

"Core" Subject Taxonomy for Mathematical Sciences Education 4/29/2005

1.0	Numbers and Computation
1.1	Number Concepts
1.1.1	Natural
1.1.2	Integers
1.1.3	Rational
1.1.4	Irrational
1.1.5	Algebraic
1.1.6	Real
1.1.7	Complex
1.1.8	Famous Numbers
1.1.8.1	0
1.1.8.2	π
1.1.8.3	e
1.1.8.4	i
1.1.8.5	Golden Mean
1.2	Arithmetic
1.2.1	Operations
1.2.1.1	Addition
1.2.1.2	Subtraction
1.2.1.3	Multiplication
1.2.1.4	Division
1.2.1.5	Roots
1.2.1.6	Factorials
1.2.1.7	Factoring
1.2.1.8	Properties of Operations
1.2.1.9	Estimation
1.2.2	Fractions
1.2.2.1	Addition
1.2.2.2	Subtraction
1.2.2.3	Multiplication
1.2.2.4	Division
1.2.2.5	Ratio and Proportion
1.2.2.6	Equivalent Fractions
1.2.3	Decimals
1.2.3.1	Addition
1.2.3.2	Subtraction
1.2.3.3	Multiplication
1.2.3.4	Division
1.2.3.5	Percents
1.2.4	Comparison of numbers
1.2.5	Exponents
1.2.5.1	Multiplication
1.2.5.2	Division
1.2.5.3	Powers
1.2.5.4	Integer Exponents
1.2.5.5	Rational Exponents
1.3	Patterns and Sequences
1.3.1	Number Patterns
1.3.2	Fibonacci Sequence
1.3.3	Arithmetic Sequence
1.3.4	Geometric Sequence

1.4	Measurement
1.4.1	Units of Measurement
1.4.1.1	Metric System
1.4.1.2	Standard Units
1.4.1.3	Nonstandard Units
1.4.2	Linear Measure
1.4.2.1	Distance
1.4.2.2	Circumference
1.4.2.3	Perimeter
1.4.3	Area
1.4.3.1	Area of Polygons
1.4.3.2	Area of Circles
1.4.3.3	Surface Area
1.4.3.4	Nonstandard Shapes
1.4.4	Volume
1.4.5	Weight and Mass
1.4.6	Temperature
1.4.7	Time
1.4.8	Speed
1.4.9	Money
1.4.10	Scale
2.0	Logic and Foundations
2.1	Logic
2.1.1	Venn Diagrams
2.1.2	Propositional and Predicate Logic
2.1.3	Methods of Proof
2.2	Set Theory
2.2.1	Sets and Set Operations
2.2.2	Relations and Functions
2.2.3	Cardinality
2.2.4	Axiom of Choice
2.3	Computability and Decidability
2.4	Model Theory
3.0	Algebra and Number Theory
3.1	Algebra
3.1.1	Graphing Techniques
3.1.2	Algebraic Manipulation
3.1.3	Functions
3.1.3.1	Linear
3.1.3.2	Quadratic
3.1.3.3	Polynomial
3.1.3.4	Rational
3.1.3.5	Exponential
3.1.3.6	Logarithmic
3.1.3.7	Piece-wise
3.1.3.8	Step
3.1.4	Equations
3.1.4.1	Linear
3.1.4.2	Quadratic

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	3.1.4.3	Polynomial
	3.1.4.4	Rational
	3.1.4.5	Exponential
	3.1.4.6	Logarithmic
	3.1.4.7	Systems
	3.1.5	Inequalities
	3.1.6	Matrices
	3.1.7	Sequences and Series
	3.1.8	Algebraic Proof
3.2		Linear Algebra
	3.2.1	Systems of Linear Equations
	3.2.2	Matrix algebra
	3.2.3	Vectors in \mathbb{R}^3
	3.2.4	Vector Spaces
	3.2.5	Linear Transformations
	3.2.6	Eigenvalues and Eigenvectors
	3.2.7	Inner Product Spaces
3.3		Abstract Algebra
	3.3.1	Groups
	3.3.2	Rings and Ideals
	3.3.3	Fields
	3.3.4	Galois Theory
	3.3.5	Multilinear Algebra
3.4		Number Theory
	3.4.1	Integers
	3.4.2	Primes
	3.4.2.1	Divisibility
	3.4.2.2	Factorization
	3.4.2.3	Distributions of Primes
	3.4.3	Congruences
	3.4.4	Diophantine Equations
	3.4.5	Irrational Numbers
	3.4.6	Famous Problems
	3.4.7	Coding Theory
	3.4.8	Cryptography
	3.5	Category Theory
	3.6	K-Theory
	3.7	Homological Algebra
	3.8	Modular Arithmetic
4.0		Discrete Mathematics
	4.1	Cellular Automata
	4.2	Combinatorics
	4.2.1	Combinations
	4.2.2	Permutations
	4.3	Game Theory
	4.4	Algorithms
	4.5	Recursion
	4.6	Graph Theory
	4.7	Linear Programming
	4.8	Order and Lattices
	4.9	Theory of Computation
	4.10	Chaos
5.0		Geometry and Topology
	5.1	Geometric Proof

