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
- Area of a square or a rectangle
Area of a triangle
Area of a piecewise rectangular figure
Area of a parallelogram
Area of a trapezoid
Circumference and area of a circle
Area involving inscribed figures
Volume of a cube or a rectangular prism
Volume of a cylinder
Sum of the angle measures of a triangle

Course Readiness and Additional Topics Appendix Supplementary Topics
Average of two numbers
Interpreting circle graphs or pie charts

1-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  added

Writing a mathematical expression

Translating sentences into two-step expressions

Square root of a rational perfect square  added

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 added
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
Section 2.2
Solving a two-step equation with integers
Solving a two-step equation with signed fractions
Solving a linear equation with several occurrences of the variable: Problem type 1
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
Solving a word problem using a linear equation: Problem type 1
Section 2.5
Percentage of a whole number
Applying the percent equation
Word problem on percentage: Problem type 1
Word problem on percentage: Problem type 2
Word problem on percentage: Problem type 3
Simple interest
Computations from circle graphs
Section 2.6
Area of a triangle
Area of a parallelogram
Volume of a cylinder
Introduction to algebraic symbol manipulation
Algebraic symbol manipulation: Problem type 1
Algebraic symbol manipulation: Problem type 2
Vertical angles and linear pairs
Angle measures of right or isosceles triangles with variables
Finding the side length of a rectangle given its perimeter or area
Perimeters and side lengths with variables

Word problem involving area and perimeter of a rectangle

Section 2.7

Solving a word problem using a linear equation: Problem type 3

Solving a value mixture problem using a linear equation

Solving a percent mixture problem using a linear equation

Solving a rate problem using a linear equation

Word problem on rates

Section 2.8

Writing an inequality

Writing a compound inequality

Solving a linear inequality: Problem type 1

Solving a linear inequality: Problem type 2

Solving a linear inequality: Problem type 3

Solving a linear inequality: Problem type 4

Solving a linear inequality: Problem type 5

Solving a compound linear inequality: Problem type 1

Graphing a linear inequality on the number line

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

Word problem with linear inequalities: Problem type 1

Word problem with linear inequalities: Problem type 2

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
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
- Solutions to a linear equation in two variables: Problem type 2
- 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
- Graphing a line given its equation in standard form
Y-intercept of a line
Finding the slope of a line given its equation
Slopes of parallel and perpendicular lines: Problem type 1
Section 3.5
Writing an equation of a line given the y-intercept and a point
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
Slopes of parallel and perpendicular lines: Problem type 2
Section 3.6
Writing equations and drawing graphs to fit a narrative
Application problem with a linear function: Problem type 1
Application problem with a linear function: Problem type 2
Chapter 3 Supplementary Topics
Scatterplots and correlation
4-Systems of Linear Equations in Two Variables
Section 4.1
Solutions to a linear equation in two variables: Problem type 2
Interpreting the graphs of two functions
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
Solving a word problem using a system of linear equations: Problem type 1
Solving a word problem using a system of linear equations: Problem type 2
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
Solving a word problem using a system of linear equations: Problem type 5
Section 4.5
Graphing a linear inequality in the plane: Problem type 1
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
Section 5.1
Exponents and integers: Problem type 1
Exponents and integers: Problem type 2
Exponents and signed fractions
Product rule of exponents
Multiplying monomials
Quotients of expressions involving exponents
Section 5.2
Introduction to the power rule of exponents
Power rule with positive exponents
Using the power and product rules to simplify expressions with positive exponents
Section 5.3
Evaluating expressions with exponents of zero
Writing a positive number without a negative exponent
Writing a negative number without a negative exponent
Writing a simple algebraic expression without negative exponents
Product rule of exponents in a multivariate monomial
Quotient rule with negative exponents
Power rule with negative exponents: Problem type 1
Power rule with negative exponents: Problem type 2
Using the power, product, and quotient rules to simplify expressions with negative exponents
Section 5.4
Scientific notation with positive exponent
Scientific notation with negative exponent
Multiplying and dividing numbers written in scientific notation
Section 5.5
Simplifying a sum or difference of polynomials
Simplifying a polynomial expression
Degree and leading coefficient of a polynomial in one variable
Degree of a multivariate polynomial
Section 5.6
Multiplying monomials
Multiplying a monomial and a polynomial: Problem type 1
Multiplying a monomial and a polynomial: Problem type 2
Multiplying binomials: Problem type 1
Squaring a binomial
Multiplying binomials: Problem type 2
Multiplying binomials: Problem type 3
Multiplying polynomials
Section 5.7
Dividing a polynomial by a monomial: Problem type 1
Dividing a polynomial by a monomial: Problem type 2
Polynomial long division: Problem type 1
Polynomial long division: Problem type 2
Polynomial long division: Problem type 3
Chapter 5 Supplementary Topics
Solving a word problem using an exponential equation: Problem type 1
Ordering numbers with positive exponents
Ordering numbers with negative exponents
Section 6.1
Greatest common factor added
Introduction to the GCF of two monomials
Greatest common factor of two monomials
Factoring out a monomial from a polynomial: Problem type 1
Factoring out a monomial from a polynomial: Problem type 2
Factoring a multivariate polynomial by grouping: Problem type 1
Factoring a multivariate polynomial by grouping: Problem type 2
Section 6.2
Factoring a quadratic with leading coefficient 1
Section 6.4
Factoring a quadratic with leading coefficient greater than 1
Factoring a quadratic polynomial in two variables
Factoring a product of a quadratic trinomial and a monomial
Section 6.5
Factoring a perfect square
Factoring a difference of squares
Factoring with repeated use of the difference of squares formula
Section 6.6
Factoring a sum or difference of two cubes
Section 6.7
Solving equations 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
Solving a quadratic equation needing simplification
Section 6.8
Solving a word problem using a quadratic equation with rational roots

