

ALGEBRA 1

Numbers and Operations Standard: Understands and applies concepts of numbers and operations				
Power Benchmark 1: Understands numbers, ways of representing numbers, relationships among numbers, and number systems				
Course Level Benchmark	Vocabulary	Background Knowledge/Prior Skills	Skills to Assess	
a. Simplifies expressions involving exponents ITED * ACT SAT * ITED 1-3 items	<ul style="list-style-type: none"> • Simplify • Exponent • Base • Power • Expanded form • Zero exponent • Negative exponent • Squared • Cubed • Scientific notation 	<ul style="list-style-type: none"> • Knows an exponent tells how many times the base is used as a factor • Knows $a^0 = 1$ • Knows $a^{-n} = 1/a^n$ • Knows when multiplying exponents with the same base you add the exponents • Knows when dividing exponents with the same base you subtract the exponents 	<ul style="list-style-type: none"> • Simplifies and expands algebraic expressions involving exponents, including zero and negative exponents (ACT, SAT) • Evaluates expressions involving exponents • Multiplies and divides expressions involving exponents (ITED, ACT, SAT) 	
b. Simplifies expressions involving radicals ITED * ACT SAT ASVAB * ITED 1-3 items	<ul style="list-style-type: none"> • Simplify • Radical • Exact form • Approximate form • Perfect-square factors • Square root • Like/unlike radical • Negative square root • Conjugate • Rationalize denominators 	<ul style="list-style-type: none"> • Knows $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$ • Knows $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$ • Knows the distributive property can be used to combine radicals 	<ul style="list-style-type: none"> • Writes radicals in simplest form (ITED, ACT, SAT) • Performs mathematical operations with radicals (ACT, SAT, ASVAB) • Express radicals in exact form and appropriate form • Simplifies by rationalizing denominators 	

Numbers and Operations Standard: 1 Understands and applies concepts of numbers and operations				
Power Benchmark 2: Understands the meanings of operations and how they relate to one another				
Course Level Benchmark	Vocabulary	Background Knowledge/Prior Skills	Skills to Assess	
a. Uses the properties of operations to simplify computations and solve problems ITED *** ACT SAT *** ITED more than 3 items	<ul style="list-style-type: none"> • Identity property • Inverse property • Distributive property • Associative property • Commutative property • Squaring • Square root • Like terms • Order of operations • Grouping • Inverse operations 	<ul style="list-style-type: none"> • Knows the identity properties of addition and multiplication • Knows the distributive, associative, and communicative properties of addition and multiplication • Knows squaring and square root are inverse operations • Knows the inverse operations undo each other • Recognizes like terms • Understands rules for combining variables • Knows the order of operations 	<ul style="list-style-type: none"> • Explains the meaning of adding, subtracting, multiplying, and dividing integers • Uses inverse properties and relationships to solve problems (ACT, SAT) • Uses order of operations including grouping symbols to solve problems (ITED, ACT, SAT) • Simplifies equations using properties of operations (ACT, SAT) 	
Power Benchmark 3: Computes fluently and makes reasonable estimates				
a. Uses a variety of operations on expressions containing real numbers ITED *** ACT SAT *** ITED more than 3 items	<ul style="list-style-type: none"> • Simplify • Rational numbers • Irrational numbers • Real numbers 	<ul style="list-style-type: none"> • Knows the algorithms of operations for real numbers 	<ul style="list-style-type: none"> • Adds, subtracts, multiplies, divides, and simplifies expression of real numbers (ITED, ACT, SAT) 	
b. Determines reasonableness of answers	<ul style="list-style-type: none"> • Reasonableness 	<ul style="list-style-type: none"> • Knows how to judge the reasonableness of the answer 	<ul style="list-style-type: none"> • Checks answer to see if it is reasonable • States sensible answers to a problem 	

