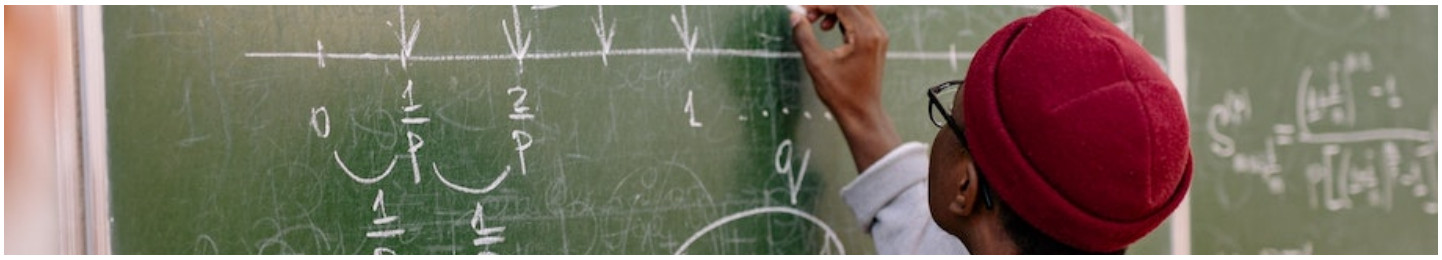
Unit A: Student Guide



> 💡 Tip: Get help when you need it!
>
> It's no secret that math can sometimes be difficult! If you get stuck anywhere, including on math concepts, technology, or how to complete the course, we invite you to reach out to our **Math Support Team (https://asuce.instructure.com/courses/6461/pages/2-meet-your-math-support-team)** .

Introduction

Welcome to Unit A! There's a lot to cover in each unit in this class, so we want to make sure you feel prepared and are familiar with the process you will be going through as you learn College Algebra. On the "**Student Guide**" pages of this course, you'll find the main steps to complete the unit and some high-level concepts and tips to help you prepare for what's ahead, including a list and examples of the unit quiz topics.

Skills

In this module, we'll develop and practice the following skills:

1. Evaluate expressions containing exponents, including exponents of integers and variables
2. Simplify expressions, including those that contain exponents, square roots, monomials, and univariate polynomials
3. Factor expressions, including univariate and multivariate polynomials and quadratics
4. Solve for a variable in an equation, including solving for a variable in terms of other variables

How to improve your skills

1. **In ALEKS, learn 100% of the Unit topics you missed on the Initial Knowledge Check by correctly answering 3 questions in each topic.** Please note: this will be the bulk of your time spent in this unit!
2. **Take the Unit Post Module Knowledge Check (PMKC).** If you missed questions, you will need to relearn those topics so that you once again have 100% of the topics in the Unit to unlock the Unit quiz.
3. **Complete the Unit Quiz in ALEKS.** Try to do this by the due date listed in the **syllabus (https://asuce.instructure.com/courses/6461/assignments/syllabus)** . The Unit Quiz covers only topics from this unit, and you will have multiple attempts to take the Unit Quiz, redo any problems you missed, improve your skills, and increase your score.

Quiz Information - Unit A

Purpose: The Unit Quiz is an opportunity for you to **test yourself** on select topics from Unit A. The Unit Quiz is **not proctored**. Also, you can **retake the Unit Quiz multiple times and fix just the problems you missed**.

Questions and topics: There are 21 questions from the topics in Unit A. These topics, together with an example problem for each one, are listed in the table below.

Review: Visit the **ALEKS: In-depth page (https://asuce.instructure.com/courses/6461/pages/aleks-in-depth)** for instructions on how to use the ALEKS system to review topics and get some extra practice.

