math102 Syllabus

Math 102: Quantitative Reasoning

Critical thinking and applications of mathematical concepts to real-world topics such as descriptive statistics, growth and decay models, and finance. Graphing calculator required. This course is designed for students in non-technical fields and may be used as a prerequisite for MATH 206, MATH 210 and STAT 214 only. Only one of MATH 100, MATH 102, MATH 103/104, MATH 105, MATH 107, MATH 109 or MATH 143 may be used for degree credit.

Prerequisites: Minimum ACT MATH score of 19 or SAT MATH score of 460, departmental exam, or Intermediate Algebra with a grade of C or better.

Text: *Viewing Life Mathematically: A Pathway to Quantitative Literacy*, by Kim Denley and Mike Hall, Hawkes Learning, 2020.

Online homework: Hawkes Learning is required as the online homework system and additional resources.

Calculator: A Graphing calculator required – TI 83/84 preferred.

Sections and Topics

Chapter 1: Critical Thinking and Problem Solving

- Understand mathematical reasoning
- Distinguish between inductive and deductive reasoning
- Identify arithmetic and geometric sequences
- Understand Pólya's problem-solving process
- Apply problem-solving strategies
- Find estimates

Chapter 4: Rates, Ratios, Proportions, and Percentages

- Write rates as fractions
- Solve proportional equations
- Calculate unit rates
- Write and interpret ratios
- Calculate proportions and percentages
- Identify and calculate percentage increase and percentage decrease
- Identify and calculate percentage increase and percentage decrease

Chapter 5: The Mathematics of Growth

- Demonstrate an understanding of functions, function notation, domain, and range
- Demonstrate an understanding of linear functions and linear growth
- Demonstrate an understanding of exponential functions and exponential growth
- Model data with linear and exponential functions

Chapter 6: Geometry

- Demonstrate an understanding of points, lines, and planes
- Apply the concepts of parallel and perpendicular
- Explore the properties of polygons
- Demonstrate an understanding of sine, cosine, and tangent functions
- Apply the concepts of similar triangles
- Demonstrate an understanding of angle measure, angle sum, and applications of angles
- Apply the concepts of perimeter and area

Chapter 7: Probability

- Calculate basic probabilities
- Use the Fundamental Counting Principle to calculate probabilities
- Calculate permutations and combinations
- Use the addition rule of probability and the multiplication rule of probability
- Calculate the expected value of an event

Chapter 8: Statistics

- Calculate and appropriately use the linear regression line for a given set of data

Chapter 9: Personal Finance

- Create a budget
- Calculate sales prices and discounts
- Calculate percentage increase/decrease
- Calculate simple interest
- Understand present value
- Understand future value
- Calculate compound interest
- Understand savings plans
- Calculate annual percentage yield
- Calculate monthly payments
- Calculate credit card payments

Chapter 11: The Arts

- Understand the relationship between mathematics and art/architecture
- Understand the use of geometry in art/architecture
- Understand the use of sequences and series in art and music
- Understand the use of the golden ratio, golden rectangles and triangles, and their use in art/architecture
- Understand triangular and square numbers
- Understand the use of regular polygons in creating tilings and tessellations
- Understand how rotations, translations, and reflections are used in art and architecture
- Understand how sound frequencies in music are used to tune a piano and their relationships in musical harmonies

Possible projects out of chapters 9-14

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