Plano ISD ★ Advanced Quantitative Reasoning Syllabus ★ 2017-2018

1st semester

Modeling and Algebraic Reasoning	Reasoning with Data and Patterns
❖ Modeling with Functions ○ writing a sequence in explicit and recursive form and finding nth terms of a sequence ○ writing multiple function models in different forms ○ using the correlation coefficient to determine the strength and direction of the linear relationship ○ knowing the benefits of a residual plot ○ analyzing, writing, and graphing piecewise and step functions ○ recognizing linear vs. exponential function from a table and a graph ○ identifying the characteristics of a logistic growth function ○ using appropriate function models to make generalizations and predictions about given scenarios ○ identifying the characteristics of a periodic function using law of sines and law of cosines to find missing values of a triangle	❖ Problem Solving Strategies – ○ using a systematic list or table ○ using a picture figure or graph ○ using guessing and checking ○ using algebra ○ recognizing a pattern ❖ Sequences ○ writing NEXT-NOW statements ❖ Networks and graphs ○ representing given scenarios as a graph or a matrix ❖ Proportionality ○ justifying decisions using precise mathematical language ○ solving different types of problems using proportionality, estimation, and aspect ratios **Semester Exams: December**

2nd semester

Probabilistic Reasoning	Statistical Analysis	Financial Literacy
❖ Combinatorics ○ determining a sample space using different methods ○ identifying permutations and combinations ○ calculating permutations and combinations ❖ Probability ○ modeling probability ○ using probabilities to make and justify decisions ○ creating truth tables to validate conditional statements ○ calculating and finding expected values ○ identifying events as independent or dependent	❖ Statistical Questioning ○ creating appropriate statements representing both null and alternative hypotheses ❖ Statistical Design and Collection ○ collecting data that is relevant to a designed study ❖ Statistical Analysis ○ interpreting statistical results ❖ Statistical Reporting ○ using various methods of graphical displays to illustrate conclusion ○ predicting outcomes based on statistical analysis ❖ Voting Statistics ○ Performing voting methods including run-off, instant run-off, plurality, majority, pairwise comparison, and points-for-preferences ○ Determining if a voting situation is fair or not fair using Arrow's Fairness Conditions ○ Using the Banzhaf Power Index to determine the power of voters ○ Identifying and using the weight of a vote to determine the power of the vote	❖ Making Money ○ analyzing differences in income opportunities ○ analyzing and adjusting future value for compound and simple interest ○ creating a reasonable budget ❖ Borrowing Money ○ creating an amortization table ○ using the TVM solver to assess the future or present value using compound interest ○ calculating the value of a credit card or loan payment ○ creating a reasonable budget **Semester Exams: June**