

ALEKS®

Higher Education Math Placement

1. Whole Numbers, Fractions, and Decimals

1.1 Operations with Whole Numbers

Addition with carry (arith050)

Subtraction with borrowing (arith006)

Multiplication with carry (arith004)

Introduction to multiplication of large numbers (arith615)

Division with carry (arith005)

Introduction to exponents (arith233)

Order of operations: Problem type 1 (arith048)

Order of operations: Problem type 2 (arith051)

Order of operations with whole numbers and exponents: Basic (arith693)

1.2 Equivalent Fractions and Ordering

Equivalent fractions (arith212)

Simplifying a fraction (arith067)

Fractional position on a number line (arith687)

Plotting fractions on a number line (arith667)

Writing an improper fraction as a mixed number (arith015)

Writing a mixed number as an improper fraction (arith619)

Ordering fractions with same denominator (arith044)

Ordering fractions (arith092)

1.3 Operations with Fractions

Addition or subtraction of fractions with the same denominator (arith618)

Introduction to addition or subtraction of fractions with different denominators (arith664)

Addition or subtraction of fractions with different denominators (arith230)

Product of a fraction and a whole number (arith086)

Introduction to fraction multiplication (arith119)

Fraction multiplication (arith053)

Fraction division (arith022)

Division involving a whole number and a fraction (arith694)
Mixed arithmetic operations with fractions (arith697)

1.4 Decimal Place Value

Rounding decimals (arith221)
Ordering decimals (arith608)

1.5 Operations with Decimals

Addition of aligned decimals (arith624)
Decimal addition (arith013)
Subtraction of aligned decimals (arith625)
Multiplication of a decimal by a power of ten (arith082)
Multiplication of a decimal by a whole number (arith017)
Decimal multiplication: Problem type 1 (arith055)
Division of a decimal by a power of ten (arith083)
Division of a decimal by a whole number (arith081)
Converting a fraction to a terminating decimal (arith222)

2. Percents, Proportions, and Geometry

2.1 Percentages

Converting between percentages and decimals (arith226)
Converting a percentage to a fraction (arith090)
Converting a fraction to a percentage (arith002)
Writing a ratio as a percentage (arith069)
Percentage of a whole number (arith030)
Applying the percent equation (arith698)
Finding the sale price given the original price and percent discount (arith074)
Finding the original price given the sale price and percent discount (arith031)

2.2 Proportions

Solving a proportion of the form $x/a = b/c$ (alge272)
Simple word problem on proportions (arith064)
Word problem on proportions: Problem type 1 (arith610)
Word problem on proportions: Problem type 2 (arith611)

2.3 Perimeter and Area

- Perimeter of a square or a rectangle (geom300)
- Finding the missing length in a figure (geom221)
- Finding a side length given the perimeter and side lengths with variables (geom817)
- Area of a square or a rectangle (geom019)
- Area of a piecewise rectangular figure (geom340)
- Area of a triangle (geom801)
- Area of a parallelogram (geom022)
- Finding the side length of a rectangle given its perimeter or area (geom217)
- Circumference and area of a circle (geom802)
- Perimeter involving rectangles and circles (geom301)
- Area involving inscribed figures (geom214)

2.4 Volume and Surface Area

- Volume of a rectangular prism (geom311)
- Volume of a cylinder (geom035)
- Surface area of a cube or a rectangular prism (geom031)
- Surface area of a cylinder (geom034)

2.5 Angles and Triangles

- Solving equations involving vertical angles (geom530)
- Sum of the angle measures of a triangle (geom001)
- Finding an angle measure for a triangle with an extended side (geom908)

2.6 Similar Figures

- Similar polygons (geom037)
- Indirect measurement (geom337)

3. Signed Numbers, Linear Equations and Inequalities

3.1 Integers

- Absolute value of a number (arith071)
- Integer addition: Problem type 1 (arith200)
- Integer addition: Problem type 2 (arith108)
- Integer subtraction: Problem type 1 (arith688)
- Integer subtraction: Problem type 2 (arith689)

Integer subtraction: Problem type 3 (arith690)
Integer multiplication and division (arith231)

