North Carolina Mathematics

Math 4

Number and Quantity

1 **Apply properties and operations with complex numbers.** NC.M4.N.1

1 Execute procedures to add and subtract complex numbers. NC.M4.N.1.1

2 Execute procedures to multiply complex numbers. NC.M4.N.1.2

2 **Apply properties and operations with matrices and vectors.** NC.M4.N.2

1 Execute procedures of addition, subtraction, multiplication, and scalar multiplication on matrices. NC.M4.N.2.1

2 Execute procedures of addition, subtraction, and scalar multiplication on vectors NC.M4.N.2.2

Algebra and Functions

1 **Apply properties of function composition to build new functions from existing functions.** NC.M4.AF.1

1 Execute algebraic procedures to compose two functions. NC.M4.AF.1.1

2 Execute a procedure to determine the value of a composite function at a given value when the functions are in algebraic, graphical, or tabular representations. NC.M4.AF.1.2

2 **Apply properties of trigonometry to solve problems.** NC.M4.AF.2

1 Translate trigonometric expressions using the reciprocal and Pythagorean identities NC.M4.AF.2.1

2 Implement the Law of Sines and the Law of Cosines to solve problems. NC.M4.AF.2.2

3 Interpret key features (amplitude, period, phase shift, vertical shifts, midline, domain, range) of models using sine and cosine functions in terms of a context NC.M4.AF.2.3

3 **Apply the properties and key features of logarithmic functions** NC.M4.AF.3

1 Execute properties of logarithms to rewrite expressions and solve equations algebraically NC.M4.AF.3.1

2 Implement properties of logarithms to solve equations in contextual situations. NC.M4.AF.3.2

3 Interpret key features of a logarithmic function using multiple representations. NC.M4.AF.3.3

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Inderstand the properties and key features of piecewise functions. NC.M4.AF.4

1 Translate between algebraic and graphical representations of piecewise functions (linear, exponential, quadratic, polynomial, square root) NC.M4.AF.4.1

2 Construct piecewise functions to model a contextual situation. NC.M4.AF.4.2

5 Understand how to model functions with regression NC.M4.AF.5

1 Construct regression models of linear, quadratic, exponential, logarithmic, & sinusoidal functions of bivariate data using technology to model data and solve problems NC.M4.AF.5.1

2 Compare residuals and residual plots of non-linear models to assess the goodness-of-fit of the model NC.M4.AF.5.2

Statistics and Probability

1 Create statistical investigations to make sense of real-world phenomena NC.M4.SP.1

1 Construct statistical questions to guide explorations of data in context. NC.M4.SP.1.1

2 Design sample surveys and comparative experiments using sampling methods to collect and analyze data to answer a statistical question. NC.M4.SP.1.2

3 Organize large datasets of real-world contexts (i.e. datasets that include 3 or more measures and have sample sizes >200) using technology (e.g., spreadsheets, dynamic data analysis tools) to determine: types of variables in the data set, possible outcomes for each variable, statistical questions that could be asked of the data, and types of numerical and graphical summaries could be used to make sense of the data. NC.M4.SP1.3

4 Interpret non-standard data visualizations from the media or scientific papers to make sense of real-world phenomena. NC.M4.SP.1.4

2 Apply informal and formal statistical inference to make sense of, and make decisions in, meaningful real-world contexts. NC.M4.SP.2

1 Design a simulation to make a sampling distribution that can be used in making informal statistical inferences. NC.M4.SP.2.1

2 Construct confidence intervals of population proportions in the context of the data. NC.M4.SP.2.2

3 Implement a one proportion z-test to determine if an observed proportion is significantly different from a hypothesized proportion. NC.M4.SP.2.3

3 Apply probability distributions in making decisions in uncertainty. NC.M4.SP.3

1 Implement discrete probability distributions to model random phenomena and make decisions (e.g., expected value of playing a game, etc.). NC.M4.SP.3.1

2 Implement the binomial distribution to model situations and make decisions NC.M4.SP.3.2

3 Recognize from simulations of sampling distributions of sample means and proportions that a normal distribution can be used as an approximate model in certain situations. NC.M4.SP.3.3

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4 Implement the normal distribution as a probability distribution to determine the likelihood of events occurring. NC.M4.SP.3.4