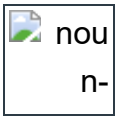
Table for Unit A Quiz Topics in ALEKS with an Example of Each

Quiz Topics - Unit A		
Number	**ALEKS Topic**	**Example**
1	Quotient of expressions involving exponents	Simplify. $\frac{y^6 z^2}{y^5 z^3}$

2	Evaluating a linear expression: Integer multiplication with addition or subtraction	Evaluate the expression when $c = 5$ and $y = -7$. $-6y + c$
3	Using distribution with double negation and combining like terms to simplify: Multivariate	Simplify. $7w - 5(2z - 4w) - z$
4	Power rules with positive exponents: Multivariate products	Simplify. $(-3z^2y^3)^4$
5	Solving a proportion of the form (x+a)/b = c/d	Solve for *w*. $\frac{8}{7} = \frac{10}{w+4}$
6	Solving for a variable in terms of other variables in a linear equation with fractions	Solve for *x*. $\frac{x-y}{5} = M$
7	Simplifying a ratio of polynomials by factoring a quadratic with leading coefficient 1	Simplify $\frac{y-2}{y^2-4y+4}$
8	Squaring a binomial: Univariate	Rewrite without parentheses and simplify. $(3+w)^2$
9	Converting between radical form and exponent form	Write the following as an exponential expression. $\sqrt[4]{x^3}$
10	Multiplying a univariate polynomial by a monomial with a negative coefficient	Rewrite without parentheses. $-9y^6(8y^3 - 4y + 3)$

11	Degree and leading coefficient of a univariate polynomial	State the degree and leading coefficient of $-18x^9 + 7x^3 + 5 + 18x^8$
12	Greatest common factor of two multivariate monomials	Find the greatest common factor of $20v^4w^3$ and $28v^5y^2w^6$.
13	Factoring a perfect square trinomial with leading coefficient 1	Factor $x^2 + 8x + 16$
14	Factoring a perfect square trinomial with leading coefficient greater than 1	Factor $49y^2 + 28y + 4$
15	Factoring a quadratic with a negative leading coefficient	Factor $-2u^2 - u + 21$
16	Rewriting an algebraic expression without a negative exponent	Rewrite the following without using a negative exponent. $\frac{1}{-4x^{-5}}$
17	Simplifying the square root of a whole number greater than 100	Simplify. $\sqrt{152}$
18	Additive property of equality with signed fractions	Solve for *y*. $y + \frac{2}{5} = \frac{1}{6}$
19	Simplifying a product involving square roots using the distributive property: Basic	Multiply. $\sqrt{3}(5\sqrt{15} - 8)$

20	Multiplying binomials with leading coefficients of 1	Multiply. $(w-8)(w+3)$
21	Factoring a quadratic with leading coefficient 1	Factor $x^2-12x+20$



All Unit A Topics

The topics in Unit A are listed below. Shaded bands are sets of similar topics.

Table of Unit A Topics with an Example of Each

Topic	Example
Signed fraction addition or subtraction: Basic	Add. $-\frac{1}{6}-\frac{3}{5}$
Signed fraction subtraction involving double negation	Evaluate. $\frac{7}{4}-\left(-\frac{1}{6}\right)$
Signed fraction multiplication: Basic	Multiply. $\left(-\frac{4}{3}\right)(-9)$
Signed fraction division	Divide. $-9\div\left(-\frac{6}{7}\right)$
Exponents and Integers: Problem type 1	Evaluate. $(-6)^2$ Evaluate. $(-3)^3$
Exponents and integers: Problem type 2	Evaluate. $-(8)^2$ Evaluate. $-(-6)^3$
Exponents and signed fractions	Evaluate. $\frac{3^2}{-5}$ Evaluate. $-\left(\frac{5}{4}\right)^3$
Order of operations with integers	Evaluate. $15-(-10)\div 5$
Order of operations with integers and exponents	Evaluate. $-\left((-2)^2-4\right)^2-2\cdot 3$
Evaluating a linear expression: Integer multiplication with addition or subtraction	Evaluate the expression when $c=5$ and $y=-7$. $-6y+c$

