



## Course Syllabus

### **Math 0332-Quantitative Reasoning Foundations**

**Catalog Description:** This course supports students in developing skills, strategies, and reasoning needed to succeed in mathematics, including communication and appropriate use of technology. Topics include the study of numeracy and the real number system: algebraic concepts, notation, and reasoning; quantitative relationships; mathematical models; and problem solving. Will not meet graduation requirements. Co-enrollment in MATH 1332-This intervention provides additional support and is required for students with prescribed TSI scores.

**Prerequisites:** Placement Score

**Semester Credit Hours:** 3

**Lecture Hours per Week:** 0

**Lab Hours per Week:** 3

**Contact Hours per Semester:** 48

**State Approval Code:** 32.0104.51 19

**Class section meeting time:** Online—students are expected to spend at least 3-4 hours per week reading, reviewing, and participating in assigned activities for successful completion of this course.

**Alternate Operations During Campus Closure:** In the event of an emergency or announced campus closure due to a natural disaster or pandemic, it may be necessary for Panola College to move to altered operations. During this time, Panola College may opt to continue delivery of instruction through methods that include, but are not limited to: online learning management system (CANVAS), online conferencing, email messaging, and/or an alternate schedule. It is the responsibility of the student to monitor Panola College's website ([www.panola.edu](http://www.panola.edu)) for instructions about continuing courses remotely, CANVAS for each class for course-specific communication, and Panola College email for important general information.

**Artificial Intelligence (AI) Course Policy:** There are situations throughout the course where you may be permitted to use artificial intelligence (AI) tools to aide in further understanding of mathematical concepts. However, AI tools may not be used for any graded assignments including but not limited to exams, quizzes, and projects. Use of any AI-generated content in this course without the instructor's consent qualifies as academic dishonesty and violates Panola College's standards of academic integrity.

#### **Core Components and Related College Student Learning Outcomes**

This course counts as part of the academic requirements of the Panola College Core Curriculum and an Associate of Arts or Associate of Science degree.  Yes  No: If no, skip to Instructional Goals.

The items below marked with an X reflect the state-mandated outcomes for this course **IF this is a CORE course:**

- Critical Thinking Skills – to include creative thinking, innovation, inquiry and analysis, evaluation and syntheses of information

- CT1: Generate and communicate ideas by combining, changing, or reapplying existing information
- CT2: Gather and assess information relevant to a question
- CT3: Analyze, evaluate, and synthesize information
- Communication Skills – to include effective development, interpretation, and expression of ideas through written, oral, and visual communication
  - CS1: Develop, interpret, and express ideas through written communication
  - CS2: Develop, interpret, and express ideas through oral communication
  - CS3: Develop, interpret, and express ideas through visual communication
- Empirical and Quantitative Skills – to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions
  - EQS1: Manipulate and analyze numerical data and arrive at an informed conclusion
  - EQS2: Manipulate and analyze observable facts and arrive at an informed conclusion
- Teamwork – to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal
  - TW1: Integrate different viewpoints as a member of a team
  - TW2: Work with others to support and accomplish a shared goal
- Personal Responsibility – to include the ability to connect choices, actions, and consequences to ethical decision-making
  - PR1: Evaluate choices and actions and relate consequences to decision-making
- Social Responsibility – to include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities
  - SR1: Demonstrate intercultural competence
  - SR2: Identify civic responsibility
  - SR3: Engage in regional, national, and global communities

### **Instructional Goals and Purposes:**

The purpose of this course is to...

1. Have instructional support while learning describing sets, subsets, and performing set operations.
2. Have instructional support while learning how to solve consumer math problems, including percent, loans, simple and compound interest, and mortgage payments.
3. Have instructional support while learning how to solve probability problems, including single- and multi-stage experiments.
4. Have instructional support while learning how to solve problems involving applications with permutations and combinations.
5. Have instructional support while learning to solve problems finding measures of central tendency, probability and statistics.
6. Have instructional support while learning how to solve problems discerning correct information from various types of graphs.

### **Learning Outcomes:**

Upon successful completion of this course, students will:

1. Define, represent, and perform operations on real and complex numbers.
2. Recognize, understand, and analyze features of a function.
3. Recognize and use algebraic (field) properties, concepts, procedures (including factoring), and algorithms to combine, transform, and evaluate absolute value, polynomial, radical, and rational expressions.

