	Algebra A			Algebra B		
	Student Text	Practice Book	Teacher Resource Edition	Student Text	Practice Book	Teacher Resource Edition

ELEMENTS OF BASIC ALGEBRA A

Common Core State Standards for Literacy in History/Social Studies, Science, and Technical

Mathematics Standards for High School

The high school standards specify the mathematics that all students should study in order to be college and career ready. Additional mathematics that students should learn in order to take advanced courses such as calculus, advanced statistics, or discrete mathematics is indicated by (+), as in this example:
All standards without a (+) symbol should be in the common mathematics curriculum for all college and career ready students. Standards with a (+) symbol may also appear in courses intended for all students.

Algebra

Seeing Structure in Expressions A-SSE

Interpret the structure of expressions

1. Interpret expressions that represent a quantity in terms of its context.						
a. Interpret parts of an expression, such as terms, factors, and coefficients	3, 4, 1, 12, 17, 18, 19, 28, 29, 30, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 61, 62, 101, 102, 103, 104, 105, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 132, 141, 156, 157, 158, 159, 160, 172, 177,	17, 18, 44, 47, 48, 49, 102	Ch 1, Ch 2,Ch 4, Ch5, Ch 6, Ch7, Ch 8, Ch 9, Ch 10, Ch 11, Ch 15, Ch 17, Ch 22, Ch 23, Ch 24,	1, 32, 63, 89, 90, 91, 93, 94, 125, 156, 157, 158, 159, 160, 161,	1,33, 34, 40 , 41, 51, 54, 55, 60, 61, 62, 64, 65,	Ch1,Ch8,Ch 13, Ch31
			Ch 1, Ch 2, Ch 18, Ch 19, Ch 22,			

b. Interpret complicated expressions by viewing one or more of their parts as a single entity.	21, 22, 172, 173, 174, 175,	21,22,23,24,25,26,27,	Ch 5, Ch 9, Ch 17,	25, 26, 27, 30, 31, 3, 34, 35, 36, 37, 38, 39, 40, 41, 42, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 92, 100, 11, 102, 13, 104, 105, 106, 107, 110, 111, 114, 115, 116, 120, 121, 122, 123, 124,	62, 117, 118, 119,	Ch31
2. Use the structure of an expression to identify ways to rewrite it.	2, 24, 25, 26, 27, 31, 32, 33, 34, 35, 36, 37, 156, 157, 158, 159, 160,	21,22,23,24,25,26,27,34,35,36,37,38,39,	Ch5, Ch 6, Ch 7, Ch 8, Ch 32,	40, 41, 42, 61, 62, 118, 119,		Ch13
Write expressions in equivalent forms to solve problems						
3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.	28, 29, 30, 31, 32,	34,35,36,37,38,39,	Ch 6, Ch 8, Ch 9,			
a. Factor a quadratic expression to reveal the zeros of the function it defines.				80, 81,162, 163, 164, 165, 166, 182, 183, 184, 185	80,81,158, 159, 160,	Ch31,Ch32, Ch33Ch34 Ch33
b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.				157, 158, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186	80,81,158, 159, 160, 184,	Ch31,Ch32, Ch33Ch34

c. Use the properties of exponents to transform expressions for exponential functions.	101, 102, 103, 104, 105	102, 103, 104,105,	Ch21,Ch23 ,Ch31,Ch3 2,	26, 28, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166,	164,165,166,16 7
4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.					
Arithmetic with Polynomials and Rational Expressions A-APR					
Perform arithmetic operations on polynomials					
1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract and multiply polynomials	38, 39, 40, 41, 42, 43, 53, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 6, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85,, 86, 87, 88, 89, 90, 81, 82, 83, 94, 95, 96, 97, 98, 99, 100, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 142, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162,	39, 40, 41, 42, 43,44,45,46,47,4 8,49,50,51,52,53, 54, 55, 59, 60, 61, 62, 63, 64, 65, 6, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 79, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 81, 82, 83, 94, 95, 96, 97, 98, 99, 100, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 130, 131, 132, 134, 135, 136, 137, 138, 139, 140, 141, 142, 142, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167,	Ch3,Ch4, Ch8, Ch9, Ch11, Ch12,Ch13 , Ch14, Ch15, Ch18, Ch22, Ch23, Ch29, Ch31, Ch3, Ch6, Ch9, Ch15, Ch16, Ch20, Ch29, Ch30, Ch31,		
Understand the relationship between zeros and factors of polynomials					

2. Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).	79, 80, 81,	78, 79, 80, 81, 82, 83,	
3. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial	79, 80, 81,	78, 79, 80, 81, 82, 83, 84, 85	
Use polynomial identities to solve problems 4. Prove polynomial indentities and use them to describe numerical relationships.			
5. (+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.			
Rewrite rational expressions 6. Rewrite rational expressions in different forms; write $(a(x))/(b(x))$ in the form of $q(x)+ (r(x))/(b(x))$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.	40, 41, 42,	40,41	Ch20
7. (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.	184, 185,186	184,	Ch23,Ch24, 36
Creation Equations * A-CED **Create equations that describe numbers or relationships**			

1. Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*	54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 75, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 113, 114, 115, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 19, 180	46,47,48,49,51 ,52,53,54,55,56,57,58,59,60,61, 65,66,67,68,69, 70,71,72,73,74, 75,76,77,78,79, 80,86,87,88,89, 90,91,92,93,94, 95,96,97,98,99	Ch 12, Ch 13, Ch23, Ch28, Ch32		
2. Create equations in two or more variables to represent relationships between quantitites; graph equations on coordinate axes with labels and scales.			Ch15, Ch21, Ch23, Ch25, Ch28, Ch35,	38, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 93,	Ch16,Ch17, Ch18,Ch20
3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.					

4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.						
Reasoning with Equations and Inequalities						
A-REI						
Understand solving equations as a process of reasoning and explain the reasoning						
1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	21, 22, 23, 24, 25, 26, 27, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 9091, 92, 93, 94, 95, 96, 97, 98, 99, 100, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142 ,143, 144, 145, 146, 147, 148,	1 to 180	Ch4, Ch 5,Ch6, Ch8, Ch9, Ch11, Ch13, Ch15, Ch17, Ch22, Ch23, Ch28, Ch33, Ch34,	95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109,	110, 111, 112, 113,	Ch8,
2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.				95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109,		
Solve equations and inequalities in one variable						
3. Solve linear equations and inequalities in one varaible, including equations with coefficients represented by letters.	55	51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61,		95, 96, 97, 98, 99,	95, 96,97,98,99,100 ,101,102,103,	Ch9
4. Solve quadratic equations in one variable.						

a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.			
b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the intial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.	181, 182, 183, 184,	181, 182,183,184	Ch31,Ch32
			Ch31,Ch32
Solve systems of equations			
5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	100, 101, 102, 103, 104, 105, 105, 107, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124,	74,75,76,77,78, 79,80,81,82,83, 84,85,110,11,11 2,113,114,115,	Ch17,Ch18, Ch20
6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	100, 101, 102, 103, 104, 105, 106, 107, 120, 121, 122, 123, 124,	74,75,76,77,78, 79,80,81,82,83, 84,85,110,11,11 2,113,114,115,	
7. Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.	100, 101, 102, 103, 104, 105, 106, 107,	74,75,76,77,78, 79,80,81,82,83, 84,85,110,11,11 2,113,114,115,	Ch33
			Ch33
8. (+) Represent a system of linear equations as a single matrix equation in a vector variable.			
9. (+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 x 3 or greater).			
Represent and solve equations and inequalities graphically			

10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 100, 101, 102, 103, 104, 15, 106, 107,	44, 45, 47, 48, 49, 50, 52, 53, 54, 56, 57, 58, 59, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 100, 101, 102, 103, 104, 15, 106, 107,	Ch23,Ch24,
11. Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. *	110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124,	25, 26,27,33,38,39	
12. Graph the solutions to a linear inequality in two varaibles as a halfplane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	120, 121, 122, 123, 124,	121,122,123,124,125	Ch16.Ch17, Ch20,Ch24

Functions

Interpreting Functions F-IF

Understand the concept of a function and use function notation

1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).	27,28,29,30,31	27,28,29,31,32,	Ch6,Ch7
2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	27,28,29,30,31	27,28,29,31,32	Ch6,Ch7
3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.	27,28,30,	27,29	Ch6,Ch7

Interpret fnctions that arise in applications in terms of the context

4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *	18,19,20,21,27, 28,38,39,40,41, 42,47,48,49,50, 51,52,5354,55, 56,57,58,64 to 68,	10 to 23,25,26,27,28, 30,38,41 to 46,48,49,50,52, 53,54,56,57,58, 63 to 88,	Ch2,Ch3, Ch4,Ch10, Ch11,Ch16, Ch17,Ch18, Ch19
5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.	27,28	27,28,30	Ch9,Ch14
6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. *	27,28,58,64,65, 66,67,68,69,70, 71,84,85	27,28,29	Ch9 to Ch12

Analyze functions using different representations

7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. *

a. Graph linear and quadratic functions and show intercepts, maxima, and minima.

b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.

e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

8. Prove the Pythagorean identify $[\![sin]\!]$^2 $(\theta)+[\![cos]\!]$ ^2 $(\theta)=1$ and use it to calculate trigonometric ratios.

a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.

b. Use the properties of exponents to interpret expressions for exponential functions.

9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).