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Prerequisite Topics (72 topics)

- Solving a proportion of the form \( \frac{x}{a} = \frac{b}{c} \)
- Translating a phrase into a two-step expression
- Solving an absolute value equation: Problem type 1
- Solving an absolute value inequality: Problem type 1
- Finding \( x \)- and \( y \)-intercepts of a line given the equation: Basic
- Writing an equation in slope-intercept form given the slope and a point
- Graphing a parabola of the form \( y = ax^2 + c \)
- Graphing a function of the form \( f(x) = ax^2 \)
- Simplifying a ratio of multivariate monomials: Advanced
- Squaring a binomial: Univariate
- Factoring out a constant before factoring a quadratic
- Factoring a quadratic with leading coefficient greater than 1: Problem type 1
- Factoring a perfect square trinomial with leading coefficient 1
- Solving an equation written in factored form
- Restriction on a variable in a denominator: Linear
- Evaluating a rational function: Problem type 1
- Simplifying a ratio of factored polynomials: Linear factors
- Simplifying a ratio of polynomials by factoring a quadratic with leading coefficient 1
- Simplifying a ratio of polynomials: Problem type 3
- Multiplying rational expressions involving multivariate monomials
- Multiplying rational expressions involving quadratics with leading coefficients greater than 1
- Dividing rational expressions involving quadratics with leading coefficients of 1
- Finding the LCD of rational expressions with linear denominators: Relatively prime
- Finding the LCD of rational expressions with linear denominators: Common factors
- Finding the LCD of rational expressions with quadratic denominators
- Writing equivalent rational expressions with monomial denominators
- Writing equivalent rational expressions with polynomial denominators
- Writing equivalent rational expressions involving opposite factors
- Adding rational expressions with common denominators and monomial numerators
- Adding rational expressions with common denominators and binomial numerators
- Adding rational expressions with common denominators and GCF factoring
- Adding rational expressions with common denominators and quadratic factoring
- Adding rational expressions with denominators \( ax \) and \( bx \): Basic
- Adding rational expressions with multivariate monomial denominators: Basic
- Adding rational expressions with linear denominators without common factors: Basic
- Complex fraction without variables: Problem type 1
- Complex fraction involving univariate monomials
- Complex fraction: GCF factoring
- Complex fraction made of sums involving rational expressions: Problem type 2
- Complex fraction made of sums involving rational expressions: Multivariate
- Solving a rational equation that simplifies to linear: Denominator \( x \)
- Solving a rational equation that simplifies to linear: Denominator \( x+a \)
- Solving a rational equation that simplifies to linear: Denominators \( a \), \( x \), or \( ax \)
- Solving a rational equation that simplifies to linear: Unlike binomial denominators
- Solving a rational equation that simplifies to quadratic: Binomial denominators, constant numerators
- Solving for a variable in terms of other variables in a rational equation: Problem type 1
- Square roots of integers raised to even exponents
- Introduction to simplifying a radical expression with an even exponent
- Square root of a perfect square monomial
- Cube root of an integer
- Domain of a square root function: Basic
- Simplifying the square root of a whole number less than 100
- Introduction to simplifying a radical expression with an odd exponent
- Introduction to square root addition or subtraction
- Square root addition or subtraction
- Simplifying a sum of differences of higher roots
- Introduction to square root multiplication
- Square root multiplication: Basic
- Introduction to simplifying a product of radical expressions: Univariate
- Simplifying a product of radical expressions: Univariate
• Introduction to simplifying a product of higher roots
• Introduction to simplifying a product involving square roots using the distributive property
• Simplifying a product involving square roots using the distributive property: Basic
• Simplifying a product involving square roots using the distributive property: Advanced
• Simplifying a quotient of square roots
• Simplifying a quotient involving a sum or difference with a square root
• Rationalizing a denominator: Quotient involving a monomial
• Solving a radical equation that simplifies to a linear equation: One radical, basic
• Solving an equation with a root index greater than 2: Problem type 1
• Solving an equation with exponent 1/a: Problem type 1
• Solving an equation using the odd-root property: Problem type 2
• Graphing a parabola of the form \( y = x^2 + bx + c \)