Algebra Standard: 2 Understands and applies concepts of algebra and functions				
Power Benchmark 1: Understands patterns, relations and functions				
Course Level Benchmark	Vocabulary	Background Knowledge/Prior Skills	Skills to Assess	
a. Uses patterns and relationships to analyze mathematical situations SAT ASVAB	<ul style="list-style-type: none"> • Patterns • Term • Prediction • Sequence 	<ul style="list-style-type: none"> • Knows patterns can be described in a variety of ways • Knows how to use the pattern to predict change from one term to the next 	<ul style="list-style-type: none"> • Describes patterns using words, tables, and graphs • Finds the terms in a sequence ASVAB • Generates equations to describe linear patterns SAT 	
b. Describes functions and their properties using function notation ITED *	<ul style="list-style-type: none"> • Function • Domain • Range • One-to-one correspondence • Function notation • Function rule • Relation • Vertical Line Test 	<ul style="list-style-type: none"> • Knows for every value in the domain of a function, there is one and only one corresponding value in the range • Understands the concept of a function as the correspondence between the elements of two sets • Understands the definition of a function: domain, range, function, relation 	<ul style="list-style-type: none"> • Identifies the domain, range, and rule of a function - • Describes functions and their properties using function notation • Recognizes the graphs of non-linear functions • Describes from a graph the relationship between two variables ITED 	
* ITED 1-3 items				
Power Benchmark 2: Represents and analyzes mathematical situations and structures using algebraic symbols				
a. Represents linear and quadratic functions in a variety of ways ITED *	<ul style="list-style-type: none"> • Standard Form • Linear function • Quadratic function • Parabola 	<ul style="list-style-type: none"> • Knows a function can be represented in a variety of ways • Understands a family of functions has similar characteristics 	<ul style="list-style-type: none"> • Describes functions using words, tables, graphs and equations - • Graphs linear and quadratic functions - • Recognizes a linear and quadratic function from its graph (ITED) • Writes the equation of a linear function given the table of values, graph, two points on the line, and slope and y-intercept - 	
* ITED 1-3 items				

Algebra Standard: Understands and applies concepts of algebra and functions

Power Benchmark 2: Represents and analyzes mathematical situations and structures using algebraic symbols (con't)

Course Level Benchmark	Vocabulary	Background Knowledge/Prior Skills	Skills to Assess	
b. Interprets graphical representations of linear functions ACT	<ul style="list-style-type: none">• Rate of change• Slope• Direct Variation• Slope-Intercept Form	<ul style="list-style-type: none">• Understands change can be described mathematically• Understands how rate of change can be described numerically and graphically• Knows a linear graph has a constant rate of change	<ul style="list-style-type: none">• Interprets slope as the amount of one quantity (y) per unit of another quantity (x)• Defines slope as a rate of change• Finds the slope, x-intercept, and y-intercept of a line given its graph, equation, or two points on the line (ACT)• Uses slope to differentiate between lines that are parallel, perpendicular, horizontal, or vertical• Compares the rates of change of two different graphs	

Algebra Standard: Understands and applies concepts of algebra and functions

Power Benchmark 3: Uses mathematical models to represent and understand quantitative relationships

Course Level Benchmark	Vocabulary	Background Knowledge/Prior Skills	Skills to Assess	
<p>a. Rewrites algebraic expressions in equivalent forms ITED *** ACT SAT ASVAB</p> <p>*** ITED more than 3 items</p>	<ul style="list-style-type: none"> • Variable • Algebraic expression • Like terms • Coefficient • Terms • Equivalent forms • Unit analysis/ Dimensional analysis 	<ul style="list-style-type: none"> • Recognizes like terms • Knows rules to simplify expressions • Knows the order of operations • Understands the concept of equivalent forms of expressions 	<ul style="list-style-type: none"> • Simplifies algebraic expressions by combining like terms and applying appropriate properties (ITED) • Evaluates simple algebraic expressions (ACT, SAT, ASVAB) • Translates words into algebraic expressions (ITED, ACT, ASVAB) • Uses unit/dimensional analysis to organize conversions and computations (ITED, ACT) 	
<p>b. Simplifies polynomial expressions ACT SAT ASVAB</p>	<ul style="list-style-type: none"> • Degree • Standard form • Monomial • Binomial • Trinomial • Polynomial • Constant • Linear • Quadratic • Cubic • Greatest monomial factor • Difference of squares • Perfect square trinomial 	<ul style="list-style-type: none"> • Knows the meaning of like terms • Knows how to factor a number • Know how to find the GCF of numbers 	<ul style="list-style-type: none"> • Names polynomials by degree and number of terms - • Writes polynomials in standard form • Adds, subtracts, and multiplies polynomials (ACT, SAT, ASVAB) • Applies basic factoring techniques to second and simple third degree polynomials (ACT, SAT) 	

