

WHCSD Scope and Sequence

Algebra II

## Algebra II Scope and Sequence

Domain	Quarter 1 46 Days	Quarter 2 42 Days	Quarter 3 46 Days	Quarter 4 47 Days
	Content	Content	Content	Content
Investigations and Functions F-IF	<b>F-IF.4</b> - For a function that models a relationship between two quantities, interpret key features of graphs and tables in	A-SSE.1b - Interpret expressions that represent a quantity in terms of its context.* b. Interpret complicated	<b>F-TF.1</b> - Understand radian measure of an angle as the length of the arc on the unit circle subtended by the	<b>S-IC.1</b> - Understand statistics as a process for making inferences about population parameters based on a random sample from that population.
Solving and Intersections SSE	terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.	expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r)n as the product of P and a	angle. <b>F-TF.2 -</b> Explain how the	<b>S-IC.2 -</b> Decide if a specified model is consistent with results from a
Trigonometric and Functions F-TF	Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums	factor not depending on P. <b>A-SSE.2</b> - Use the structure of an expression to identify ways to	unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of	given data generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you
Equivalent Forms S-IC	and minimums; symmetries; end behavior; and periodicity.* <b>F-IF.5</b> - Relate the domain of a	rewrite it. For example, see x4 – y4 as (x2)2 – (y2)2 , thus recognizing it as a difference of squares that can be factored as	angles traversed counterclockwise around the unit circle.	to question the model? <b>S-IC.4 -</b> Use data from a sample survey to estimate a population
Using Probability in Making Decisions S-MD	function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of	(x2 – y2)(x2 + y2). <b>A-REI.2 -</b> Solve simple rational and radical equations in one variable, and give examples	<b>F-TF.5</b> - Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.*	mean or proportion; develop a margin of error through the use of simulation models for random sampling.
	person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*	showing how extraneous solutions may arise. <b>A.REI.11 -</b> Explain why the x-coordinates of the points where	<b>F-TF.8</b> - Prove the Pythagorean identity sin2 $(\theta) + \cos 2(\theta) = 1$ and use it to find sin $(\theta)$ , cos $(\theta)$ , or	<b>S-IC.5</b> - Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.
	<b>F-IF.7b</b> - Graph functions expressed symbolically and show key features of the graph,	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	$tan(\theta)$ given $sin(\theta)$ , $cos(\theta)$ , or $tan(\theta)$ and the quadrant of the angle.	<b>S-IC.6 -</b> Evaluate reports based on data.
	by hand in simple cases and using technology for more complicated cases.* b. Graph square root, cube root, and piecewise-defined functions, including stop	approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or	<b>F-IF.7e</b> - Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology	<b>S-MD.6+ -</b> (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).
	functions, including step functions and absolute value	g(x) are linear, polynomial, rational, absolute value,	for more complicated cases.*	S-MD.7+ - (+) Analyze decisions and

functions. <b>F-IF.9</b> - Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum. <b>A-CED.2</b> - Create equations in two or more variables to	exponential, and logarithmic functions. A-CED.2 - Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. A-CED.3 - Represent constraints by equations or inequalities, and by systems of equations and/or	<ul> <li>e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.</li> <li>F-IF.9 - Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal deperintment.</li> </ul>	strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game). <b>F-TF.5</b> - Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.* <b>F-TF.6+</b> - (+) Understand that restricting a trigonometric function to a domain on which it is always
two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. A-SSE.1a - Interpret expressions that represent a quantity in terms of its context.* a. Interpret parts of an expression, such as terms, factors, and coefficients. A-SSE.1b - Interpret expressions that represent a	<ul> <li>b) optimise of equations during interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.</li> <li>F-IF.5 - Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it</li> </ul>	descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum. <b>F-BF.3</b> - Identify the effect on the graph of replacing f(x) by $f(x) + k$ , $k f(x)$ , $f(kx)$ , and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs.	<ul> <li>increasing or always decreasing allows its inverse to be constructed.</li> <li>F-TF.9+ - (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.</li> <li>F-IF.7e - Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*</li> <li>e. Graph exponential and logarithmic</li> </ul>
quantity in terms of its context.* b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r)n as the product of P and a factor not depending on P. <b>F-IF.4</b> - 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. Key features include: intercepts; intervals where the	takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.* <b>F-BF.1b</b> - Write a function that describes a relationship between two quantities.* b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model. <b>F-BF.3</b> Identify the effect on the	Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. <b>A.APR.2</b> - 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 $(x - a)is a factor of p(x).A-APR.3 - Identify zeros of$	<ul> <li>functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.</li> <li>F-IF.8 - Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</li> <li>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.</li> <li>b. Use the properties of exponents to</li> </ul>