Topic	Example
Evaluating a quadratic expression: Integers	Evaluate the expression when $b = 4$. $b^2 - 6b + 9$
Distributive property: Integer coefficients	Use the distributive property to remove the parentheses. $(4 - 4u + 2y)(-7)$
Using distribution and combining like terms to simplify: Univariate	Simplify. $2(2x + 3) - 10$
Using distribution with double negation and combining like terms to simplify: Multivariate	Simplify. $7w - 5(2z - 4w) - z$
Understanding the product rule of exponents	Write p^2p^4 without exponents. Fill in the blank. $p^2p^4 = p^?$
Introduction to the product rule of exponents	Simplify. v^6v^3
Product rule with positive exponents: Univariate	Multiply. $6w(-5w^4)$
Product rule with positive exponents: Multivariate	Multiply. $2w^4v^7 \cdot 6w \cdot 3v^9$
Understanding the power rules of exponents	Write $(4a^4)^2$ without exponents. Fill in the blank. $(4a^4)^2 = ?a^?$
Introduction to the power of a power rule of exponents	Simplify. $(u^4)^4$
Introduction to the power of a product rule of exponents	Simplify. $(2w)^4$
Power rules with positive exponents: Multivariate products	Simplify. $(-3z^2y^3)^4$

Topic	Example
Power rules with positive exponents: Multivariate quotients	Simplify. $\left(\frac{w^2}{5u^3}\right)^3$
Simplifying a ratio of multivariate monomials: Basic	Simplify. $\frac{18bc}{42bc}$
Introduction to the quotient rule of exponents	Simplify. $\frac{x^6}{x^2}$
Simplifying a ratio of univariate monomials	Simplify. $\frac{40y^3}{72y}$
Quotient of expressions involving exponents	Simplify. $\frac{y^6z^2}{y^5z^3}$
Simplifying a ratio of multivariate monomials: Advanced	Simplify. $\frac{36x^3y^5}{9x^2y^4}$
Evaluating expressions with exponents of zero	Evaluate the expressions. $(-5)^0$ $(-1)\left(\frac{3}{7}\right)^0$
Evaluating an expression with a negative exponent: Whole number base	Rewrite the following without an exponent. 2^{-3}
Evaluating an expression with a negative exponent: Positive fraction base	Rewrite the following without an exponent. $\left(\frac{9}{2}\right)^{-1}$
Evaluating an expression with a negative exponent: Negative integer base	Rewrite the following without an exponent. $(-9)^{-1}$
Rewriting an algebraic expression without a negative exponent	Rewrite the following without using a negative exponent. $\frac{1}{-4x^{-5}}$

Topic	Example
Introduction to the product rule with negative exponents	Simplify. $w^{-3} \cdot w^{8}$
Quotient rule with negative exponents: Problem type 1	Simplify. $\frac{y^{-9}}{y^{-5}}$
Power of a power rule with negative exponents	Simplify. $(w^{5})^{-3}$
Converting between scientific notation and standard form in a real-world situation	Write 0.092 in scientific notation. Write 3.93×10^{6} in standard notation.
Degree and leading coefficient of a univariate polynomial	State the degree and leading coefficient of $-18x^{9} + 7x^{3} + 5 + 18x^{8}$
Simplifying a sum or difference of two univariate polynomials	Simplify. $(-7w^{2} - w + 2) + (-6w^{2} + 5)$
Multiplying a univariate polynomial by a monomial with a positive coefficient	Use the distributive property to remove the parentheses. $5z^{3}(4z^{2} - 3)$
Multiplying a univariate polynomial by a monomial with a negative coefficient	Rewrite without parentheses. $-9y^{6}(8y^{3} - 4y + 3)$
Multiplying binomials with leading coefficients of 1	Multiply. $(w - 8)(w + 3)$

Topic	Example
Multiplying binomials with leading coefficients greater than 1	Multiply. $(4-5c)(3+8c)$
Multiplying conjugate binomials: Univariate	Multiply. $(4-y)(4+y)$
Squaring a binomial: Univariate	Rewrite without parentheses and simplify. $(3+w)^2$
Introduction to the GCF of two monomials	Find the greatest common factor of $15y$ and $20x^3$.
Greatest common factor of two multivariate monomials	Find the greatest common factor of $20v^4w^3$ and $28v^5y^2w^6$.
Factoring a linear binomial	Factor $5w+15$
Factoring out a monomial from a polynomial: Univariate	Factor $10y^3-6y^2$
Factoring out a monomial from a polynomial: Multivariate	Factor $15uv^2x^5+24u^4v^9$
Factoring a quadratic with leading coefficient 1	Factor $x^2-12x+20$
Factoring out a constant before factoring a quadratic	Factor $6y^2-6y-12$
Factoring a quadratic with leading coefficient greater than 1: Problem type 1	Factor $3z^2+14z-5$
Factoring a quadratic with leading coefficient greater than 1: Problem	Factor $8z^2-14z+5$

