topics)

- Addition or subtraction of fractions with the same denominator 
- Finding the LCD of two fractions 
- Addition or subtraction of unit fractions 
- Introduction to addition or subtraction of fractions with different denominators 
- Addition or subtraction of fractions with different denominators 
- Word problem involving addition or subtraction of fractions with different denominators 
- Fractional part of a circle 

Mixed Numbers (5 Topics)

- Writing a mixed number and an improper fraction for a shaded region 

- Writing an improper fraction as a mixed number [🔗](#)
- Writing a mixed number as an improper fraction [🔗](#)
- Addition or subtraction of mixed numbers with the same denominator [🔗](#)
- Mixed number subtraction with the same denominator and renaming [🔗](#)

Exponents and Order of Operations (4 Topics)

- Exponents and fractions [🔗](#)
- Exponents and signed fractions [🔗](#)
- Order of operations with fractions: Problem type 1 [🔗](#)
- Complex fraction without variables: Problem type 1 [🔗](#)

Equations and Applications (2 Topics)

- Multiplicative property of equality with fractions [🔗](#)
- Solving a fraction word problem using a linear equation of the form $Ax = B$ [🔗](#)

Decimals (30 Topics)

Place Value, Ordering, and Rounding (6 Topics)

- Writing a decimal and a fraction for a shaded region [🔗](#)
- Decimal place value: Tenths and hundredths [🔗](#)
- Decimal place value: Hundreds to ten thousandths [🔗](#)
- Introduction to ordering decimals
- Ordering decimals [🔗](#)
- Rounding decimals [🔗](#)

Addition and Subtraction (3 Topics)

- Word problem with addition or subtraction of 2 decimals [🔗](#)
- 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 [🔗](#)

Multiplication (3 Topics)

- Multiplication of a decimal by a power of ten [🔗](#)
- Word problem with multiplication of a decimal and a whole number [🔗](#)
- Word problem with decimal addition and multiplication [🔗](#)

Division (3 Topics)

- Division of a decimal by a power of ten [🔗](#)
- Word problem with division of a decimal and a whole number [🔗](#)
- Word problem with decimal subtraction and division [🔗](#)

Converting Fractions to Decimals (6 Topics)

- Converting a fraction with a denominator of 10 or 100 to a decimal [🔗](#)
- Converting a fraction with a denominator of 100 or 1000 to a decimal [🔗](#)
- Converting a fraction to a terminating decimal: Basic [🔗](#)
- 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 [🔗](#)

Equations and Applications (4 Topics)

- Additive property of equality with decimals [🔗](#)
- Multiplicative property of equality with decimals [🔗](#)
- Solving a two-step equation with signed decimals [🔗](#)
- Solving a decimal word problem using a linear equation of the form $Ax + B = C$ [🔗](#)

Square Roots (5 Topics)

- Square root of a perfect square [🔗](#)

- Using a calculator to approximate a square root 
- Estimating a square root 
- Square root of a rational perfect square 
- Simplifying the square root of a whole number less than 100 

Ratios, Proportions, and Percents (32 Topics)

Ratios and Rates (6 Topics)

- Writing ratios for real-world situations 
- Finding a unit price 
- Computing unit prices to find the better buy 
- Solving a word problem on proportions using a unit rate 
- Solving a one-step word problem using the formula $d = rt$ 
- Word problem on unit rates associated with ratios of whole numbers: Decimal answers 

Proportions (5 Topics)

- Solving a proportion of the form $x/a = b/c$ 
- Word problem on proportions: Problem type 1 
- Word problem on proportions: Problem type 2 
- Word problem on mixed number proportions 
- Word problem with powers of ten 

Converting Between Fractions, Decimals, and Percentages (7 Topics)

- Converting a fraction with a denominator of 100 to a percentage 
- Converting a percentage to a fraction with a denominator of 100 
- Finding the percentage of a grid that is shaded 
- Introduction to converting a percentage to a decimal 
- 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 

Applications Involving Percentages (14 Topics)

- Finding a percentage of a whole number 
- Applying the percent equation: Problem type 1 
- Applying the percent equation: Problem type 2 
- Finding a percentage of a total amount: Real-world situations 
- Writing a ratio as a percentage without a calculator 
- Computing a percentage from a table of values 
- Finding the rate of a tax or commission 
- Finding the sale price without a calculator given the original price and percent discount 
- Finding the total cost including tax or markup 
- Finding the original price given the sale price and percent discount 
- Finding the percentage increase or decrease: Advanced 
- Finding simple interest without a calculator 
- Introduction to compound interest 
- Finding the final amount in a word problem on compound interest 