3.2 Signed Fractions and Decimals

Signed fraction addition: Basic (arith116)
Signed fraction addition: Advanced (arith106)
Signed fraction multiplication: Basic (arith822)
Signed fraction multiplication: Advanced (arith105)
Signed decimal addition with three numbers (arith234)

3.3 Signed Numbers and Exponents

Exponents and integers: Problem type 1 (arith702)
Exponents and signed fractions (arith704)
Exponents and order of operations (arith600)

3.4 Algebraic Expressions

Writing a simple variable expression for a real-world situation (alge733)
Evaluating a linear expression in two variables (alge005)
Evaluating a quadratic expression in one variable (alge004)

3.5 Properties of Real Numbers

Distributive property: Whole number coefficients (alge606)
Distributive property: Integer coefficients (alge604)
Combining like terms: Integer coefficients (alge607)
Combining like terms: Advanced (alge663)

3.6 Solving a Linear Equation with One Occurrence of the Variable

Additive property of equality with decimals (alge800)
Additive property of equality with integers (alge010)
Additive property of equality with a negative coefficient (alge266)
Multiplicative property of equality with whole numbers (alge008)
Multiplicative property of equality with decimals (alge825)
Multiplicative property of equality with integers (alge797)
Multiplicative property of equality with signed fractions (alge012)
Solving a two-step equation with integers (alge006)
Solving a two-step equation with signed fractions (alge208)

3.7 Solving a Linear Equation with Several Occurrences of the Variable

Solving a linear equation with several occurrences of the variable: Variables on the same side and distribution (alge011)

Solving a linear equation with several occurrences of the variable: Variables on both sides and distribution (alge013)

Solving a linear equation with several occurrences of the variable: Fractional forms with binomial numerators (alge179)

Solving equations with zero, one, or infinitely many solutions (alge742)

3.8 Applications with Linear Equations

Translating a sentence into a one-step equation (alge016)

Translating a sentence into a two-step expression (alge291)

Solving a simple word problem using the formula $d = rt$ (alge823)

Solving a word problem with two unknowns using a linear equation (alge014)

Solving a value mixture problem using a linear equation (alge794)

3.9 Solving an Inequality

Graphing a linear inequality on the number line (alge017)

Graphing a compound linear inequality on the number line (alge166)

Solving a linear inequality: Problem type 1 (alge019)

Solving a linear inequality: Problem type 2 (alge020)

Solving a linear inequality: Problem type 3 (alge021)

Solving a linear inequality: Problem type 4 (alge207)

Solving a compound linear inequality: Problem type 1 (alge746)

Solving a compound linear inequality: Problem type 2 (alge747)

3.10 Solving an Equation or Inequality with Absolute Value

Solving an equation involving absolute value: Basic (alge103)

Solving an inequality involving absolute value: Basic (alge170)

3.11 Solving a Multivariable Equation for a Variable

Introduction to algebraic symbol manipulation (alge810)

Algebraic symbol manipulation: Problem type 1 (alge743)

Algebraic symbol manipulation: Problem type 2 (alge744)

4. Lines and Systems of Linear Equations

4.1 Graphing Lines

- Plotting a point in the coordinate plane (alge067)
- Finding a solution to a linear equation in two variables (alge066)
- Graphing a line given its equation in slope-intercept form (alge194)
- Graphing a line given its equation in standard form (alge195)
- Graphing a vertical or horizontal line (alge198)

4.2 Slope of a Line

- Finding slope given the graph of a line on a grid (alge684)
- Finding slope given two points on the line (alge685)
- Finding the slope of a line given its equation (alge631)
- Slopes of parallel and perpendicular lines: Problem type 1 (geom807)

4.3 Equation of a Line

- Finding x- and y-intercepts of a line given the equation: Advanced (alge210)
- Writing the equation of a line given the slope and a point on the line (alge071)
- Writing the equation of the line through two given points (alge072)

4.4 Solving a System of Linear Equations

- Graphically solving a system of linear equations (alge725)
- Solving a simple system using substitution (alge751)
- Solving a system of linear equations using elimination with multiplication and addition (alge076)
- Solving a system that is inconsistent or consistent dependent (alge752)