Section 2.2  (4 topics, due on 01/22/2017)

• 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
• Finding the side length of a rectangle given its perimeter or area

Section 2.3  (12 topics, due on 01/22/2017)

• Translating a sentence into a multi-step equation
• 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 of the form \( Ax + B = C \)
• Solving a word problem with three unknowns using a linear equation
• Solving a word problem involving consecutive integers
• Writing a multi-step equation for a real-world situation
• Solving a value mixture problem using a linear equation
• Solving a distance, rate, time problem using a linear equation
• Finding the perimeter or area of a rectangle given one of these values
• Computing a percent mixture
• Solving a percent mixture problem using a linear equation

Section 2.5  (6 topics, due on 01/29/2017)

• Translating a sentence into a compound inequality
• Graphing a compound inequality on the number line
• Writing a compound inequality given a graph on the number line
• Union and intersection of intervals
• Solving a compound linear inequality: Graph solution, basic
• Solving a compound linear inequality: Interval notation

Section 2.6  (5 topics, due on 01/29/2017)

• Solving an absolute value equation: Problem type 3
• Solving an absolute value equation: Problem type 4
• Solving an absolute value equation of the form \( |ax+b| = |cx+d| \)
• Solving an absolute value inequality: Problem type 4
• Solving an absolute value inequality: Problem type 5

Section 3.3  (9 topics, due on 02/05/2017)

• Rewriting a linear equation in the form \( Ax + By = C \)
• Finding the slope and y-intercept of a line given its equation in the form \( Ax + By = C \)
• Writing an equation in point-slope 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 \( Ax + By = C \)
• Identifying parallel and perpendicular lines from equations
• Writing equations of lines parallel and perpendicular to a given line through a point

Section 3.5  (10 topics, due on 02/05/2017)

• Identifying functions from relations
• Vertical line test
- Domain and range from ordered pairs
- Table for a linear function
- Evaluating functions: Linear and quadratic or cubic
- Finding outputs of a two-step function with decimals that models a real-world situation: Function notation
- Domain and range from the graph of a discrete relation
- Graphing a function of the form \( f(x) = ax + b \): Integer slope
- Domain of a square root function: Advanced
- Determining whether an equation defines a function: Basic

Sections 4.1, 4.2 (13 topics, due on 02/12/2017)

- Identifying solutions to a system of linear equations
- Classifying systems of linear equations from graphs
- Solving a system of linear equations using substitution
- Solving a system of linear equations using elimination with addition
- Solving a system of linear equations using elimination with multiplication and addition
- Solving a system of linear equations with fractional coefficients
- Solving a \(2 \times 2\) system of linear equations that is inconsistent or consistent dependent
- Interpreting the graphs of two functions
- Solving a word problem involving a sum and another basic relationship using a system of linear equations
- Solving a word problem using a system of linear equations of the form \( Ax + By = C \)
- Solving a value mixture problem using a system of linear equations
- Solving a percent mixture problem using a system of linear equations
- Solving a tax rate or interest rate problem using a system of linear equations

Section 5.7 (8 topics, due on 02/19/2017)

- Factoring out a monomial from a polynomial: Multivariate
- Factoring a quadratic with leading coefficient greater than 1: Problem type 2
- Factoring a quadratic with leading coefficient greater than 1: Problem type 3
- Factoring a perfect square trinomial with leading coefficient greater than 1
- Factoring a perfect square trinomial in two variables
- Factoring a polynomial involving a GCF and a difference of squares: Multivariate
- Factoring with repeated use of the difference of squares formula
- Factoring a sum or difference of two cubes

Section 5.8 (8 topics, due on 02/26/2017)

- Finding the roots of a quadratic equation of the form \( ax^2 + bx = 0 \)
- Finding the roots of a quadratic equation with leading coefficient 1
- Finding the roots of a quadratic equation with leading coefficient greater than 1
- Solving a quadratic equation needing simplification
- Solving a word problem using a quadratic equation with rational roots
- Pythagorean Theorem
- Word problem involving the Pythagorean Theorem
- Using the Pythagorean Theorem and a quadratic equation to find side lengths of a right triangle