5.2		Plane Geometry
	5.2.1	Measurement
	5.2.2	Lines and Planes
	5.2.3	Angles
	5.2.4	Triangles
	5.2.4.1	Properties
	5.2.4.2	Congruence
	5.2.4.3	Similarity
	5.2.4.4	Pythagorean Theorem
	5.2.5	Polygons
	5.2.5.1	Properties
	5.2.5.2	Regular
	5.2.5.3	Irregular
	5.2.5.4	Congruence
	5.2.5.5	Similarity
	5.2.6	Circles
	5.2.7	Patterns
	5.2.7.1	Geometric Patterns
	5.2.7.2	Tilings and Tessellations
	5.2.7.3	Symmetry
	5.2.7.4	Golden Ratio
	5.2.8	Transformations
	5.2.8.1	Translation
	5.2.8.2	Rotation
	5.2.8.3	Reflection
	5.2.8.4	Scaling
5.3		Solid Geometry
	5.3.1	Dihedral Angles
	5.3.2	Spheres
	5.3.3	Cones
	5.3.4	Cylinders
	5.3.5	Pyramids
	5.3.6	Prisms
	5.3.7	Polyhedra
5.4		Analytic Geometry
	5.4.1	Cartesian Coordinates
	5.4.2	Lines
	5.4.3	Circles
	5.4.4	Planes
	5.4.5	Conics
	5.4.6	Polar Coordinates
	5.4.7	Parametric Curves
	5.4.8	Surfaces
	5.4.9	Distance Formula
5.5		Projective Geometry
5.6		Differential Geometry
5.7		Algebraic Geometry
5.8		Topology
	5.8.1	Point Set Topology
	5.8.2	General Topology
	5.8.3	Differential Topology
	5.8.4	Algebraic Topology
5.9		Trigonometry
	5.9.1	Angles

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	5.9.2	Trigonometric Functions
	5.9.3	Inverse Trigonometric Functions
	5.9.4	Trigonometric Identities
	5.9.5	Trigonometric Equations
	5.9.6	Roots of Unity
	5.9.7	Spherical Trigonometry
	5.10	Fractal Geometry
6.0	Calculus	
	6.1	Single Variable
	6.1.1	Functions
	6.1.2	Limits
	6.1.3	Continuity
	6.1.4	Differentiation
	6.1.5	Integration
	6.1.6	Series
	6.2	Several Variables
	6.2.1	Functions of Several Variables
	6.2.2	Limits
	6.2.3	Continuity
	6.2.4	Partial Derivatives
	6.2.5	Multiple integrals
	6.2.6	Taylor Series
	6.3	Advanced Calculus
	6.3.1	Vector Valued Functions
	6.3.2	Line Integrals
	6.3.3	Surface Integrals
	6.3.4	Stokes Theorem
	6.3.5	Curvilinear Coordinates
	6.3.6	Linear spaces
	6.3.7	Fourier Series
	6.3.8	Orthogonal Functions
	6.4	Tensor Calculus
	6.5	Calculus of Variations
	6.6	Operational Calculus
7.0	Analysis	
	7.1	Real Analysis
	7.1.1	Metric Spaces
	7.1.2	Convergence
	7.1.3	Continuity
	7.1.4	Differentiation
	7.1.5	Integration
	7.1.6	Measure Theory
	7.2	Complex Analysis
	7.2.1	Convergence
	7.2.2	Infinite Series
	7.2.3	Analytic Functions
	7.2.4	Integration
	7.2.5	Contour Integrals
	7.2.6	Conformal Mappings