Geometry (45 Topics)

Perimeter (5 Topics)

- Perimeter of a polygon 
- Perimeter of a square or a rectangle 
- Sides of polygons having the same perimeter 
- Finding the missing length in a figure 

- Perimeter of a piecewise rectangular figure [🔗](#)

***Lines, Angles, and Triangles* (9 Topics)**

- Identifying parallel and perpendicular lines [🔗](#)
- Naming segments, rays, and lines
- Acute, obtuse, and right angles [🔗](#)
- Solving equations involving vertical angles [🔗](#)
- Solving equations involving angles and a pair of parallel lines [🔗](#)
- Acute, obtuse, and right triangles [🔗](#)
- Classifying scalene, isosceles, and equilateral triangles by side lengths or angles [🔗](#)
- Finding an angle measure of a triangle given two angles [🔗](#)
- Finding an angle measure for a triangle with an extended side [🔗](#)

***Polygons and Quadrilaterals* (1 Topic)**

- Interpreting a Venn diagram of 2 sets [🔗](#)

***Area of Polygons* (10 Topics)**

- Area of a square or a rectangle [🔗](#)
- Perimeter and area on a grid [🔗](#)
- Distinguishing between the area and perimeter of a rectangle [🔗](#)
- Areas of rectangles with the same perimeter [🔗](#)
- Finding the side length of a rectangle given its perimeter or area [🔗](#)
- Finding the perimeter or area of a rectangle given one of these values [🔗](#)
- Area of a piecewise rectangular figure [🔗](#)
- Word problem involving the area between two rectangles [🔗](#)
- Area of a triangle [🔗](#)
- Area involving rectangles and triangles [🔗](#)

***Circumference and Area of Circles* (8 Topics)**

- Introduction to a circle: Diameter, radius, and chord [🔗](#)
- Circumference of a circle [🔗](#)
- Finding the radius or the diameter of a circle given its circumference [🔗](#)
- Circumference ratios [🔗](#)
- Perimeter involving rectangles and circles [🔗](#)
- Circumference and area of a circle [🔗](#)
- Area involving rectangles and circles [🔗](#)
- Word problem involving the area between two concentric circles [🔗](#)

***Volumes* (2 Topics)**

- Volume of a rectangular prism made of unit cubes [🔗](#)
- Volume of a rectangular prism [🔗](#)

***Surface Areas* (3 Topics)**

- Surface area of a cube or a rectangular prism [🔗](#)
- Surface area of a triangular prism [🔗](#)
- Surface area of a cylinder [🔗](#)

***Pythagorean Theorem* (3 Topics)**

- Introduction to the Pythagorean Theorem [🔗](#)
- Pythagorean Theorem [🔗](#)
- Word problem involving the Pythagorean Theorem [🔗](#)

***Congruent and Similar Figures* (4 Topics)**

- Identifying similar or congruent shapes on a grid
- Similar polygons [🔗](#)

- Similar right triangles 
- Indirect measurement 

Measurement (17 Topics)

U.S. Customary Units of Measurement (6 Topics)

- Choosing U.S. Customary measurement units 
- U.S. Customary unit conversion with whole number values 
- Conversions involving measurements in feet and inches 
- Adding measurements in feet and inches 
- U.S. Customary unit conversion with whole number values: Two-step conversion 
- U.S. Customary area unit conversion with whole number values 

Metric Units of Measurement (6 Topics)

- Choosing metric measurement units 
- Metric distance conversion with whole number values 
- Metric mass or volume conversion with whole number values 
- Metric distance conversion with decimal values 
- Metric conversion with decimal values: Two-step problem 
- Metric area unit conversion with decimal values 

Time and Temperature (4 Topics)

- Time unit conversion with whole number values 
- Adding time 
- Elapsed time 
- Converting between temperatures in Fahrenheit and Celsius 

Converting Between Measurement Systems (1 Topic)

- Converting between metric and U.S. Customary unit systems 

Statistics and Probability (28 Topics)

Tables and Graphs of Data (12 Topics)