Section 6.1 (5 topics, due on 02/26/2017)

- Restriction on a variable in a denominator: Quadratic
- Domain of a rational function: Excluded values
- Simplifying a ratio of polynomials using GCF factoring
- Simplifying a ratio of linear polynomials: 1, -1, and no simplification
- Simplifying a ratio of polynomials: Problem type 1

Section 6.2 (6 topics, due on 02/26/2017)

- Multiplying rational expressions made up of linear expressions
- Multiplying rational expressions involving quadratics with leading coefficients of 1
- Multiplying rational expressions involving multivariate quadratics
- Dividing rational expressions involving linear expressions
- Dividing rational expressions involving quadratics with leading coefficients greater than 1
- Dividing rational expressions involving multivariate quadratics

Section 6.3 (7 topics, due on 03/05/2017)

- Adding rational expressions with different denominators and a single occurrence of a variable
- Adding rational expressions with denominators \(ax\) and \(bx\): Advanced
- Adding rational expressions with denominators \(ax^n\) and \(bx^m\)
- Adding rational expressions with linear denominators without common factors: Advanced
- Adding rational expressions with linear denominators with common factors: Basic
- Adding rational expressions with denominators \(ax-b\) and \(b-ax\)
- Adding rational expressions involving different quadratic denominators

Section 6.4  (6 topics, due on 03/05/2017)
- Complex fraction without variables: Problem type 2
- Complex fraction: Quadratic factoring
- Complex fraction made of sums involving rational expressions: Problem type 1
- Complex fraction made of sums involving rational expressions: Problem type 6
- Complex fraction with negative exponents: Problem type 1
- Complex fraction with negative exponents: Problem type 2

Section 6.5  (5 topics, due on 03/12/2017)
- Polynomial long division: Problem type 1
- Polynomial long division: Problem type 2
- Polynomial long division: Problem type 3
- Synthetic division
- Using the remainder theorem to evaluate a polynomial

Section 6.6  (11 topics, due on 03/26/2017)
- Solving a proportion of the form \((x+a)/b = c/d\)
- Solving a proportion of the form \(a/(x+b) = c/x\)
- Solving a rational equation that simplifies to linear: Denominators \(ax\) and \(bx\)
- Solving a rational equation that simplifies to linear: Like binomial denominators
- Solving a rational equation that simplifies to linear: Factorable quadratic denominator
- Solving a rational equation that simplifies to quadratic: Proportional form, basic
- Solving a rational equation that simplifies to quadratic: Denominator \(x\)
- Solving a rational equation that simplifies to quadratic: Binomial denominators and numerators
- Solving a rational equation that simplifies to quadratic: Factorable quadratic denominator
- Solving a rational equation that simplifies to quadratic: Proportional form, advanced
- Word problem on proportions: Problem type 1

Section 6.7  (5 topics, due on 03/26/2017)
- Solving for a variable in terms of other variables in a rational equation: Problem type 2
- Solving for a variable in terms of other variables in a rational equation: Problem type 3
- Word problem involving multiple rates
- Solving a work problem using a rational equation
- Solving a distance, rate, time problem using a rational equation

Section 7.1  (15 topics, due on 04/02/2017)
- Using absolute value to simplify square roots of perfect square monomials
- Finding \(n^{th}\) roots of perfect \(n^{th}\) powers with signs
- Finding the \(n^{th}\) root of a perfect \(n^{th}\) power fraction
- Finding the \(n^{th}\) root of a perfect \(n^{th}\) power monomial
- Using absolute value to simplify higher radical expressions
- Domain of a square root function: Advanced
- Domains of higher root functions
- Simplifying the square root of a whole number greater than 100
- Simplifying a radical expression with an even exponent
- Simplifying a radical expression with an odd exponent
- Simplifying a radical expression with two variables
- Simplifying a higher root of a whole number
- Introduction to simplifying a higher radical expression
- Simplifying a higher radical expression: Univariate
- Simplifying a higher radical expression: Multivariate

