

**KINGSBOROUGH COMMUNITY COLLEGE
THE CITY UNIVERSITY OF NEW YORK**

DEPARTMENT, COURSE NUMBER, AND TITLE:

Department of Mathematics & Computer Science, **MAT 00500 - Introduction to Mathematical Thought**

BULLETIN DESCRIPTION OF COURSE:

This course emphasizes quantitative reasoning skills for informed citizens to understand the world around them. Topics include basic probability, data analysis, and solution of elementary algebraic equations, word problems and modeling from data.

CREDITS AND HOURS: 3 Credits, 7 hours per week.

COURSE PREREQUISITES AND COREQUISITES:

Open to non-STEM students who have passed the arithmetic part of CUNY's entrance exam.

ENROLLMENT AND RATIONAL:

A. PROJECTED ENROLLMENT: 50-90 Students.

B. SUGGESTED CLASS LIMITS: 30 Students.

C. FREQUENCY COURSE IS LIKELY TO BE OFFERED: Course to be offered every term.

D. ROLE OF COURSE IN DEPARTMENT'S CURRICULUM AND COLLEGE'S MISSION:

Mathematics 5 is designed to provide the non-mathematics, non-science major students with an understanding of the role of mathematics in today's society.

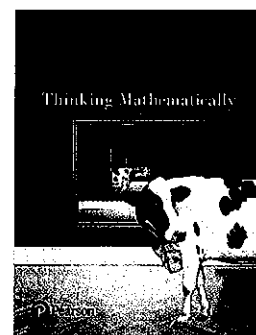
PROPOSED TEXT BOOK(S) AND/OR OTHER REQUIRED INSTRUCTIONAL MATERIAL(S):

Robert Blitzer, *Thinking Mathematically*, 7th Edition, Prentice Hall/Pearson Publishing, 2018.

WHAT STUDENTS WILL KNOW AND BE ABLE TO DO UPON COMPLETION OF COURSE:

Students will be able to evaluate solutions to problems for reasonableness using a variety of means, including estimation. Students will learn effective communication of quantitative analysis or solutions to mathematical problems. Students will have the basic knowledge of the usage of algebraic numerical, graphical, or statistical methods to draw accurate conclusions and solve mathematical problems. Students will understand the fundamentals of statistics. Students will know how to represent quantitative problems. Students will understand the principles of mathematical modeling. Students will understand the application of mathematical methods to problems in other fields of study.

METHODS OF TEACHING: Mathematics 5 is taught by classroom lecture and demonstration of specific mathematical concepts, operations, and procedures, combined with homework assignments designed to improve and solidify student understanding and mastery of these concepts, operations and procedures.



ASSIGNMENTS TO STUDENTS:

Assignments are taken from the textbook, and are chosen at the discretion of the instructor. Students may use a Scientific Calculator.

METHOD OF EVALUATING LEARNING:

Evaluation is based upon regular classroom examinations and a final examination. The instructor will administer a final exam that will constitute 40% of the final grade. The remaining 60% is to be divided between in-class tests, homework, and class participation at the discretion of the instructor. A final percentage of 60% or better will be deemed to sufficient to pass the course.

Topical Course Outline for the 12-week semester:

Data	Topics	Suggested Exercises
	<u>PART I:</u>	
	2.1~Basic Set Concepts (2 hr)	p.62-83,87,89,91,105,107.p.63-113,115
	2.2~Subsets (1 hr)	p.71-1,7,13,19,25,27,29,33,41,43,45,59,61
	2.3~Venn Diagrams and Set Operations (1 hr)	p.84-5,6,7,8,17,19,23,35odd,43,51,67,72,73,74,75,77,85,97,99,101,103
	2.4~Set Operations and Venn Diagrams with Three Sets (2 hr)	p.94-95-1,3,5,11,14,16,18,24,25,27,29,31,37,38,41,42
	5.2~The integers; Order of Operations (3 hr)	p.273-7,9,13,19,25,35,37,39,59,63,71,85,91,95,97,99
	6.1~Algebraic Expressions and Formulas (2 hr)	p.351-7,12,18,23,25,31,33,35,37,43,55,57
	6.2~Linear Equations in One Variable and Proportions (2 hr)	p.366-367-11,19,23,32,33,36,39,47,48,53,55,63,67,69,71,89,90,105
	6.3~Applications of Linear Equations (2 hr)	p.377-1,11. p.379-43,45,51,57
	9.1~Measuring Length: The Metric System (1 hr)	p.590-1-33 odd, 49,53
	9.3~Measuring Weight and Temperature (1 hr)	p.608-1-13 odd. p.609-19-31 odd, 37,41,45
	9.2~Measuring Area and Volume (2 hr)	p.599-600-3,5,7,13-23 odd, 29,33,39
	6.4~Linear Inequalities in One Variable (2 hr)	p.388-23,33,42,47,51,52,61,63
	5.4~The Irrational Numbers (4 hr)	p.300-301-11,19,23,31,33,41,49,51,55,59,63,65
	5.6~Exponents and Scientific Notation (2 hr)	p.324-325-15,17,29,33,35,39,41,45,55,67,73,77,79,85,91,97
	Review I. Homework I. EXAM I (2 hr)	
	<u>PART II:</u>	
	8.1~Percent, Sales Tax, and Discounts (2 hr)	p.501-7,13,31,37,41,43,47,49