Topic	Example
type 2	
Factoring a quadratic with a negative leading coefficient	Factor $-2u^2 - u + 21$
Factoring a perfect square trinomial with leading coefficient 1	Factor $x^2 + 8x + 16$
Factoring a perfect square trinomial with leading coefficient greater than 1	Factor $49y^2 + 28y + 4$
Factoring a difference of squares in one variable: Basic	Factor $16 - u^2$
Simplifying a ratio of polynomials by factoring a quadratic with leading coefficient 1	Simplify $\dfrac{y-2}{y^2-4y+4}$
Simplifying a ratio of polynomials: Problem type 1	Simplify $\dfrac{v^2+5v+6}{6v^2-54}$
Introduction to simplifying a radical expression with an even exponent	Simplify. $\sqrt{y^{36}}$
Finding nth roots of perfect nth powers with signs	Evaluate the following. Click on "Not a real number" if applicable. (a) $-\sqrt[3]{27}$, (b) $\sqrt[4]{-16}$
Converting between radical form and exponent form	Write the following as an exponential expression. $\sqrt[4]{x^3}$
Rational exponents: Unit fraction exponents and whole number bases	Evaluate. $343^{1/3}$ and $16^{1/4}$

Topic	Example
Rational exponents: Non-unit fraction exponent with a whole number base	Simplify. $32^{4/5}$
Rational exponents: Negative exponents and fractional bases	Simplify. Write your answers without exponents. $\left(\frac{1}{4}\right)^{-5/2}$ and $16^{-3/2}$
Simplifying the square root of a whole number greater than 100	Simplify. $\sqrt{152}$
Introduction to square root addition or subtraction	Simplify. $\sqrt{10}+4\sqrt{10}$
Introduction to square root multiplication	Simplify. $\sqrt{6}\cdot\sqrt{6}$
Square root multiplication: Basic	Simplify. $\sqrt{8}\cdot\sqrt{6}$
Introduction to simplifying a product of radical expressions: Univariate	Simplify. $(\sqrt{3y})^2$
Introduction to simplifying a product involving square roots using the distributive property	Multiply. $\sqrt{7}(\sqrt{6}-4)$
Simplifying a product involving square roots using the distributive property: Basic	Multiply. $\sqrt{3}(5\sqrt{15}-8)$
Additive property of equality with signed fractions	Solve for y. $y+\frac{2}{5}=\frac{1}{6}$

Topic	Example
Multiplicative property of equality with signed fractions	Solve for *u*. $-14 = -\frac{7}{6}u$
Solving a multi-step equation given in fractional form	Solve for *x*. $\frac{x+42}{9} = 4$
Solving a two-step equation with signed fractions	Solve for *x*. $-\frac{1}{4}x - \frac{4}{3} = -\frac{5}{4}$
Solving a proportion of the form (x+a)/b = c/d	Solve for *w*. $\frac{8}{7} = \frac{10}{w+4}$
Solving for a variable in terms of other variables using addition or subtraction: Basic	Solve for *y*. $15 = y + c$
Solving for a variable in terms of other variables using addition or subtraction: Advanced	Solve for *r*. $q + r + s = P$
Solving for a variable in terms of other variables using multiplication or division: Basic	Solve for *W*. $\frac{W}{4} = g$
Solving for a variable in terms of other variables using multiplication or division: Advanced	Solve for *y*. $K = 4yz$
Solving for a variable in terms of other variables using addition or subtraction with division	Solve for *n*. $-7 = 21m + 14n$
Solving for a variable inside parentheses in terms of other variables	Solve for *x*. $(5 + x)m = y$

Topic	Example
Solving for a variable in terms of other variables in a linear equation with fractions	Solve for *x*. $\frac{x-y}{5}=M$

💡 Click the **Next** button (below) to continue.