Course Readiness and Additional Topics Appendix

Course Readiness

Multiplication of a decimal by a power of ten
Multiplication of a decimal by a whole number
Decimal multiplication: Problem type 1
Division of a decimal by a power of ten
Division of a decimal by a whole number
Decimal division
Word problem with one decimal operation: Problem type 1
Word problem with one decimal operation: Problem type 2
Word problem using decimal addition and multiplication
Word problem using decimal subtraction and division

Section A.1

Decimal place value
Rounding decimals
Converting a decimal to a fraction
Converting a fraction to a terminating decimal
Converting a fraction to a repeating decimal
Converting between percentages and decimals
Converting a percentage to a fraction
Converting a fraction to a percentage
Percentage of a whole number
Writing a ratio as a percentage

Section A.2

Mean of a data set
Mean and median of a data set
Weighted mean
Mode of a data set

Section A.3

Supplementary and complementary angles
Perimeter of a square or a rectangle
Perimeter of a polygon
-Set of Real Numbers
  - Section 1.1
    - Factors
    - Prime numbers
    - Prime factorization
    - Least common multiple
    - Equivalent fractions
    - Simplifying a fraction
    - Addition or subtraction of fractions with the same denominator
    - Addition or subtraction of fractions with different denominators
    - The reciprocal of a number
    - Product of a unit fraction and a whole number
    - Product of a fraction and a whole number
    - Introduction to fraction multiplication
    - Fraction multiplication
    - Division involving a whole number and a fraction
    - Fraction division
    - Writing an improper fraction as a mixed number
    - Writing a mixed number as an improper fraction
    - Addition of mixed numbers with same denominator and carry
    - Subtraction of mixed numbers with same denominator and borrowing
Addition or subtraction of mixed numbers with different denominators

Mixed number multiplication: Problem type 1

Mixed number division

Section 1.2

Ordering fractions

Fractional position on a number line

Plotting integers on a number line

Plotting rational numbers on a number line

Ordering integers

Absolute value of a number

Integers and rational numbers

Rational and irrational numbers

Section 1.3

Introduction to exponents

Writing expressions using exponents

Order of operations: Problem type 1

Order of operations: Problem type 2

Order of operations with whole numbers and exponents

Mixed arithmetic operations with fractions

Perimeter of a square or a rectangle

Area of a square or a rectangle

Area of a trapezoid

Volume of a cube or a rectangular prism

Square root of a perfect square

Writing a mathematical expression

Translating sentences into two-step expressions

Square root of a rational perfect square

Section 1.4

Writing a signed number for a real-world situation

Integer addition: Problem type 1

Integer addition: Problem type 2

Signed fraction addition: Advanced

Signed decimal addition

Section 1.5
Integer subtraction: Problem type 1
Integer subtraction: Problem type 2
Integer subtraction: Problem type 3
Word problem with addition or subtraction of integers
Simple addition and subtraction of signed fractions
Operations with absolute value
Section 1.6
Integer multiplication and division
Mixed arithmetic operations with integers
Signed fraction multiplication: Advanced
Exponents and integers: Problem type 1
Exponents and integers: Problem type 2
Exponents and signed fractions
Exponents and order of operations
Evaluation of a linear expression in two variables
Evaluation of a polynomial in one variable
Section 1.7
Properties of addition
Properties of real numbers
Distributive property: Basic
Distributive property: Advanced
Combining like terms: Basic
Combining like terms: Advanced
Combining like terms in a quadratic expression
Chapter 1 Supplementary Topics
Word problem with common multiples
Fractional part of a circle
Word problem with fractions
Converting a mixed number to a decimal
Ordering fractions with variables

2-Linear Equations and Inequalities
Section 2.1
Additive property of equality with whole numbers
Additive property of equality with integers
Additive property of equality with a negative coefficient
Additive property of equality with decimals
Multiplicative property of equality with whole numbers
Multiplicative property of equality with signed fractions
Multiplicative property of equality with integers
Translating sentences into equations
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Solving a two-step equation with integers
Solving a two-step equation with signed fractions
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Solving a linear equation with several occurrences of the variable: Problem type 3
Solving a linear equation with several occurrences of the variable: Problem type 4
Solving equations with zero, one, or infinitely many solutions
Section 2.3
Solving a linear equation with several occurrences of the variable: Problem type 2
Solving a linear equation with several occurrences of the variable: Problem type 5
Section 2.4
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Applying the percent equation
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Computations from circle graphs
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Area of a parallelogram
Volume of a cylinder
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Angle measures of right or isosceles triangles with variables
Finding the side length of a rectangle given its perimeter or area
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Solving a value mixture problem using a linear equation
Solving a percent mixture problem using a linear equation
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Writing an inequality
Writing a compound inequality
Solving a linear inequality: Problem type 1
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Solving a linear inequality: Problem type 5
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Graphing a compound linear inequality on the number line
Finding the value for a new score that will yield a given mean
Writing an inequality for a real-world situation
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Set builder and interval notation
Chapter 2 Supplementary Topics
Set builder notation
Union and intersection of finite sets
Additive property of equality with fractions
Using two steps to solve an equation with whole numbers
Solving an equation to find the value of an expression
Simple absolute value equation
Translating sentences into equations: Advanced
Solving a fraction word problem using a simple linear equation
Solving a word problem using a linear equation: Problem type 2
Solving a word problem using a linear equation: Problem type 4
Solving a word problem with 3 unknowns using a linear equation
Converting between temperatures in Fahrenheit and Celsius
Area between two rectangles
Area involving rectangles and circles
Area between two concentric circles
Rate of filling of a solid
Computing a percentage from a table of values
Interpreting bar graphs
Interpreting line graphs
Metric distance conversion with whole number values
Customary unit conversion with whole number values
Conversion between metric and customary unit systems
Converting between compound units: Basic
Converting between compound units: Advanced