4.5 Graphing Linear Inequalities in the Plane

- Graphing a linear inequality in the plane: Standard form (alge018)
- Graphing a linear inequality in the plane: Vertical or horizontal lines (alge225)
- Graphing a system of linear inequalities (alge079)

4.6 Applications with Lines and Systems

- Interpreting line graphs (mstat007)
- Interpreting the graphs of two functions (alge263)
- Writing an equation and drawing its graph to model a real-world situation (alge701)
- Application problem with a linear function: Problem type 1 (alge805)

Solving a value mixture problem using a system of linear equations (alge184)
Solving a distance, rate, time problem using a system of linear equations (alge224)
Solving a percent mixture problem using a system of linear equations (alge192)
Solving a word problem using a 3 by 3 system of linear equations (alge793)

5. Relations and Functions

5.1 Sets and Intervals

Set builder and interval notation (set004)
Union and intersection of finite sets (set002)

5.2 Evaluating Functions

Evaluating functions: Problem type 1 (pcalc760)
Evaluating a piecewise-defined function (fun030)
Variable expressions as inputs of functions (fun033)
Sum, difference, and product of two functions (fun019)

5.3 Domain and Range

Domain and range from ordered pairs (fun016)
Domain and range from the graph of a continuous function (fun024)
Domain of a square root function (pcalc763)
Domain of a rational function (alge715)

5.4 Graphs of Functions and their Transformations

Vertical line test (fun010)
Finding local maxima and minima of a function given the graph (pcalc752)
Translating the graph of a function: One step (pcalc769)
Transforming the graph of a function by reflecting over an axis (pcalc771)
Transforming the graph of a function by shrinking or stretching (pcalc772)
Writing an equation for a function after a vertical translation (alge185)
Writing an equation for a function after a vertical and horizontal translation (fun020)
Graphing a simple cubic function (alge262)
Graphing a function involving a square root (pcalc781)

5.5 Composition of Functions and Inverse Functions

Composition of two functions: Basic (fun022)

Inverse functions: Problem type 1 (fun012)

Inverse functions: Problem type 2 (alge130)

6. Integer Exponents and Factoring

6.1 Properties of Exponents

Writing a positive number without a negative exponent (arith042)

Writing a negative number without a negative exponent (arith043)

Introduction to the product rule of exponents (alge024)

Product rule with positive exponents (alge030)

Product rule with negative exponents (alge028)

Introduction to the quotient rule of exponents (alge827)

Quotients of expressions involving exponents (alge026)

Quotient rule with negative exponents: Problem type 1 (alge755)

Introduction to the power rule of exponents (alge754)

Power rule with positive exponents (alge027)

Power rule with negative exponents: Problem type 1 (alge025)

Power rule with negative exponents: Problem type 2 (alge799)

Using the power and product rules to simplify expressions with positive exponents
(alge756)

6.2 Scientific Notation

Scientific notation with positive exponent (arith036)

Scientific notation with negative exponent (arith037)

6.3 Operations with Polynomials

Simplifying a sum or difference of two univariate polynomials (alge798)

Multiplying a monomial and a polynomial: Univariate with positive leading coefficients
(alge735)

Multiplying a monomial and a polynomial: Multivariate (alge835)

Multiplying binomials with leading coefficients of 1 (alge033)

Multiplying binomials that are a sum and a difference of two terms: Univariate (alge764)

Squaring a binomial: Univariate (alge032)

Multiplication involving binomials and trinomials in two variables (alge180)

6.4 Factoring Polynomials

Greatest common factor of two monomials (alge037)
Factoring out a monomial from a polynomial: Univariate (alge738)
Factoring out a monomial from a polynomial: Multivariate (alge739)
Factoring a quadratic with leading coefficient 1 (alge705)
Factoring a quadratic with leading coefficient greater than 1 (alge040)
Factoring a product of a quadratic trinomial and a monomial (alge041)
Factoring a difference of squares (alge624)
Factoring a polynomial by grouping: Problem type 1 (alge038)

