

Math Analysis Curriculum Map

Kennett High School

Section	Topic	Specific Concept	Standard	Assessment	mp	assignments
1.1	Coordinate geometry	distance formula, midpoint fomrula	G-GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula		1	page 5) 4,6, 12, 18, 20, 22, 26, 28, 31,33
1.2	Coordinate geometry	equations of lines and geometric shapes	F-IF.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.			page 11) 14, 22, 23-26, 32
6.1	Coordinate geometry proofs		G-GPE.4 Use coordinates to prove simple geometric theorems algebraically.			page 218)2-10 even, 11, 12
1.3	Coordinate geometry	equations of lines, medians, altitudes	theorems algebraically.	quiz 1		page 16)12,13,16,18 ,20-24
	number systems - set notation		N-RN.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.			page 17)20-24
1.5	complex numbers		N-CN.1 Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.			28)4,14,18,24, 26,30-40 even
			N-CN.8+ Extend polynomial identities to the complex numbers.			page 406)18-22 even

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11.2	complex numbers	graphing	N-CN.4+ Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.			page 35)16,24,28,30,32,34,40,42
			N-CN.5+ Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation.			HW page 41)18,22,24,28-38 even
1.6	solving quadratic equations		N-CN.9 Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials			page 22)10,12,13,15,18
1.7	quadratic function	graphing	F-IF.7a Graph linear and quadratic functions and show intercepts, maxima, and minima.	quiz 2		HW page 45)4,6,7,9,11-14
			F-IF.8a 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.			
1.4 and 1	linear and quadratic models	applications		quiz 3		

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2.1	polynomial functions	operations	A-APR.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			pg 56)14,18,22-30 even
15.5	Binomial theorem		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			pg 592)2,6,20
2.2	remainder and factor theorems		A-APR.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 $p(x)$			pg 61)8,10,12,16,18,22-26 even pg 66)10-18 even HW pg 66)21-24,27-32, 38, 40
2.3	graphing polynomials		A-APR.3 Identify zeros of polynomials when suitable factorizations are available and use the zeros to construct a rough graph of the functions defined by the polynomial.	quiz 4		pg 83)2-10 even
			F-IF.7c Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.			pg 84)16, 20, 22, 24, 28 page 89)16-28 even

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Section	Topic	Specific Concept	Standard	Assessment	mp	assignments
2.6	solving polynomials		A-APR.4 Prove polynomial identities and use them to describe numerical relationships.	test 1		
2.4	applications of polynomials	max and mins	G-MG.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).			pg 71)2,3,10,12 pg 72)1,2
3.2	polynomial inequalities	sign tests (one variable)		-		pg 99)28-32 pg 103)10,16,18,24,28,30,36 pg 106)6,13,16,22,24
3.3	polynomial inequalities	two variables		quiz 5		
4.1	functions		F-IF.7b Graph square root, cube root, and piecewise defined functions, including step functions and absolute value functions.			pg 122)2-16 even
			F-IF.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 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 $y=f(x)$			pg 123)18,21,25; pg 128)1-10

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Section	Topic	Specific Concept	Standard	Assessment	mp	assignments
			F-IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context			pg 128)18-21,23-32,34,36
4.2	operations of functions		F-IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the functions			
			F-BF.1b Combine standard function types using arithmetic operations.			
			F-BF.1c Compose functions.			
4.3	reflecting graphs	symmetry	F-IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.	quiz 6	mp 2	page 136)2,4,10,14, 16,20,22

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Section	Topic	Specific Concept	Standard	Assessment	mp	assignments
			<p>F-IF.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. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity</p>			page 137)24,26, 31-36, 40
4.4	transformations		<p>F-BF.3 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. 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.</p>			page 143)1-5, 8, 10

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Section	Topic	Specific Concept	Standard	Assessment	mp	assignments
			F-IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.			page 144)9, 11-15
4.5	inverse functions		F-BF.4 Find inverse functions.	quiz 7		page 149)1-4
			F-BF.4a Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse.			page 149)7-10, 12-24 even
			F-BF.4b Verify by composition that one function is the inverse of another.			page 154)2-12 even
			F-BF.4c Read values of an inverse function from a graph or a table, given that the function has an inverse.			page 161) 1-6
			F-BF.4d Produce an invertible function from a non-invertible function by restricting the domain.			

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Section	Topic	Specific Concept	Standard	Assessment	mp	assignments
4.7	verbal descriptions of functions		F-BF.1 Write a functions that describes a relationship between two quantities	test 2		
5.1	Negative exponents		F-IF.8b Use the properties of exponents to interpret expressions for exponential functions.			pg 173)12,16,20-34 even
5.2	Rational exponents		F-IF.8b Use the properties of exponents to interpret expressions for exponential functions.	quiz 8		page 178)2-14 even pg 174)38c, 40c, 43,44,46,
5.3	exponential functions		F-IF.7e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	project		pg 178)20-38 even, 44,48
			F-BF.5 Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.			pg 183)1-9; page 184)10-16 even, 19-21
			F-LE.4 For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology.			pg 189)6-14 even; page 196)48, 50 page 200)2-34 even

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Section	Topic	Specific Concept	Standard	Assessment	mp	assignments
5.5	logarithmic functions		F-LE.4 For exponential models, express as a logarithm the solution to $ab = ct = d$ where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology.			page 194)14-18 even, 36-44 even
			F-BF.5 Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.	quiz 9		
5.6	Laws of logs			test 4		
13.1	arithmetic and geometric sequences		F-BF.2+ Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.			page 476)2-36 even
13.2	recursive sequences		F-BF.2+ Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.			page 477)38-54 even; page 481)2-22 even
			F-LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading from a table)	quiz 10		page 482)24, 29, 31, 32, 33; page 489)2-12 even, 29-35