- Interpreting a tally table 
- Constructing a bar graph for non-numerical data
- Constructing a histogram for numerical data
- Interpreting a bar graph
- Interpreting a double bar graph
- Interpreting a pictograph table 
- Interpreting a line graph 
- Interpreting a circle graph or pie chart
- Finding a percentage of a total amount in a circle graph 
- Computations from a circle graph 
- Angle measure in a circle graph 
- Finding if a question can be answered by the data 

Mean, Median, and Mode (7 Topics)

- Mode of a data set 
- Mean of a data set 
- Mean and median of a data set 
- Finding the value for a new score that will yield a given mean 
- How changing a value affects the mean and median 
- Choosing the best measure to describe data 
- Rejecting unreasonable claims based on average statistics 

Counting (3 Topics)

- Interpreting a Venn diagram of 3 sets 
- Introduction to the counting principle 
- Counting principle 

Probability (6 Topics)

- Introduction to the probability of an event 
- Probability of an event 
- Understanding likelihood 
- Odds of an event
- Outcomes and event probability 
- Introduction to expectation 

Graphs of Linear Equations (21 Topics)

Ordered Pairs (3 Topics)

- Reading a point in the coordinate plane 
- Plotting a point in the coordinate plane 
- Table for a linear equation 

Graphing and Intercepts (10 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 given the graph of a line on a grid 
- Finding x- and y-intercepts of a line given the equation: Basic 
- Graphing a line given its x- and y-intercepts 
- Graphing a line by first finding its x- and y-intercepts 
- Graphing a parabola of the form $y = ax^2$

Slope (8 Topics)

- Classifying slopes given graphs of lines 
- Finding slope given the graph of a line on a grid 
- Finding slope given two points on the line 
- Finding the slope of horizontal and vertical lines 
- Finding the coordinate that yields a given slope 
- Graphing a line given its slope and y-intercept 
- Graphing a line through a given point with a given slope 
- Writing an equation and drawing its graph to model a real-world situation: Advanced

Exponents and Polynomials (36 Topics)

Polynomial Addition and Subtraction (3 Topics)

- Degree and leading coefficient of a univariate polynomial 
- Simplifying a sum or difference of two univariate polynomials 
- Simplifying a sum or difference of multivariate polynomials 

Product and Power Rules of Exponents (9 Topics)

- Understanding the product rule of exponents 
- Introduction to the product rule of exponents 
- Product rule with positive exponents: Univariate 
- 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 and product rules with positive exponents [🔗](#)

Polynomial Multiplication (8 Topics)

- 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 with leading coefficients greater than 1 [🔗](#)
- Multiplying binomials in two variables [🔗](#)
- Multiplying conjugate binomials: Univariate [🔗](#)
- Squaring a binomial: Univariate [🔗](#)
- Multiplication involving binomials and trinomials in one variable [🔗](#)

Factoring Polynomials (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 [🔗](#)

Quotient Rule and Negative Exponents (7 Topics)

- Introduction to the quotient rule of exponents [🔗](#)
- Simplifying a ratio of univariate monomials [🔗](#)
- Quotient of expressions involving exponents [🔗](#)
- Evaluating expressions with exponents of zero [🔗](#)
- Evaluating an expression with a negative exponent: Whole number base [🔗](#)
- Power of 10: Negative exponent [🔗](#)
- Evaluating an expression with a negative exponent: Positive fraction base [🔗](#)

Scientific Notation (5 Topics)

- Scientific notation with positive exponent [🔗](#)
- Scientific notation with negative exponent [🔗](#)
- Converting between scientific notation and standard form in a real-world situation [🔗](#)
- Multiplying numbers written in scientific notation: Basic [🔗](#)
- Dividing numbers written in scientific notation: Basic [🔗](#)

Inequalities (12 Topics)

Writing and Graphing Inequalities (6 Topics)

- Translating a sentence by using an inequality symbol [🔗](#)
- Graphing a linear inequality on the number line [🔗](#)
- Writing an inequality given a graph on the number line [🔗](#)
- Translating a sentence into a one-step inequality [🔗](#)
- Translating a sentence into a multi-step inequality [🔗](#)
- Writing an inequality for a real-world situation [🔗](#)

Linear Inequalities (6 Topics)

- Identifying solutions to a two-step linear inequality in one variable [🔗](#)
- Additive property of inequality with whole numbers [🔗](#)
- Additive property of inequality with integers [🔗](#)
- Multiplicative property of inequality with integers [🔗](#)
- Solving a two-step linear inequality: Problem type 1 [🔗](#)

- Solving a two-step linear inequality: Problem type 2 