7. Quadratic and Polynomial Functions

7.1 Solving a Quadratic Equation

Solving equations written in factored form (alge681)
Completing the square (alge094)
Finding the roots of a quadratic equation with leading coefficient 1 (alge045)
Finding the roots of a quadratic equation with leading coefficient greater than 1 (alge048)
Solving a quadratic equation needing simplification (alge211)
Applying the quadratic formula: Exact answers (alge095)
Discriminant of a quadratic equation (alge214)
Solving a word problem using a quadratic equation with rational roots (alge703)
Solving a word problem using a quadratic equation with irrational roots (alge524)

7.2 Solving a Quadratic Inequality

Solving a quadratic inequality written in factored form (alge784)

7.3 Graphing a Quadratic Function

Graphing a parabola of the form $y = ax^2$ (alge252)
Graphing a parabola of the form $y = (x-a)^2 + c$ (alge253)
Graphing a parabola of the form $y = ax^2 + bx + c$: Integer coefficients (pcalc746)
Rewriting a quadratic function to find the vertex of its graph (pcalc774)
Finding the x-intercept(s) and the vertex of a parabola (alge277)

7.4 Polynomial Functions

Finding zeros of a polynomial function written in factored form (pcalc764)
Finding x- and y-intercepts given a polynomial function (pcalc765)

Determining the end behavior of the graph of a polynomial function (pcalc782)
Inferring properties of a polynomial function from its graph (pcalc738)

7.5 Circles

Graphing a circle given its equation in standard form (pcalc605)
Graphing a circle given its equation in general form (pcalc064)

8. Rational Expressions and Functions

8.1 Simplifying Rational Expressions

Least common multiple of two monomials (alge055)
Simplifying a ratio of polynomials: Problem type 1 (alge710)
Ratio of multivariate polynomials (alge034)
Adding rational expressions with common denominators (alge056)
Adding rational expressions with different denominators: ax , bx (alge057)
Adding rational expressions with different denominators: $x+a$, $x+b$ (alge622)
Multiplying rational expressions: Problem type 1 (alge053)
Multiplying rational expressions: Problem type 2 (alge620)
Dividing rational expressions: Problem type 1 (alge054)
Complex fractions without variables: Problem type 1 (arith695)
Complex fraction: Problem type 1 (alge058)
Complex fraction: Problem type 3 (alge767)

8.2 Division of Polynomials

Dividing a polynomial by a monomial: Univariate (alge759)
Polynomial long division: Problem type 1 (alge761)

8.3 Solving Rational Equations

Solving a rational equation that simplifies to a linear equation: Problem type 1 (alge060)
Solving a rational equation that simplifies to a linear equation: Problem type 2 (alge205)
Solving a rational equation that simplifies to a linear equation: Problem type 3 (alge206)
Solving a rational equation that simplifies to a quadratic equation: Problem type 2 (alge062)

8.4 Direct and Inverse Variations

Word problem on direct variation (alge175)
Word problem on inverse variation (alge176)

Writing an equation that models variation (pcalc681)

8.5 Graphing Rational Functions

Sketching the graph of a rational function: Constant over linear (pcalc815)

Sketching the graph of a rational function: Linear over linear (pcalc816)

9. Radicals and Rational Exponents

9.1 Simplifying Expressions with Radicals

Square root of a rational perfect square (arith601)

Square root simplification (arith093)

Square root of a perfect square monomial (alge264)

Simplifying a radical expression: Problem type 1 (alge080)

Simplifying a sum of radical expressions (alge084)

Simplifying a product of radical expressions (alge640)

Rationalizing the denominator of a radical expression (alge086)

Rationalizing the denominator of a radical expression using conjugates (alge088)

9.2 Solving Equations with Radicals

Solving a radical equation that simplifies to a linear equation: One radical (alge089)

Solving a radical equation that simplifies to a linear equation: Two radicals (alge090)

Solving a radical equation that simplifies to a quadratic equation: One radical (alge091)

9.3 Pythagorean Theorem and the Distance Formula

Pythagorean Theorem (geom044)

Distance between two points in the plane (alge132)

9.4 Higher Roots

Cube root of an integer (arith094)