Section 7.2  (10 topics, due on 04/02/2017)
- Converting between radical form and exponent form
- Rational exponents: Unit fraction exponents and whole number bases
- Rational exponents: Unit fraction exponents and bases involving signs
- Rational exponents: Non-unit fraction exponent with a whole number base
- Rational exponents: Negative exponents and fractional bases
- Rational exponents: Product rule
- Rational exponents: Quotient rule
- Rational exponents: Products and quotients with negative exponents
- Rational exponents: Power of a power rule
- Rational exponents: Powers of powers with negative exponents

Section 7.3 (9 topics, due on 04/02/2017)

- Introduction to simplifying a sum or difference of radical expressions: Univariate
- Simplifying a sum or difference of radical expressions: Univariate
- Simplifying a sum or difference of radical expressions: Multivariate
- Simplifying a sum or difference of higher radical expressions
- Square root multiplication: Advanced
- Simplifying a product of radical expressions: Multivariate
- Simplifying a product of higher radical expressions
- Special products of radical expressions: Conjugates and squaring
- Simplifying products or quotients of higher radicals with different indices: Univariate

Section 7.4 (7 topics, due on 04/09/2017)

- 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
- Rationalizing a denominator using conjugates: Variable in denominator
- Rationalizing a denominator: Quotient involving a higher radical
- Rationalizing a denominator: Quotient involving higher radicals and monomials

Section 7.5 (16 topics, due on 04/16/2017)

- Introduction to solving a radical equation
- Solving a radical equation that simplifies to a linear equation: One radical, advanced
- Solving a radical equation that simplifies to a linear equation: Two radicals
- Solving a radical equation with two radicals that simplifies to $\sqrt{x} = a$
- Solving a radical equation that simplifies to a quadratic equation: One radical, basic
- Solving a radical equation with a quadratic expression under the radical
- Solving a radical equation that simplifies to a quadratic equation: Two radicals
- Algebraic symbol manipulation with radicals
- Word problem involving radical equations: Basic
- Solving an equation with a root index greater than 2: Problem type 2
- Solving an equation with exponent $\frac{1}{a}$: Problem type 2
- Solving an equation of the form $x^2 = a$ using the square root property
- Solving a quadratic equation using the square root property: Exact answers, basic
- Solving an equation using the odd-root property: Problem type 1
- Solving an equation with positive rational exponent
- Solving an equation with negative rational exponent

Section 7.6 (6 topics, due on 04/23/2017)

- Using $i$ to rewrite square roots of negative numbers
- Simplifying a product and quotient involving square roots of negative numbers
- Adding or subtracting complex numbers
- Multiplying complex numbers
- Dividing complex numbers
- Simplifying a power of $i$

Section 8.1 (5 topics, due on 04/23/2017)

- Solving a radical equation that simplifies to a quadratic equation: One radical, advanced
- Solving an equation of the form $x^2 = a$ using the square root property
- 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
Section 8.2  (5 topics, due on 04/23/2017)

- Applying the quadratic formula: Exact answers
- Applying the quadratic formula: Decimal answers
- Solving a quadratic equation with complex roots
- Discriminant of a quadratic equation
- Solving a word problem using a quadratic equation with irrational roots

Section 8.3  (2 topics, due on 04/30/2017)

- Writing a quadratic equation given the roots and the leading coefficient
- Solving an equation that can be written in quadratic form: Problem type 1

Section 8.4  (10 topics, due on 04/30/2017)

- Finding intercepts of a nonlinear function given its graph
- Graphing a parabola of the form $y = ax^2$
- Graphing a function of the form $f(x) = ax^2 + c$
- Finding the vertex, intercepts, and axis of symmetry from the graph of a parabola
- Graphing a parabola of the form $y = (x-h)^2 + k$
- Graphing a parabola of the form $y = ax^2 + bx + c$: Integer coefficients
- Finding the x-intercept(s) and the vertex of a parabola
- Finding the maximum or minimum of a quadratic function
- How the leading coefficient affects the shape of a parabola

Section 8.5  (4 topics, due on 05/07/2017)

- Solving a quadratic inequality written in factored form
- Solving a quadratic inequality
- Solving a rational inequality: Problem type 1
- Solving a rational inequality: Problem type 2