Texas Mathematics

Algebra I (2012)

Mathematical process standards.

1. The student uses mathematical processes to acquire and demonstrate mathematical understanding A1.C.1

a apply mathematics to problems arising in everyday life, society, and the workplace A1.C.1.A

b use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution A1.C.1.B

c select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems A1.C.1.C

d communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate A1.C.1.D

e create and use representations to organize, record, and communicate mathematical ideas A1.C.1.E

f analyze mathematical relationships to connect and communicate mathematical ideas A1.C.1.F

g display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication A1.C.1.G

Linear functions, equations, and inequalities

2 The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations A1.C.2

a determine the domain and range of a linear function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities A1.C.2.A

b write linear equations in two variables in various forms, including y = mx + b, Ax + By = C, and y - y1 = m(x - x1), given one point and the slope and given two points A1.C.2.B

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c write linear equations in two variables given a table of values, a graph, and a verbal description A1.C.2.C

d write and solve equations involving direct variation A1.C.2.D

e write the equation of a line that contains a given point and is parallel to a given line A1.C.2.E

f write the equation of a line that contains a given point and is perpendicular to a given line A1.C.2.F

g write an equation of a line that is parallel or perpendicular to the X or Y axis and determine whether the slope of the line is zero or undefined A1.C.2.G

h write linear inequalities in two variables given a table of values, a graph, and a verbal description A1.C.2.H

i write systems of two linear equations given a table of values, a graph, and a verbal description A1.C.2.I

3 The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations A1.C.3

a determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including y = mx + b, Ax + By = C, and y - y1 = m(x - x1) A1.C.3.A

b calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems A1.C.3.B

c graph linear functions on the coordinate plane and identify key features, including x-intercept, y-intercept, zeros, and slope, in mathematical and real-world problems A1.C.3.C

d graph the solution set of linear inequalities in two variables on the coordinate plane A1.C.3.D

e determine the effects on the graph of the parent function f(x) = x when f(x) is replaced by af(x), f(x) + d, f(x - c), f(bx) for specific values of a, b, c, and d A1.C.3.E

f graph systems of two linear equations in two variables on the coordinate plane and determine the solutions if they exist A1.C.3.F

g estimate graphically the solutions to systems of two linear equations with two variables in real-world problems A1.C.3.G

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	h graph the solution set of systems of two linear inequalities in two variables on the coordinate plane A1.C.3.H
	4 The student applies the mathematical process standards to formulate statistical relationships and evaluate their reasonableness based on real-world data A1.C.4
	a calculate, using technology, the correlation coefficient between two quantitative variables and interpret this quantity as a measure of the strength of the linear association A1.C.4.A
	b compare and contrast association and causation in real-world problems A1.C.4.B
	c write, with and without technology, linear functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems A1.C.4.C
	5 The student applies the mathematical process standards to solve, with and without technology, linear equations and evaluate the reasonableness of their solutions A1.C.5
	a solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides A1.C.5.A
	b solve linear inequalities in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides A1.C.5.B
	c solve systems of two linear equations with two variables for mathematical and real-world problems A1.C.5.C
Quadratic functions and equations	**6** The student applies the mathematical process standards when using properties of quadratic functions to write and represent in multiple ways, with and without technology, quadratic equations A1.C.6
	a determine the domain and range of quadratic functions and represent the domain and range using inequalities; A1.C.6.A
	b write equations of quadratic functions given the vertex and another point on the graph, write the equation in vertex form (f(x) = a(x - h)2+ k), and rewrite the equation from vertex form to standard form (f(x) = ax2+ bx + c) A1.C.6.B
	c write quadratic functions when given real solutions and graphs of their related equations A1.C.6.C
	7 The student applies the mathematical process standards when using graphs of quadratic functions and their related transformations to represent in multiple ways and determine, with and without technology, the solutions to equations A1.C.7

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	a graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including x-intercept, y-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry A1.C.7.A
	b describe the relationship between the linear factors of quadratic expressions and the zeros of their associated quadratic functions A1.C.7.B
	c determine the effects on the graph of the parent function f(x) = x2 when f(x) is replaced by af(x), f(x) + d, f(x - c), f(bx) for specific values of a, b, c, and d A1.C.7.C
	8 The student applies the mathematical process standards to solve, with and without technology, quadratic equations and evaluate the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data A1.C.8
	a solve quadratic equations having real solutions by factoring, taking square roots, completing the square, and applying the quadratic formula A1.C.8.A
	b write, using technology, quadratic functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems A1.C.8.B
Exponential functions and equations	**9** The student applies the mathematical process standards when using properties of exponential functions and their related transformations to write, graph, and represent in multiple ways exponential equations and evaluate, with and without technology, the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data A1.C.9
	a determine the domain and range of exponential functions of the form f(x) = abx and represent the domain and range using inequalities A1.C.9.A
	b interpret the meaning of the values of a and b in exponential functions of the form f(x) = abx in real-world problems A1.C.9.B
	c write exponential functions in the form f(x) = abx (where b is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay A1.C.9.C
	d graph exponential functions that model growth and decay and identify key features, including y-intercept and asymptote, in mathematical and real-world problems; A1.C.9.D
	e write, using technology, exponential functions that provide a reasonable fit to data and make predictions for real-world problems A1.C.9.E

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Number and algebraic methods

10 The student applies the mathematical process standards and algebraic methods to rewrite in equivalent forms and perform operations on polynomial expressions A1.C.10

a add and subtract polynomials of degree one and degree two A1.C.10.A

b multiply polynomials of degree one and degree two A1.C.10.B

c determine the quotient of a polynomial of degree one and polynomial of degree two when divided by a polynomial of degree one and polynomial of degree two when the degree of the divisor does not exceed the degree of the dividend A1.C.10.C

d rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property A1.C.10.D

e factor, if possible, trinomials with real factors in the form ax2 + bx + c, including perfect square trinomials of degree two A1.C.10.E

f decide if a binomial can be written as the difference of two squares and, if possible, use the structure of a difference of two squares to rewrite the binomial A1.C.10.F

11 The student applies the mathematical process standards and algebraic methods to rewrite algebraic expressions into equivalent forms A1.C.11

a simplify numerical radical expressions involving square roots A1.C.11.A

b simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents A1.C.11.B

12 The student applies the mathematical process standards and algebraic methods to write, solve, analyze, and evaluate equations, relations, and functions A1.C.12

a decide whether relations represented verbally, tabularly, graphically, and symbolically define a function A1.C.12.A

b evaluate functions, expressed in function notation, given one or more elements in their domains A1.C.12.B

c identify terms of arithmetic and geometric sequences when the sequences are given in function form using recursive processes A1.C.12.C

d write a formula for the nth term of arithmetic and geometric sequences, given the value of several of their terms A1.C.12.D

e solve mathematic and scientific formulas, and other literal equations, for a specified variable A1.C.12.E