

Grade Twelve

Number, Number Sense and Operations Standard

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| <i>Number and
Number Systems</i> | 1. Determine what properties (closure, identity, inverse, commutative and associative) hold for operations with complex numbers. |
| Computation
and Estimation | 2. Apply combinations as a method to create coefficients for the Binomial Theorem, and make connections to everyday and workplace problem situations. |

Measurement Standard

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| <i>Use
Measurement
Techniques and
Tools</i> | 1. Solve problems involving derived measurements; e.g., acceleration and pressure. |
| | 2. Use radian measures in the solution of problems involving angular velocity and acceleration. |
| | 3. Apply informal concepts of successive approximation, upper and lower bounds, and limits in measurement situations; e.g., measurement of some quantities, such as volume of a cone, can be determined by sequences of increasingly accurate approximations. |

Geometry and Spatial Sense Standard

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| Transformations
and Symmetry | 1. Use matrices to represent translations, reflections, rotations, dilations and their compositions. |
| | 2. Derive and apply the basic trigonometric identities; i.e., angle addition, angle subtraction and double angle. |
| <i>Visualization
and Geometric
Models</i> | 3. Relate graphical and algebraic representations of lines, simple curves and conic sections. |
| | 4. Recognize and compare specific shapes and properties in multiple geometries; e.g., plane, spherical and hyperbolic. |

Patterns, Functions and Algebra Standard

- Use Patterns, Relations and Functions*
1. Analyze the behavior of arithmetic and geometric sequences and series as the number of terms increases.
 2. Translate between the numeric and symbolic form of a sequence or series.
 3. Describe and compare the characteristics of transcendental and periodic functions; e.g., general shape, number of roots, domain and range, asymptotic behavior, extrema, local and global behavior.
 4. Represent the inverse of a transcendental function symbolically.
- Use Algebraic Representations*
5. Set up and solve systems of equations using matrices and graphs, with and without technology.
 6. Make arguments about mathematical properties using mathematical induction.
 7. Make mathematical arguments using the concepts of limit.
 8. Compare estimates of the area under a curve over a bounded interval by partitioning the region with rectangles; e.g., make successive estimates using progressively smaller rectangles.
 9. Translate freely between polar and Cartesian coordinate systems.
- Analyze Change*
10. Use the concept of limit to find instantaneous rate of change for a point on a graph as the slope of a tangent at a point.

Data Analysis and Probability Standard

- Data Collection*
1. Identify and use various sampling methods (voluntary response, convenience sample, random sample, stratified random sample, census) in a study.
- Statistical Methods*
2. Transform bivariate data so it can be modeled by a function; e.g., use logarithms to allow nonlinear relationship to be modeled by linear function.
 3. Describe the shape and find all summary statistics for a set of univariate data, and describe how a linear transformation affects shape, center and spread.
 4. Apply the concept of a random variable to generate and interpret probability distributions, including binomial, normal and uniform.

5. Use sampling distributions as the basis for informal inference.
- Probability* 6. Use theoretical or experimental probability, including simulations, to determine probabilities in real-world problem situations involving uncertainty, such as mutually exclusive events, complementary events, and conditional probability.