8.3~Simple Interest (2 hr)	p.518-519-4,7,13,17,23,31,37
8.4~Compound Interest (3 hr)	p.527-16,17,19,21,25,31
6.5~Quadratic Equations (4 hr)	p.403-404-11,13,21,23,26,29,35,37,43,47,51,55
12.1~Sampling, Frequency Distributions, Graphs (4 hr)	p.782-783-8-16 all, 21
12.2~Measures of Central Tendency (2 hr)	p.797-798-6,13,23,27,37,50,51
12.3~Measures of Dispersion (2 hr)	p.806-4,11,18,27
12.4~The Normal Distribution (4 hr)	p.819-820-3,7,11,13,15,19,23,27,29,31,39,45,59,65
12.6~Scatter Plots, and Correlation (2 hr)	p.835-837-3,10,11,13,33
Review II. Homework II. EXAM II (2 hr)	
<u>PART III:</u>	
7.1~Graphing and Functions (1 hr)	p.422-21,23,25,33,43,47,55,57,58,59
7.2~Linear Functions and Their Graphs (4 hr)	p.435-3,9,11,15,19,23,29,39,43,45
7.3~Systems of Linear Equations in Two Variables (2hr)	p.449-450-13,15,17,19,33
11.1~The Fundamental Counting Principle (1 hr)	p.698-699-3,7,9,12,15
11.4~Fundamentals of Probability (2 hr)	p.721-723-1-10 all,11,13,15,19,21,26,27,31,35,37,39,41,45,67
11.6~Events Involving NOT and OR; Odds (2 hr)	p.741-743-3,5,6,13,15,17,19,25,27,31,35,37,69,73,75
11.7~Events Involving AND; Conditional Probability (2 hr)	p.753-755-1,3,5,15,19,31,33,35,65,67,69
11.2~Permutations (2 hr)	p.706-707-3,9,13,19,25,31,33,39,45,49
11.3~Combinations (2 hr)	p.713-714-1,3,5,13,15,17,19,31,37,47,51,55
11.8~Expected Value (1 hr)	p.761-762-3,7
7.6~Modeling Data; Quadratic Functions (2 hr)	p.480-481-9,13,29
Review III. Homework III. EXAM III (2 hr)	
<u>PART IV:</u>	
Review for FINAL EXAM (5 hr)	

Annex:

PART I: MAT 5~Introduction to Mathematical Thought (29 hrs)

Objectives:

1. Set Theory. Sets and Subsets. Operations with Sets. Venn Diagrams.
2. Operations with Integers. Order of Operations.
3. Evaluating Algebraic Expressions. 4.
- Solving Linear Equations. Solving Linear Equations with Fractions. Proportions.
5. Setting Up Problems. Solving Literal Equations.
6. Unit Conversions. Measuring Length, Weight and Temperature. Measuring Area and Volume.
7. Solving and Graphing Linear Inequalities. Solving and Graphing Compound Linear Inequalities.
8. Simplifying Square Roots. Performing Operations with Square Roots. Rationalizing the denominator.
9. Exponents and Scientific Notation.

PART II: MAT 5~Introduction to Mathematical Thought (27 hrs)

Objectives:

1. Solving applied problems involving percents, sales taxes and discounts.
2. Finding percent increase or decrease.
3. Calculating simple interest and accumulated balance using the future value formula.
4. Calculating compound interest, finding the principal and accumulated balance using formulas.
5. Understanding and computing effective annual yield.
6. Multiplying binomials using the FOIL method.
7. Factoring trinomials.
8. Solving quadratic equations by factoring and using the quadratic formula.
9. Identifying the population and sample using an appropriate sampling technique.
10. Organizing and presenting data in frequency tables and graphs, histograms and frequency polygons.
11. Determining measures of central tendency for a data set, mean, median, mode, midrange.
12. Determining measures of dispersion for a data set, range, standard deviation.
13. Recognizing characteristics of normal distributions.
14. Understanding and using the 68-95-99.7 Rule.
15. Finding a z-score and understanding percentiles and quartiles.
16. Using and interpreting margins of error and 95% Confidence Interval.
17. Interpreting a scatter plot for a table of data items, determining correlation and its causality.
18. Computing the correlation coefficient.

PART III: MAT 5~Introduction to Mathematical Thought (23 hrs)

Objectives:

1. Graph equations and functions in the rectangular coordinate system.
2. Graph a linear equation. Graph horizontal and vertical lines.
3. Calculate slope. Use slope and y -intercept to model data.
4. Decide whether an ordered pair is a solution of a linear system.
5. Solve linear systems. Solve problems using systems of linear equations.
6. Use the Fundamental Counting Principle to determine the number of possible outcomes in a given situation.
7. Compute theoretical and empirical probabilities.
8. Find the probability that an event will not occur, $P(\text{not } E)$.
9. Find the probability of one event or a second event occurring, $P(A \text{ or } B)$.
10. Understand and use odds.
11. Find the probability of successive events.
12. Compute conditional probabilities.
13. Evaluate factorial expressions.
14. Use the permutations formula.
15. Use the combinations formula.
16. Compute expected value.
17. Graph quadratic functions

PART IV: MAT 5~Introduction to Mathematical Thought (5 hrs)

Review for Final Exam