## 2021-2022

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function is increasing,	graph of replacing $f(x)$ by $f(x) + k$ ,	polynomials when suitable	interpret expressions for exponential
decreasing, positive, or	k f(x), f(kx), and f(x + k) for	factorizations are available,	functions. For example, identify
negative; relative maximums	specific values of k (both positive	and use the zeros to	percent rate of change in functions
and minimums; symmetries; end	and negative); find the value of k	construct a rough graph of	such as y = (1.02)t , y = (0.97)t , y =
behavior; and periodicity.*	given the graphs. Experiment with	the function defined by the	(1.01)12t, y = (1.2)t/10, and classify
	cases and illustrate an	polynomial.	them as representing exponential
F-IF.7b - Graph functions	explanation of the effects on the		growth or decay.
expressed symbolically and	graph using technology. Include	A.APR.6 - Rewrite simple	<b>3</b> • • • • • • • • • • • • • • • • • • •
show key features of the graph,	recognizing even and odd	rational expressions in	
	functions from their graphs and		
by hand in simple cases and	algebraic expressions for them.	different forms; write	
using technology for more	algebraic expressions for them.	a(x)/b(x) in the form $q(x) +$	
complicated cases.*		r(x)/b(x), where a(x), b(x),	
b. Graph square root, cube root,	F-BF.4a - Find inverse functions.	q(x), and r(x) are	
and piecewise-defined	a. Solve an equation of the form	polynomials with the degree	
functions, including step	f(x) = c for a simple function f that	of r(x) less than the degree	
functions and absolute value	has an inverse and write an	of b(x), using inspection,	
functions.	expression for the inverse. For	long division, or, for the	
	example, $f(x) = 2 \times 3$ or $f(x) =$	more complicated	
F-IF.7e - Graph functions	$(x+1)/(x-1)$ for $x \neq 1$ .	examples, a computer	
expressed symbolically and		algebra system.	
show key features of the graph,	F-IF.4 - For a function that models	0,	
by hand in simple cases and	a relationship between two	A-SSE.2 - Use the structure	
using technology for more	quantities, interpret key features	of an expression to identify	
complicated cases.*	of graphs and tables in terms of	ways to rewrite it. For	
e. Graph exponential and	the quantities, and sketch graphs	example, see x4 – y4 as	
logarithmic functions, showing	showing key features given a	(x2)2 – (y2)2 , thus	
intercepts and end behavior,	verbal description of the	recognizing it as a	
and trigonometric functions,	relationship. Key features include:	difference of squares that	
showing period, midline, and	intercepts; intervals where the	can be factored as (x2 – y2	
amplitude.	function is increasing, decreasing,	)(x2 + y2 ).	
	positive, or negative; relative		
F-IF.8a - Write a function defined	maximums and minimums;	F-IF.4 - For a function that	
by an expression in different but	symmetries; end behavior; and	models a relationship	
equivalent forms to reveal and	periodicity.*	between two quantities,	
explain different properties of		interpret key features of	
the function.	F-IF.5 - Relate the domain of a	graphs and tables in terms	
a. Use the process of factoring	function to its graph and, where	of the quantities, and sketch	
and completing the square in a	applicable, to the quantitative	graphs showing key	
quadratic function to show	relationship it describes. For	features given a verbal	
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zeros, extreme values, and	example, if the function h(n) gives	description of the	
symmetry of the graph, and	the number of person-hours it	relationship. Key features	
interpret these in terms of a	takes to assemble n engines in a	include: intercepts; intervals	
context.	factory, then the positive integers	where the function is	
	would be an appropriate domain	increasing, decreasing,	