Algebra Standard: Understands and applies concepts of algebra and functions				
Power Benchmark 3: Uses mathematical models to represent and understand quantitative relationships (con't)				
Course Level Benchmark	Vocabulary	Background Knowledge/Prior Skills	Skills to Assess	
c. Solves multi-step equations *** ITED more than 3 items	<ul style="list-style-type: none"> Multi-step problems Literal equations Inverse Operations 	<ul style="list-style-type: none"> Recognizes like terms Understands rules for combining variables Knows the order of operations Knows the inverse relationship between addition and subtraction and multiplication and division Understands the process of working backwards to solve equations (strategy of undoing) 	<ul style="list-style-type: none"> Solves equations for a specified variable (ITED, ACT, SAT, ASVAB) Solves multi-step equations involving like variables on the same side of the equal sign, like variables on both sides of the equal sign, and the distributive property (ITED, ACT, SAT, ASVAB) Writes an equation for a specific problem (ITED, SAT, ASVAB) 	
d. Solves single variable inequalities ACT SAT ASVAB	<ul style="list-style-type: none"> Inequality Compound inequality Solution of an inequality Open dot Closed dot 	<ul style="list-style-type: none"> Understands the process of working backwards to solve equalities (strategy of undoing) Knows the meaning of the inequality symbols 	<ul style="list-style-type: none"> Solves multi-step single variable inequalities involving like variables on the same side of the equal sign, like variables on both sides of the equal sign, and distributive property (ACT, SAT, ASVAB) Graphs solutions of inequalities on a number line 	

Algebra Standard: Understands and applies concepts of algebra and functions

Power Benchmark 4: Analyzes change in a variety of situations

Course Level Benchmark	Vocabulary	Background Knowledge/Prior Skills	Skills to Assess	
a. Solves systems of equations by graphing, substitution, and elimination ACT SAT ASVAB	<ul style="list-style-type: none"> • Systems of equations • Graphing method • Substitution method • Elimination method • No solution • Infinitely many solutions • One solution 	<ul style="list-style-type: none"> • Knows how to graph a linear equation. • Knows how to solve a literal equation. 	<ul style="list-style-type: none"> • Uses graphing to solve a systems of equations (ACT, SAT, ASVAB) • Uses substitution to solve a systems of equations (ACT, SAT, ASVAB) • Uses elimination to solve a systems of equations (ACT, SAT, ASVAB) 	
b. Solves quadratic equations by quadratic formula, factoring, and square roots ACT SAT ASVAB	<ul style="list-style-type: none"> • Quadratic equation • Standard form • Quadratic formula • Factoring • Square roots • Zero-product property 	<ul style="list-style-type: none"> • Knows order of operations. • Knows how to find square root of a number • Know how to write the Standard Form of any polynomial 	<ul style="list-style-type: none"> • Solves quadratic equations by quadratic formula, factoring, and square roots (ACT, SAT, ASVAB) • Analyzes quadratic equations to decide which method of solving is appropriate 	

Data Analysis and Probability: Understands and applies concepts of data analysis and probability				
Power Benchmark 4: Understands and applies concepts of probability				
Grade Level Benchmark	Vocabulary	Background Knowledge/Prior Skills	Skills to Assess	
a. Experiment and analyze simple probabilities	<ul style="list-style-type: none"> • Outcomes • Sample space • Event • Probability • Theoretical Probability • Experimental Probability • Independent Events • Dependent Events 	<ul style="list-style-type: none"> • Know the difference between Theoretical and Experimental Probability 	<ul style="list-style-type: none"> • Demonstrates finding probability of an event, both independent and dependent • Defines a sample space 	

Problem Solving Standard: Understands and applies problem solving strategies				
Power Benchmark 1: Uses a variety of strategies to solve problems				
Grade Level Benchmark	Vocabulary	Background Knowledge/Prior Skills	Skills to Assess	
a. Applies and adapts a variety of appropriate strategies to solve problems	<ul style="list-style-type: none"> • Try, test, revise • Make a model 	<ul style="list-style-type: none"> • Knows the general problem solving strategies • Knows the same situation can often be represented in more than one way • Knows different problems may be solved using the same method 	<ul style="list-style-type: none"> • Chooses appropriate strategies to solve problems in the context of the problem situation (ITED) • Uses previous learned strategies, skills, knowledge, and concepts to solve problems (ITED) • Translates words to numbers to symbolic expressions (ITED) 	

ITED Focus Lessons: Ratios, Proportions, Matrices (adding and subtracting), Fractions, Decimals, Percents, Absolute Value (simplify and solve problems), range of rounded numbers, write equations for specific problem but do not solve, Pythagorean Theorem