4. Identify and solve absolute value, polynomial, radical, and rational equations.
5. Identify and solve absolute value and linear inequalities.
6. Model, interpret and justify mathematical ideas and concepts using multiple representations.
7. Connect and use multiple strands of mathematics in situations and problems, as well as in the study of other disciplines

**Course Content:**

Students in all sections of this course may learn the following content:

The objectives for this course are aligned with the Texas College Readiness Standards as adopted by the Texas Higher Education Coordinating Board.

1. Numeric Reasoning
  - a. Number representations and operations
    - i. Compare and order real numbers using mathematical symbols ( $=$ ,  $\neq$ ,  $<$ ,  $>$ ). ii. Understand that numbers can be represented in different ways and convert between the different representations – fractions, mixed numbers, decimals, percentages, scientific notation.
    - ii. Perform Computations with real numbers – including the four operations on integers, fractions, decimals, and percentages, evaluating exponents and square roots, and using order of operations.
  - b. Number sense and number concepts
    - i. Use estimation to check for errors and reasonableness of solutions.
    - ii. Interpret the relationships between the different representations of numbers.
  - c. Systems of measurement
    - i. Select or use the appropriate type of method, unit, and tool for the attribute being measured.
    - ii. Convert units within and between systems of measurement.
2. Algebraic Reasoning
  - a. Identifying expressions and equations
    - i. Explain the difference between expressions and equations.
  - b. Manipulating expressions
    - i. Recognize and use algebraic properties, concepts, and algorithms to combine, transform, and evaluate expressions (e.g., polynomials, radicals, rational expressions).
  - c. Solving equations, inequalities, and systems of equations and inequalities
    - i. Describe and interpret solution sets of equalities and inequalities.
    - ii. Explain the difference between the solution set of an equation and the solution set of an inequality.
    - iii. Recognize and use algebraic properties, concepts, and algorithms to solve equations, inequalities, and systems of linear equations and inequalities.
  - d. Representing relationships
    - i. Interpret multiple representations of equations, inequalities, and relationships.
    - ii. Convert among multiple representations of equations, inequalities, and relationships.
3. Geometric and Spatial Reasoning
  - a. Figures and their properties
    - i. Recognize characteristics and dimensional changes of two- and three-dimensional figures.
    - ii. Form and validate conjectures about one-, two-, and three-dimensional figures and their properties.
    - iii. Recognize and apply right triangle relationships including basic trigonometry.
  - b. Transformations and symmetry
    - i. Identify transformations and symmetries of figures.
    - ii. Use transformations to investigate congruence, similarity, and symmetries of figures
  - c. Connections between geometry and other mathematical content strands
    - i. Make connections between geometry and algebraic equations.

- ii. Make connections between geometry, statistics, and probability.
  - d. Measurements involving geometry and algebra
    - i. Find the perimeter and area of two-dimensional figures.
    - ii. Determine the surface area and volume of three-dimensional figures.
    - iii. Determine indirect measurements of geometric figures using a variety of methods.
- 4. Probabilistic Reasoning
  - a. Counting principles
    - i. Determine the nature and the number of elements in a finite sample space.
  - b. Computation and interpretation of probabilities
    - i. Compute and interpret the probability of an event and its complement.
    - ii. Compute and interpret the probability of [conditional and] compound events.
  - c. Measurement involving probability
    - i. Use probability to make informed decisions.
- 5. Statistical Reasoning
  - a. Design a study
    - i. Formulate a statistical question, plan an investigation, and collect data.
  - b. Describe data
    - i. Classify types of data.
    - ii. Construct appropriate visual representations of data.
    - iii. Compute and describe the study data with measures of center and basic notions of spread.
    - iv. Describe patterns and departure from patterns in the study data.
  - c. Analyze, interpret, and draw conclusions from data
    - i. Analyze data sets using graphs and summary statistics.
    - ii. Analyze relationships between paired data using spreadsheets, graphing calculators, or statistical software.
    - iii. Make predictions using summary statistics.
    - iv. Identify and explain misleading uses of data.
- 6. Functions
  - a. Recognition and representation of functions
    - i. Recognize if a relation is a function.
    - ii. Recognize and distinguish between different types of functions.
  - b. Analysis of functions
    - i. Understand and analyze features of a functions.
    - ii. Algebraically construct and analyze new functions.
  - c. Model real-world situations with functions
    - i. Apply known functions to model real-world situations.
    - ii. Develop a function to model a situation.
- 7. Problem Solving and Reasoning
  - a. Mathematical problem solving
    - i. Analyze given information.
    - ii. Formulate a plan or strategy.
    - iii. Determine a solution.
    - iv. Justify the solution.
    - v. Evaluate the problem-solving process.
  - b. Proportional reasoning
    - i. Use proportional reasoning to solve problems that require fractions, ratios, percentages, decimals, and proportions in a variety of contexts using multiple representations.
  - c. Logical reasoning
    - i. Develop and evaluate convincing arguments.
    - ii. Understand attributes and relationships with inductive and deductive reasoning.
  - d. Real-world problem solving
    - i. Interpret results of the mathematical problem in terms of the original real-world situation.
    - ii. Evaluate the problem-solving process.
- 8. Communication and Representation
  - a. Language, terms, and symbols of mathematics
    - i. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem.

