Information for Course Syllabus

Name of Course: Applied Mathematical Concepts

Grade Level: 12

School: ORHS

Major Assignments: PBLs and Final Exam

Field Trips: None

How can parents access instructional materials? Canvas

Applied Mathematical Concepts
2021-2022

Term 1

Linear Programming and Problem Solving	**AM.A.PS.A.1** Apply problem solving strategies to real-world situations. Strategies include, but are not limited to: making orderly lists or tables, drawing diagrams, considering simpler problems, looking for patterns, working backwards, guess and check, using logical reasoning, etc.
	AM.A.LP.A.1 Use mathematical models involving equations and systems of equations to represent, interpret, and analyze quantitative relationships, change in various contexts, and other real-world phenomena.
	AM.A.LP.A.2 Read, interpret, and solve linear programming problems graphically and by computational methods.
	AM.A.LP.B.3 Use linear programming to solve optimization problems.
	AM.A.LP.B.4 Interpret the meaning of the maximum or minimum value in terms of the objective function.

Organize and Interpret Data	**AM.D.ID.A.1** Organize data for problem solving.
	AM.D.ID.A.2 Use a variety of counting methods to organize information, determine probabilities, and solve problems.
	AM.D.ID.A.3 Translate from one representation of data to another, e.g., a bar graph to a circle graph.
	AM.D.ID.A.4 Calculate and interpret statistical problems using measures of central tendency and graphs.

Normal Probability Distributions & Confidence Intervals	**AM.D.ND.A.1** Calculate the mean (expected value) and standard deviation of both a random variable and a linear transformation of a random variable.
	AM.D.ND.A.2 Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.
	AM.D.CI.A.1 Understand the meaning of confidence level, of confidence intervals, and the properties of confidence intervals.
	AM.D.CI.A.2 Construct and interpret a large sample confidence interval for a proportion and for a difference between two proportions.
	AM.D.CI.A.3 Construct the confidence interval for a mean and for a difference between two means.

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Term 2

Financial Mathematics	
	AM.N.NQ.A.1 Define interest, compound interest, annuities, sinking funds, amortizations, annuities, future value, and present value.
	AM.N.NQ.A.2 Recognize the importance of applying a financial model to business.
	AM.N.NQ.A.3 Determine future value and present value of an annuity.
	AM.N.NQ.A.4 Determine the amortization schedule for an annuity and a home mortgage.
	AM.N.NQ.B.5 Apply financial mathematics to depreciation schedules.
	AM.N.NQ.B.6 Solve contextual problems involving financial decision-making.
	AM.N.NQ.B.7 Apply arithmetic and geometric sequences to simple and compound interest, annuities, loans, and amortization.
	AM.N.NQ.B.8 Solve problems in mathematics of finance involving compound interest using exponential and logarithmic techniques.
	AM.N.NQ.C.9 Know when to use transcendental functions to accomplish various application purposes such as predicting population growth.
	AM.N.NQ.C.10 Use orders of magnitude estimates for determining an appropriate model for a contextual situation.

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Term 2

Investigative Logic & Boolean Algebra	**AM.G.L.A.1** Define the order of operations for the logical operators.
	AM.G.L.A.2 Define conjunction, disjunction, negation, conditional, and biconditional.
	AM.G.L.A.3 Solve a variety of logic puzzles.
	AM.G.L.A.4 Construct and use a truth table to draw conclusions about a statement.
	AM.G.L.B.5 Apply the laws of logic to judge the validity of arguments.
	AM.G.L.B.6 Give counterexamples to disprove statements.
	AM.D.ID.A.6 Analyze survey data using Venn diagrams.
	AM.G.L.B.7 Analyze arguments with quantifiers through the use of Venn diagrams.
	AM.G.L.B.8 Represent logical statements with networks.
	AM.A.LB.A.1 Develop the symbols and properties of Boolean algebra; connect Boolean algebra to standard logic.
	AM.A.LB.B.3 Analyze basic electrical networks; compare the networks to Boolean Algebra configurations.
	AM.A.LB.B.4 Develop electrical networks and translate them into Boolean Algebra equations.

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Counting and Combinatorial Reasoning	**AM.D.CR.A.1** Use permutations, combinations, and the multiplication principle to solve counting problems.
	AM.D.CR.A.2 Design and interpret simple experiments using tree-diagrams, permutations, and combinations.
	AM.D.CR.A.3 Apply counting principles to probabilistic situations involving equally likely outcomes.
	AM.D.CR.A.4 Solve counting problems by using Venn diagrams and show relationships modeled by the Venn diagram.
	AM.D.CR.A.5 Use permutations and combinations to compute probabilities of compound events and solve problems.
	AM.D.CR.B.6 Apply the Law of Large numbers to contextual situations.
	AM.D.CR.B.7 Discuss the various examples and consequences of innumeracy; consider poor estimation, improper experimental design, inappropriate comparisons, and scientific notation comparisons.
	AM.D.CR.B.8 Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values. a. Find the expected payoff for a game of chance. For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant. b. Evaluate and compare strategies on the basis of expected values. For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.
	AM.D.CR.B.9 Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).
	AM.D.CR.B.10 Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).