3-Graphing Linear Equations in Two Variables

Section 3.1
Reading a point in the coordinate plane
Plotting a point in the coordinate plane

Section 3.2
Graphing a line given the x- and y-intercepts
Graphing a line given its equation in slope-intercept form
Graphing a line given its equation in standard form
Graphing a vertical or horizontal line
Solutions to a linear equation in two variables: Problem type 1
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Y-intercept of a line
Finding x- and y-intercepts of a line given the equation in standard form

Section 3.3
Graphing a line through a given point with a given slope
Finding slope given the graph of a line on a grid
Finding slope given two points on the line

Section 3.4
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Y-intercept of a line
Finding the slope of a line given its equation
Slopes of parallel and perpendicular lines: Problem type 1
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Writing the equation of a line given the slope and a point on the line
Writing the equation of the line through two given points
Writing the equations of vertical and horizontal lines through a given point
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Scatterplots and correlation
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Classifying systems of linear equations from graphs
Graphically solving a system of linear equations
Section 4.2
Solving a simple system using substitution
Section 4.3
Solving a system of linear equations
Solving a system that is inconsistent or consistent dependent
Section 4.4
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Solving a word problem using a system of linear equations: Problem type 3
Solving a word problem using a system of linear equations: Problem type 4 Necessary?
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Graphing a linear inequality in the plane: Problem type 2
Graphing a linear inequality in the plane: Problem type 3
Graphing a system of linear inequalities
Chapter 4 Supplementary Topics
Translating sentences into inequalities
Solving a word problem using a system of linear inequalities

## 5-Polynomials and Properties of Exponents

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- Solving a rational equation that simplifies to a quadratic equation: Problem type 1
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- Solving a proportion: Basic
- Solving a proportion: Advanced
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- Solving a word problem using a rational equation
- Similar polygons
- Indirect measurement

Section 7.8
- Word problem on direct variation
- Word problem on inverse variation
- Word problem on combined variation

Chapter 7 Supplementary Topics
- Complex fraction: Problem type 2
- Ratio of multivariate polynomials
- Basic word problem on rates
- Word problem on inverse proportions

8-Radicals
- Section 8.1
- Square root of a perfect square
Square root of a perfect square monomial
Pythagorean Theorem
Cube root of an integer

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Square root multiplication
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Section 8.5
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Rationalizing the denominator of a radical expression using conjugates

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Rational exponents: Negative exponents and fractional bases
Rational exponents: Products and quotients
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Chapter 8 Supplementary Topics
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Estimating a square root
Simplifying a product of radical expressions
9-Quadratic Equations, Complex Numbers, and Functions

Section 9.1
- Even root property
- Solving an equation with exponent using the even-root property

Section 9.2
- Completing the square
- Solving a quadratic equation by completing the square

Section 9.3
- Solving a quadratic equation using the quadratic formula

Section 9.4
- Using $i$ to rewrite square roots of negative numbers
- Simplifying a product or quotient involving roots of negative numbers
- Adding and subtracting complex numbers
- Multiplying complex numbers
- Dividing complex numbers
- Solving a quadratic equation with complex roots

Section 9.5
- Word problem using the maximum or minimum of a quadratic function
- Finding the x-intercept(s) and the vertex of a parabola
- Graphing a parabola: Problem type 1
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Section 9.6
- Function tables
- Introduction to functions: Notation and graphs
- Domain and range from ordered pairs
- Identifying functions from relations
- Vertical line test
- Domain of a square root function

Chapter 9 Supplementary Topics
- Graphing an equation involving absolute value in the plane
- Graphing a simple cubic function
- Simplifying a power of $i$
- Discriminant of a quadratic equation
- Solving a word problem using a quadratic equation with irrational roots
Caution: You may have removed too many lower-level topics from the course; this is not usually recommended.

For students who have not yet mastered lower-level topics, learning/reviewing these topics is essential for success in learning more advanced topics that are central to the course. We recommend that you put some of these topics back into the course, even though they are only review for the core topics.

The ALEKS Assessment determines the exact topics each student already knows, doesn't know, and is ready to learn. Only those students who need to work on a given topic will be asked to do so. Students who have already mastered topics (including prerequisite topics) will not be prompted to learn them again.