	7.2.7	Several Complex Variables
7.3	Numerical Analysis	
	7.3.1	Computer Arithmetic
	7.3.2	Solutions of Equations
	7.3.3	Solutions of Systems
	7.3.4	Interpolation
	7.3.5	Numerical Differentiation
	7.3.6	Numerical Integration
	7.3.7	Numerical Solutions of ODEs
	7.3.8	Numerical Solutions of PDEs
7.4	Integral Transforms	
	7.4.1	Fourier Transforms
	7.4.2	Laplace Transforms
	7.4.3	Hankel Transforms
	7.4.4	Wavelets
	7.4.5	Other Transforms
7.5	Signal Analysis	
	7.5.1	Sampling Theory
	7.5.2	Filters
	7.5.3	Noise
	7.5.4	Data Compression
	7.5.5	Image Processing
7.6	Functional Analysis	
	7.6.1	Hilbert Spaces
	7.6.2	Banach Spaces
	7.6.3	Topological Spaces
	7.6.4	Locally Convex Spaces
	7.6.5	Bounded Operators
	7.6.6	Spectral Theorem
	7.6.7	Unbounded Operators
	7.7	Harmonic Analysis
	7.8	Global Analysis
8.0	Differential and Difference Equations	
	8.1	Ordinary Differential Equations
	8.1.1	First Order
	8.1.2	Second Order
	8.1.3	Linear Oscillations
	8.1.4	Nonlinear Oscillations
	8.1.5	Systems of Differential Equations
	8.1.6	Sturm Liouville Problems
	8.1.7	Special Functions
	8.1.8	Power Series Methods
	8.1.9	Laplace Transforms
	8.2	Partial Differential Equations
	8.2.1	First Order
	8.2.2	Elliptic
	8.2.3	Parabolic
	8.2.4	Hyperbolic
	8.2.5	Integral Transforms
	8.2.6	Integral Equations
	8.2.7	Potential Theory

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8.2.8	Nonlinear Equations	9.4.3.	Limit Theorems
8.2.9	Symmetries and Integrability	9.4.3.1.	Central Limit Theorem
8.3	Difference Equations	9.4.3.2.	Law of Large Numbers
8.3.1	First Order	9.4.4.	Multivariate Distributions
8.3.2	Second Order	9.4.4.1.	Joint
8.3.3	Linear Systems	9.4.4.2.	Conditional
8.3.4	Z Transforms	9.4.4.3.	Expectations
8.3.5	Orthogonal Polynomials	9.4.5.	Stochastic Processes
8.4	Dynamical Systems	9.4.5.1.	Brownian Motion
8.4.1	1D Maps	9.4.5.2.	Markov Chains
8.4.2	2D Maps	9.4.5.3.	Queuing Theory
8.4.3	Lyapunov Exponents	9.4.6.	Probability Measures
8.4.4	Bifurcations	9.4.7.	Simulation
8.4.5	Fractals	10.0	Applied Mathematics
8.4.6	Differentiable Dynamics	10.1	Mathematical Physics
8.4.7	Conservative Dynamics	10.2	Mathematical Economics
8.4.8	Chaos	10.3	Mathematical Biology
8.4.9	Complex Dynamical Systems	10.4	Mathematics for Business
9.0	Statistics and Probability	10.5	Engineering Mathematics
9.1.	Data Collection	10.6	Mathematical Sociology
9.1.1.	Experimental Design	10.7	Mathematics for Social Sciences
9.1.2.	Sampling and Surveys	10.8	Mathematics for Computer Science
9.1.3.	Data and Measurement Issues	10.9	Mathematics for Humanities
9.2.	Data Summary and Presentation	10.10	Consumer Mathematics
9.2.1.	Summary Statistics	11.0	Mathematics History
9.2.1.1.	Measures of Central Tendency	11.1	General
9.2.1.2.	Measures of Spread	11.2	Famous Problems
9.2.2.	Data Representation	11.3	Biographies of Mathematicians
9.2.2.1.	Graphs and Plots		
9.2.2.2.	Tables		
9.3.	Statistical Inference and Techniques		
9.3.1.	Sampling Distributions		
9.3.2.	Regression and Correlation		
9.3.3.	Confidence Intervals		
9.3.4.	Hypothesis Tests		
9.3.5.	Statistical Quality Control		
9.3.6.	Non-parametric Techniques		
9.3.7.	Multivariate Techniques		
9.3.8.	Survival Analysis		
9.3.9.	Bayesian Statistics		
9.4.	Probability		
9.4.1.	Elementary Probability		
9.4.1.1.	Sample Space and Events		
9.4.1.2.	General Rules		
9.4.1.3.	Combinations and Permutations		
9.4.1.4.	Random Variables		
9.4.2.	Univariate Distributions		
9.4.2.1.	Discrete Distributions		
9.4.2.2.	Continuous Distributions		
9.4.2.3.	Expected Value		