-Rational Expressions
Section 7.1
Simplifying a ratio of polynomials: Problem type 1
Domain of a rational function
Section 7.2
Multiplying rational expressions: Problem type 1
Multiplying rational expressions: Problem type 2
Dividing rational expressions: Problem type 1
Dividing rational expressions: Problem type 2
Complex fractions without variables: Problem type 1
Section 7.3
Introduction to the LCM of two monomials
Least common multiple of two monomials
Section 7.4
Adding rational expressions with common denominators
Adding rational expressions with different denominators: ax, bx
Adding rational expressions with different denominators: Multivariate
Adding rational expressions with different denominators: x+a, x+b
Adding rational expressions with different denominators: Quadratic
Section 7.5
Complex fractions without variables: Problem type 2
Complex fraction: Problem type 1
Complex fraction: Problem type 3
Complex fraction: Problem type 4
Section 7.6
Solving a rational equation that simplifies to a linear equation: Problem type 1
Solving a rational equation that simplifies to a linear equation: Problem type 2
Solving a rational equation that simplifies to a linear equation: Problem type 3
Solving a rational equation that simplifies to a linear equation: Problem type 4
Solving a rational equation that simplifies to a quadratic equation: Problem type 1
Solving a rational equation that simplifies to a quadratic equation: Problem type 2
Solving a rational equation that simplifies to a quadratic equation: Problem type 3
Section 7.7
Simple word problem on proportions
Solving a proportion: Basic
Solving a proportion: Advanced
Word problem involving multiple rates
Word problem on proportions: Problem type 1
Word problem on proportions: Problem type 2
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 added
Square root of a perfect square monomial
Pythagorean Theorem

Square root simplification

Simplifying a radical expression: Problem type 1

Simplifying a higher radical: Problem type 1

Simplifying a higher radical: Problem type 2

Square root addition

Simplifying a sum of radical expressions

Square root multiplication

Simplifying a product of radical expressions using the distributive property

Special products with square roots: Conjugates and squaring

Rationalizing the denominator of a radical expression

Rationalizing the denominator of a radical expression using conjugates

Solving an equation with radicals: Problem type 1

Solving an equation with radicals: Problem type 2

Solving an equation with radicals: Problem type 3

Solving an equation with radicals: Problem type 4

Converting between radical form and exponent form

Rational exponents: Basic

Rational exponents: Negative exponents and fractional bases

Rational exponents: Products and quotients

Rational exponents: Powers of powers

Distance between two points in the plane

Estimating a square root

Simplifying a product of radical expressions
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
- Graphing a parabola: Problem type 2
- Graphing a parabola: Problem type 3

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.