

MAT102 | Quantitative Reasoning

Course Text

There is no text for this course. All materials are included in the course fee.

Course Description

This course teaches students the practical application of calculations in everyday life, such as decision-making, saving money, estimating, understanding media reports, etc. This course is designed to make math approachable for all learners and not only those planning to be mathematicians or engineers. This course helps students gain confidence in their mathematical abilities while supplying them with the essentials to navigate math in their daily life.

Learning Outcomes

After completing this course, students will be able to:

1. Apply mathematical concepts to solve real-world problems using appropriate quantitative reasoning strategies.
2. Analyze geometric relationships and spatial reasoning to solve problems involving shapes and measurements.
3. Evaluate algebraic expressions and equations to model and solve mathematical relationships.
4. Interpret data presented in tables, graphs, and various visual formats to draw meaningful conclusions.
5. Construct logical arguments using principles of logic, set theory, and deductive reasoning.
6. Calculate and interpret statistical measures to summarize and describe data distributions.
7. Determine probabilities and assess risk in uncertain situations using probability theory.
8. Compare different mathematical functions and their applications in modeling real-world phenomena.
9. Synthesize mathematical principles to analyze voting systems, apportionment methods, and democratic processes.
10. Create mathematical models using graph theory to represent and solve network and relationship problems.

Course Prerequisites

There are no prerequisites for this course.

Academic Integrity Statement

Academic integrity is the pursuit of scholarly activity in an honest, truthful and responsible manner. Violations of academic integrity include, but are not limited to, plagiarism, cheating, fabrication and academic misconduct. Failure to comply with the Academic Integrity Policy can result in a failure and/or zero on the

attempted assignment/examination, a removal from the course, disqualification to enroll in future courses, and/or revocation of an academic transcript.

Course Completion Policy

In order for a course to be considered complete, **all required coursework must be attempted, submitted, and graded.** Required coursework consists of graded assignments. Any Academic Integrity Policy violations may prevent a course from being considered complete.

Assessment Types

StraighterLine courses may include any combination of the assessment types described below. Review the descriptions to learn about each type, then review the Course Evaluation Criteria to understand how your learning will be measured in this course.

Benchmarks

Benchmarks test your mastery of course concepts. You have 3 attempts, and your highest score counts.

Note: Cumulative Benchmarks (final exams) only allow 1 attempt.

Capstones

Capstones are project-based assessments that help you apply concepts to real-world scenarios. You have 2 attempts, and your highest score counts.

Checkpoints

Checkpoints are quick knowledge checks on important course concepts. All are open-book, and most have 1-3 attempts.

AI Use-Case Policies

StraighterLine Capstone assessments operate under one of three AI Use-Case Policies. These designations are selected intentionally to support learners in developing digital literacy, ethical reasoning, and authentic communication skills. Each model requires students to engage meaningfully with the course outcomes while adhering to academic standards.

Independent Work Requirement: Capstones with this designation must be completed independently without using AI tools. The goal is for learners to showcase their own understanding and skills without AI assistance. Students are expected to generate and submit original work developed solely through their own reasoning and effort.

AI-Assisted Planning Option: Capstones with this designation may allow AI tools to support brainstorming and assessment planning. If allowed, students will be asked to document any AI assistance by noting how it informed their work. Documentation must be included within the assignment or in a designated reflection field. Examples include describing how an AI tool helped organize an outline, generate ideas, or surface sources for further exploration.

AI-Integration Requirement: Capstones with this designation require AI tools as part of the learning process. Students will be asked to reflect upon their AI interactions and AI contributions to the assessment. Reflections must include which tools were used, how they were used, and what insights students gained from the process. This promotes transparency, ethical use, and metacognitive skill-building.

Course Evaluation Criteria

Your score provides a percentage score and letter grade for each course. A passing percentage is 70% or higher.