- ii. Use mathematical language to represent and communicate the mathematical concepts in a problem.
  - iii. Use mathematical language for reasoning, problem solving, making connections, and generalizing.
  - b. Interpretation of mathematical work
    - i. Model and interpret mathematical ideas and concepts using multiple representations.
    - ii. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context.
  - c. Presentation and representation of mathematical work
    - i. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words.
    - ii. Create and use representations to organize, record, and communicate mathematical ideas.
    - iii. Explain, display, or justify mathematical ideas and arguments using precise mathematical language in written or oral communications.
9. Connections
- a. Connections among the strands of mathematics
    - i. Connect and use multiple key concepts of mathematics in situations and problems.
    - ii. Connect mathematics to the study of other disciplines.
  - b. Connections of mathematics to nature, real-world situations, and everyday life
    - i. Use multiple representations to demonstrate links between mathematical and real-world situations.
    - ii. Understand and use appropriate mathematical models in the natural, physical, and social sciences.
    - iii. Know and understand the use of mathematics in a variety of careers and professions.

**Major Assignments/Assessment:**

Faculty may assign both in- and out-of-class activities to evaluate students' knowledge and abilities. Faculty may choose from – but are not limited to -- the following methods: attendance, class preparedness and participation, collaborative learning projects, exams/tests/quizzes, homework, internet, library assignments, readings, research papers, scientific observations, student-teacher conferences, and written assignments.

The Mathematics Department does not accept late work.

**Assessment(s):**

1. Exam per Chapter
2. Comprehensive Final Exam

**Course Grade:**

Class Participation	10%
Homework/Quiz Average	15%
Exams	55%
Comprehensive Final Exam	20%

**Letter Grades for the Course will be assigned as follows:**

- A:  $90 < \text{Average} < 100$
- B:  $80 < \text{Average} < 90$
- C:  $70 < \text{Average} < 80$
- D:  $60 < \text{Average} < 70$

F: 00 < Average < 60

**TEXAS SUCCESS INITIATIVE (TSI):** You must have a C or better to complete your TSI requirements or pass the credit level MATH course with a C or better.

**Texts, Materials, and Supplies:**

- Canvas Access
- Desmos Calculator

**Other:**

- Courses conducted via video conferencing may be recorded and shared for instructional purposes by the instructor.
- For current texts and materials, use the following link to access bookstore listings: <https://www.panolacollegestore.com>
- For testing services, use the following link: <https://www.panola.edu/student-services/student-support/academic-testing-center>
- If any student in this class has special classroom or testing needs because of a physical learning or emotional condition, please contact the ADA Student Coordinator in Support Services located in the Charles C. Matthews Student Center or go to <https://www.panola.edu/student-services/student-support/disability-support-services> for more information.
- Panola College welcomes pregnant and parenting students as a part of the student body. This institution is committed to providing support and adaptations for a successful educational experience for pregnant and parenting students. Students experiencing a need for accommodations related to pregnancy or parenting will find a Pregnancy and Parenting Accommodations Request form in *The Pathfinder* or may request the form from the course instructor.
- Withdrawing from a course is the student's responsibility. Students who do not attend class and who do not withdraw will receive the grade earned for the course.
- Student Handbook, *The Pathfinder*: <https://www.panola.edu/> (located at the bottom under students)