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Section	Topic	Specific Concept	Standard	Assessment	mp	assignments
13.3	series		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			page 726)3-15 3's
	rational expressions		A-APR.6 Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, 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.			page 496)2-16 even, 20, 24, 26
			A-APR.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.			page 502)2-18 even
	rational functions		F-IF.7d Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.	quiz 11		page 503)30- 36 even, 41-44
13.4	limits of sequences					page 508)2-18 even
13.5	Sums of infinite series					

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Section	Topic	Specific Concept	Standard	Assessment	mp	assignments
13.6	Sigma notation		A-SSE.1 Interpret expressions that represent a quantity in terms of its context.			page 509)24, 34, 35
13.7	Induction		A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.	test 5	midterm exam	pg 513)2,4,6
6.2	Equations of circles		G-GPE.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.		mp 3	
6.3	ellipses		G-GPE.3 Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.			
6.4	hyperboals		G-GPE.3 Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.			
6.5	parabolas		G-GPE.2 Derive the equation of a parabola given a focus and directrix.	project (test grade)		

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Section	Topic	Specific Concept	Standard	Assessment	mp	assignments
9.1	Right triangles		F-TF.3 Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3, \pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for $\pi-x, \pi+x$, and $2\pi-x$ in terms of their values for x , where x is any real number.			page 334)2-8 even, 14-20 even
			G-SRT.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.			page 336)21-26, 28,34,36
9.2	Area of triangle		G-SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	quiz 10		page 342) 7-16
			G-SRT.9 Derive the formula $A = 1/2 ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.			page 347)4-20 even
9.3	Law of sines		G-SRT.10 Prove the Laws of Sines and Cosines and use them to solve problems.			page 352)2-8 even; page 348)21-23, 25
9.4	Law of cosine		G-SRT.11 Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).	quiz 11		page 353)9-18 page 355)2-26 even page 357)30,31 page 362)6-18 even

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Section	Topic	Specific Concept	Standard	Assessment	mp	assignments
9.5	Applications of trig					
12.1	Representation of vectors		N-VM.1+ Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes			page 423)2-16 e
12.2	Algebraic representation of vectors		N-VM.2+ Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.			page 429)2-18 e
			N-VM.4+ Add and subtract vectors.			page 430)21-25
			N-VM.3+ Solve problems involving velocity and other quantities that can be represented by vectors.			page 435)2-14 e
			N-VM.5+ Multiply a vector by a scalar.			page 436)18-24
12.3	Vector and Parametric equations		N-VM.3+ Solve problems involving velocity and other quantities that can be represented by vectors.			
12.4	Parallel and perpendicular vectors		N-VM.11+ Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.			

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Section	Topic	Specific Concept	Standard	Assessment	mp	assignments
12.7	Determinants		N-VM.12+ Work with 2×2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of plane, and interpret the absolute value of the determinant in terms of area	test 6		
7.1	Unit circle		F-TF.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.			page 272)1,2,5,
7.3	Sine and cosine function		F-TF.2 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	quiz 12		page 262)17ab,
7.2	Sectors of circles		G-C.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian proportionality; derive the formula for the area of a sector.			page 280)11-14
7.4	Evaluating sine and cosine			quiz 13		page 261)2-14 e
7.5	Other Trig functions			test 7		page 272)3,4,7-
8.2	Sine and cosine Curves		F-TF.4 Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.			page 280)15-18

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Section	Topic	Specific Concept	Standard	Assessment	mp	assignments
8.3	Modeling periodic behavior		F-TF.5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.	quiz 13		page 273)21-28
7.6	Inverse Trig functions		F-TF.6 Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.			page 262)26,28
8.1	Solving simple equations		F-TF.7 Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.	quiz 15		page 266)16-22
8.4	Relationships among functions		F-TF.8 Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.			page 305)2-16 e
8.5	Solving more difficult trig equations			test 8		page 313)2-14 e
10.1	Addition formulas sin and cos		F-TF.9+ Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.			page 306)30, 34
10.2	Addition formula tan		F-TF.9+ Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.	quiz 19		page 299)2-20 e

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10.3	Double and half angle fomrulas		G-SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.			page 300)22-36
10.4	solving trig equations					page 306)20-26
11.1	Polar coordinates					page 321)2-10 e
11.2	polar complex numbers		N-CN.6+ Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.	test 9		page 321)12-20
16.1	Intro to prob		S-CP.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”).			page 321)22, 30
16.2	Prob of events occurring together		S-CP.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.			page 373)2-26 e

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Section	Topic	Specific Concept	Standard	Assessment	mp	assignments
16.3	Binomial probability Theorem		S-MD.3+ Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value.			page 373)28-38
16.4	Probability problems solved with combinations		S-CP.9 Use permutations and combinations to compute probabilities of compound events and solve problems.	quiz 20		page 377)2-8 ev
16.5	Conditional probability		S-CP.3 Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.			page 383)2-24 e

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Section	Topic	Specific Concept	Standard	Assessment	mp	assignments
			S-CP.6 Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.			
16.6	Expected Value		S-MD.2 Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.			
			S-MD.5 Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.			
			S-MD.5a Find the expected payoff for a game of chance.	test 10		
18.1	Intro to curve fitting					
18.2	Fitting Exponential curves					
18.3	Fitting Power curves					

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18.4	Choosing the best model		<p>S-ID.6a Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.</p>	project		

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