	for the function.*	positive, or negative;	
F-IF.9 - Compare properties of		relative maximums and	
two functions each represented	F-IF.7e - Graph functions	minimums; symmetries; end	
in a different way (algebraically,	expressed symbolically and show	behavior; and periodicity.*	
graphically, numerically in	key features of the graph, by		
tables, or by verbal	hand in simple cases and using	F-IF.5 - Relate the domain	
descriptions). For example,	technology for more complicated	of a function to its graph	
given a graph of one quadratic	cases.*	and, where applicable, to	
function and an algebraic	e. Graph exponential and	the quantitative relationship	
expression for another, say	logarithmic functions, showing	it describes. For example, if	
which has the larger maximum.	intercepts and end behavior, and	the function h(n) gives the	
	trigonometric functions, showing	number of person-hours it	
F-BF.3 - Identify the effect on	period, midline, and amplitude.	takes to assemble n	
the graph of replacing $f(x)$ by $f(x)$		engines in a factory, then	
+ k, k f(x), f(kx), and $f(x + k)$ for	F-IF.8 - Write a function defined	the positive integers would	
specific values of k (both	by an expression in different but	be an appropriate domain	
positive and negative); find the	equivalent forms to reveal and	for the function.*	
value of k given the graphs.	explain different properties of the		
Experiment with cases and	function.	F-IF.7c - Graph functions	
illustrate an explanation of the	a. Use the process of factoring	expressed symbolically and	
effects on the graph using	and completing the square in a	show key features of the	
technology. Include recognizing	quadratic function to show zeros,	graph, by hand in simple	
even and odd functions from	extreme values, and symmetry of	cases and using technology	
their graphs and algebraic	the graph, and interpret these in	for more complicated	
expressions for them. A-APR.1 - Understand that	terms of a context.	cases.* c. Graph polynomial	
polynomials form a system	b. Use the properties of exponents to interpret	functions, identifying zeros	
analogous to the integers,	expressions for exponential	when suitable factorizations	
namely, they are closed under	functions. For example, identify	are available, and showing	
the operations of addition,	percent rate of change in	end behavior.	
subtraction, and multiplication;	functions such as $y = (1.02)t$ , $y =$		
add, subtract, and multiply	(0.97)t, y = $(1.01)$ 12t, y =	N-CN.1 - Know there is a	
polynomials.	(1.2)t/10, and classify them as	complex number i such that	
	representing exponential growth	i 2 = -1, and every complex	
A-APR.4 - Prove polynomial	or decay.	number has the form a + bi	
identities and use them to	_	with a and b real.	
describe numerical	F-IF.9 - Compare properties of		
relationships. For example, the	two functions each represented in	N-CN.2 - Use the relation i 2	
polynomial identity (x2 + y2) 2 =	a different way (algebraically,	= -1 and the commutative.	
$(x^2 - y^2)^2 + (2xy)^2$ can be used	graphically, numerically in tables,	associative, and distributive	
to generate Pythagorean triples.	or by verbal descriptions). For	properties to add, subtract,	
	example, given a graph of one	and multiply complex	
A-APR.7+ - (+) Understand that	quadratic function and an	numbers.	
rational expressions form a	algebraic expression for another,		
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numbo subtra divisio	•	say which has the larger maximum.	N-CN.7 - Solve quadratic	
A-SSI expres quanti a. Inte expres factors A-SSI expres quanti b. Inte expres quanti b. Inte expres quanti co expres quanti co expres quanti co expres quanti co expres quanti co expres quanti co expres quanti co expres quanti co expres quanti co expres quanti co expres quanti co expres quanti co expres quanti co expres quanti co expres quanti co expres quanti co expres co expres co expres co expres co expres co ex	ression; add, subtract, tiply, and divide rational ressions. <b>SE.1a</b> - Interpret ressions that represent a nutity in terms of its context.* therpret parts of an ression, such as terms, bors, and coefficients. <b>SE.1b</b> - Interpret ressions that represent a nutity in terms of its context.* therpret complicated ressions by viewing one or e of their parts as a single ty. For example, interpret +r) n as the product of P and ctor not depending on P. <b>SE.2</b> - Use the structure of expression to identify ways to rite it. For example, see x4 – is (x2)2 – (y2)2, thus ognizing it as a difference of ares that can be factored as – y2 )(x2 + y2 ).	<ul> <li>F-LE.4 - For exponential models, express as a logarithm the solution to abct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.</li> <li>A-CED.4 - Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.</li> <li>A-CED.2 - Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.</li> <li>F-LE.4 - For exponential models, express as a logarithm the solution to abct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.</li> <li>F-LE.5 - Interpret the parameters in a linear or exponential function in terms of a context.</li> <li>F-BF.1b - Write a function that describes a relationship between two quantities.* b. Combine standard function that models the temperature of a cooling body by adding a constant</li> </ul>	equations with real coefficients that have complex solutions. N-CN.8+ - (+) Extend polynomial identities to the complex numbers. For example, rewrite x2 + 4 as (x + 2i)(x - 2i). N-CN.9+ - (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials. S-IC.1 - Understand statistics as a process for making inferences about population parameters based on a random sample from that population. S-IC.2 - Decide if a specified model is consistent with results from a given data generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model? S-IC.3 - Recognize the purposes of and differences among sample surveys, experiments, and observational studies;	
		cooling body by adding a constant function to a decaying exponential, and relate these	observational studies; explain how randomization relates to each.	