Simplifying a higher radical: Problem type 1 (alge273)

Simplifying a higher radical: Problem type 2 (alge811)

9.5 Rational Exponents

Rational exponents: Basic (alge250)

Rational exponents: Negative exponents and fractional bases (alge251)

Rational exponents: Powers of powers (alge249)

Rational exponents: Products and quotients (alge773)

10. Exponentials and Logarithms

10.1 Properties of Logarithms

Converting between logarithmic and exponential equations (alge108)

Converting between natural logarithmic and exponential equations (pcalc799)

Evaluating a logarithmic expression (alge232)

Basic properties of logarithms (pcalc708)

Expanding a logarithmic expression: Problem type 1 (pcalc779)

Writing expressions as a single logarithm (alge787)

Change of base for logarithms: Problem type 1 (pcalc612)

10.2 Solving Logarithmic and Exponential Equations

Solving a logarithmic equation: Problem type 1 (alge233)

Solving a logarithmic equation: Problem type 2 (alge113)

Solving a logarithmic equation: Problem type 3 (pcalc803)

Solving a logarithmic equation: Problem type 4 (pcalc804)

Solving a logarithmic equation: Problem type 5 (pcalc805)

Solving an exponential equation: Problem type 1 (alge111)

Solving an exponential equation: Problem type 2 (alge112)

Solving an exponential equation: Problem type 3 (alge789)

10.3 Graphing Logarithmic and Exponential Functions

The graph, domain, and range of an exponential function (pcalc797)

The graph, domain, and range of a logarithmic function (pcalc800)

Translating the graph of a logarithmic or exponential function (pcalc102)

10.4 Applications with Exponential Functions

Evaluating an exponential function that models a real-world situation (pcalc798)

Solving a word problem using an exponential equation: Problem type 1 (alge177)

11. Trigonometry

11.1 Angles

Converting between degree and radian measure: Problem type 1 (pcalc002)

Sketching an angle in standard position (pcalc006)
Reference angles: Problem type 1 (pcalc626)
Coterminal angles (pcalc622)
Arc length and central angle measure (pcalc005)

11.2 Right Triangle Trigonometry

Sine, cosine, and tangent ratios (pcalc600)
Using a trigonometric ratio to find a side length in a right triangle (pcalc607)
Using a trigonometric ratio to find an angle measure in a right triangle (pcalc608)
Finding trigonometric ratios given a right triangle (pcalc008)
Solving a triangle with the law of sines: Problem type 1 (pcalc031)
Solving a triangle with the law of cosines (pcalc033)

11.3 Unit Circle

Finding coordinates on the unit circle for special angles (pcalc627)
Trigonometric functions and special angles: Problem type 1 (pcalc629)
Trigonometric functions and special angles: Problem type 2 (pcalc630)
Finding values of trigonometric functions given information about an angle: Problem type 1 (pcalc011)
Finding values of trigonometric functions given information about an angle: Problem type 2 (pcalc012)

11.4 Graphing Trigonometric Functions

Amplitude and period of sine and cosine functions (pcalc633)
Amplitude, period, and phase shift of sine and cosine functions (pcalc634)
Sketching the graph of a sine or cosine function: Problem type 1 (pcalc107)
Sketching the graph of a sine or cosine function: Problem type 2 (pcalc106)

11.5 Inverse Trigonometric Functions

Values of inverse trigonometric functions (pcalc016)
Composition of a trigonometric function and an inverse trigonometric function: Problem type 2 (pcalc019)

11.6 Trigonometric Identities

Simplifying trigonometric expressions (pcalc648)
Sum and difference identities: Problem type 2 (pcalc663)
Double-angle identities: Problem type 2 (pcalc667)

11.7 Trigonometric Equations

Finding solutions in an interval for a basic equation involving sine or cosine (pcalc650)

Finding solutions in an interval for a basic tangent, cotangent, secant, or cosecant equation (pcalc651)

Finding solutions in an interval for a trigonometric equation using Pythagorean identities (pcalc654)

Solving a basic trigonometric equation involving sine or cosine (pcalc020)

* ~~Item~~: ALEKS item available in the course product but deleted in the default mode .

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