There are a total of 1000 points in the course:

Assessment	Points	Learning Outcomes
Checkpoint 1: Numbers in Everyday Life	63	1
Checkpoint 2: Solving Everyday Problems	63	1
Checkpoint 3: Problem Solving with Shapes	63	2
Checkpoint 4: Basic Algebra	63	3
Checkpoint 5: Everyday Math Examples	63	1
Checkpoint 6: Tables, Graphs, and Functions	63	4
Checkpoint 7: Spreadsheets	63	4
Checkpoint 8: Logic and Sets	63	5
Checkpoint 9: Statistics	63	6
Checkpoint 10: Probability	63	7
Checkpoint 11: Functions	63	3, 8
Checkpoint 12: Linear Functions	63	3, 8
Checkpoint 13: Exponential and Logarithmic Functions	63	3, 8
Checkpoint 14: Voting and Apportionment	63	9
Checkpoint 15: Time Value of Money	63	1
Checkpoint 16: Graph Theory	63	10
Total	1000	

Course Roadmap

This roadmap provides an overview of the checkpoints and lessons covered in this course.

Checkpoint 1: Numbers in Everyday Life

- Numbers
- Adding and subtracting
- Multiplying
- Dividing
- Fractions
- Reducing and expanding fractions
- Adding and multiplying fractions
- Fractions and decimal numbers

- Percents

Checkpoint 2: Solving Everyday Problems

- Comparisons
- Times more / % increase
- Ratios
- Rates
- Rates (continued)
- Unit conversion problems
- Unit conversion problems (continued)
- Unit conversion examples

Checkpoint 3: Problem Solving with Shapes

- Perimeter
- Area
- Volume
- Estimating in 1, 2, and 3 dimensions
- Angles

Checkpoint 4: Basic Algebra

- Equations with an unknown value
- Solving for x
- Creating equations with x
- Solving for x mentally
- Rate and comparison problems with x

Checkpoint 5: Everyday Math Examples

- Personal finance
- Health
- Utilities and phone
- Electricity
- Investing: Stocks and bonds

Checkpoint 6: Tables, Graphs, and Functions

- Introduction to functions
- Function examples
- Linear functions
- Linear function examples
- Graphing via slope and intercept
- Exponential functions
- Exponential function examples
- Piecewise linear functions

Checkpoint 7: Spreadsheets

- Tables and spreadsheets
- Spreadsheets and formulas
- Exploring with formulas

- Spreadsheets and graphing
- Bar charts
- Spreadsheets and bar charts
- Spreadsheets and pie charts

Checkpoint 8: Logic and Sets

- Propositions
- Conditional statements
- Logical deduction
- Converse and biconditional statements
- Common logical deduction mistakes
- Logic: AND/OR/NOT
- AND/OR/NOT logic examples
- Common applications of logic
- Logical induction
- Sets and Venn diagrams

Checkpoint 9: Statistics

- Averages
- Median
- Spread
- Estimates/Margins of error
- Margin of error examples
- Comparing averages of two populations

Checkpoint 10: Probability

- Counting
- Probability
- Chances and percent chance
- Adding and multiplying probabilities
- Expected values

Checkpoint 11: Functions

- Functions and function notation
- Domain and range
- Rates of change and behavior of graphs
- Composition of functions
- Transformation of functions
- Absolute value functions
- Inverse functions

Checkpoint 12: Linear Functions

- Linear functions
- Graphs of linear functions
- Modeling with linear functions
- Fitting linear models to data

Checkpoint 13: Exponential and Logarithmic Functions

- Exponential functions
- Graphs of exponential functions
- Logarithmic functions
- Graphs of logarithmic functions
- Logarithmic properties
- Exponential and logarithmic equations
- Exponential and logarithmic models
- Fitting exponential models to data

Checkpoint 14: Voting and Apportionment

- Voting
- Ranked choice voting example
- Fair division
- Apportionment
- Apportionment in politics
- Apportionment paradoxes
- U.S. Electoral College

Checkpoint 15: Time Value of Money

- Money and interest
- Compounding
- APR vs APY
- Annuities
- Loan amortization

Checkpoint 16: Graph Theory

- Introduction to graphs
- Euler trails
- Hamiltonian paths
- Planar graphs
- Graph coloring
- Weighted graphs and navigation apps

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