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for the second of	1	1
functions to the model.		
	S-IC.4 - Use data from a	
F-IF.7e - Graph functions	sample survey to estimate a	
expressed symbolically and show	population mean or	
key features of the graph, by	proportion; develop a	
hand in simple cases and using	margin of error through the	
technology for more complicated	use of simulation models for	
cases.*	random sampling.	
e. Graph exponential and	random camping.	
logarithmic functions, showing		
intercepts and end behavior, and	S-IC.6 - Evaluate reports	
	based on data.	
trigonometric functions, showing		
period, midline, and amplitude.	S-ID.4 - Use the mean and	
	standard deviation of a data	
	set to fit it to a normal	
	distribution and to estimate	
	population percentages.	
	Recognize that there are	
	data sets for which such a	
	procedure is not	
	appropriate. Use	
	calculators, spreadsheets,	
	and tables to estimate areas	
	under the normal curve.	
	A-SSE.1b - Interpret	
	expressions that represent a	
	quantity in terms of its	
	context.*	
	b. Interpret complicated	
	expressions by viewing one	
	or more of their parts as a	
	single entity. For example,	
	interpret P(1+r)n as the	
	product of P and a factor not	
	depending on P.	
	A-SSE.2 - Use the structure	
	of an expression to identify	
	ways to rewrite it. For	
	example, see x4 – y4 as	
	(x2)2 - (y2)2, thus	
	recognizing it as a	
	difference of squares that	
	can be factored as (x2 – y2	

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)(x2 + y2 ).	
A-SSE.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. For example, calculate	
mortgage payments.*	
mongage paymente.	
A-APR.4 - Prove polynomial	
identities and use them to	
describe numerical	
relationships. For example,	
the polynomial identity $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$	
yz = (xz - yz)z + (zxy)z can be used to generate	
Pythagorean triples.	
A-APR.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.	
F-IF.8b - Write a function	
defined by an expression in different but equivalent	
forms to reveal and explain	
different properties of the	
function.	
b. Use the properties of	
exponents to interpret	
expressions for exponential functions. For example,	
identify percent rate of	
change in functions such as	
y = (1.02)t, $y = (0.97)t$ , $y =$	
(1.01)12t, y = $(1.2)t/10$ , and	

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			classify them as representing exponential growth or decay. F-LE.4 - For exponential models, express as a logarithm the solution to abct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.	
Resources	CPM (College Preparatory Math) ODE Model Curriculum GAISE model framework	CPM (College Preparatory Math) ODE Model Curriculum GAISE model framework	CPM (College Preparatory Math) ODE Model Curriculum GAISE model framework	CPM (College Preparatory Math) ODE Model Curriculum GAISE model framework
Notes:	GAISE model framework       GAISE model framework       GAISE model framework         Mathematical Practices       I. Make sense of problems and persevere in solving them.       2.         Reason abstractly and quantitatively.       3. Construct viable arguments and critique the reasoning of others.       4.         Model with mathematics.       5. Use appropriate tools strategically.       6.         Attend to precision.       7.       Look for and make use of structure.         8. Look for and express regularity in repeated reasoning.       Image: Construct of the structure is a structure in the structure is a structure.			