**BRONX COMMUNITY COLLEGE**

**of the City University of New York**

**DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE**

 **SYLLABUS: MTH 30 - Precalculus (4 Credits - 4 Hours per week)**

**Prerequisite: MTH 6 or equivalent, and if required ENG 2 and RDL 2**

**TEXT: Precalculus Essentials (Fifth Edition) by Robert Blitzer, Pearson**

 **ISBN 978-0-13-457815-6**

This course is a **Pathways Core B (Mathematical and Quantitative Reasoning) Course**:
A course in this area must meet all of the following learning outcomes. A student will:

1. Interpret and draw appropriate inferences from quantitative representations, such as formulas, graphs, or tables.
2. Use algebraic, numerical, graphical, or statistical methods to draw accurate conclusions and solve mathematical problems.
3. Represent quantitative problems expressed in natural language in a suitable mathematical format.
4. Effectively communicate quantitative analysis or solutions to mathematical problems in written or oral form.
5. Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation.
6. Apply mathematical methods to problems in other fields of study.

**Course Learning Outcomes (Pathways Learning Outcomes contributed to)**

On successful completion of this course a student will be able to:

1. Solve factorable polynomials equations and inequalities of at least 3rd degree in one real variable and 2nd degree rational equations and inequalities in one real variable (b, c, e)
2. Graph polynomial, rational, exponential, logarithmic, sine and cosine functions (b, d, e, f)
3. Verify trigonometric identities and solve trigonometric equations (b, d)
4. Employ transformations of functions algebraically and graphically as problem-solving tools (b, c)
5. Compute inverse functions and use their properties to obtain more precise algebraic  and graphical information about the corresponding original functions (a, b, c)
6. Demonstrate fluency with function notation and operations on functions including composition (b, c)
7. Identify whether a given graph or algebraic relation represents a function and analyze it to determine its particular properties such as domain and range, end behavior, asymptotes, and periodicity (a, c, d)
8. Form models to apply them in the solution of real-world problems such as involving exponential growth and decay and optimization in finance, biology, chemistry, or physics (a, b, c, d, e, f)

**SECTION TOPIC SUGGESTED EXERCISES**

**Functions and Graphs**

 1.2 Basics of Functions and their Graphs 176/ 11-31 (odd), 45, 47, 53-57, 71, 72, 75-81

 1.3 More on Functions and their Graphs 195/ 11, 15, 17, 23, 85-92, 97

 1.6 Transformations of Functions 241/ 1-87 (odd)

 l.7 Combinations of Functions; 258/ 5-11, 17-33, 51-59, 83-94

 Composite Functions

 1.8 Inverse Functions 269/ 1-5, 11-24, 29-37, 53-58

**SECTION TOPIC SUGGESTED EXERCISES**

**Polynomial and Rational Functions**

 2.2 Quadratic Functions 330/ 9-55 (odd)

 2.3 Polynomial Functions and Their Graphs 348/ 3-7, 15-21, 25, 27-33, 37, 39, 41-47

* 1. Dividing Polynomials; 363/ 13, 15, 17-25, 33-41

 Remainder and Factor Theorems

 2.5 Zeroes of Polynomial Functions 377/ 1-16, 17-31 (odd), 53-55, 58, 59

 2.6 Rational Functions and Their Graphs 398/ 1-14, 21-28, 37-43, 45, 49, 57, 63, 71, 77-80

 2.7 Polynomial and Rational Inequalities 412/ 1-23 (odd), 43-45, 55-57, 69, 70

**Exponential and Logarithmic Functions**

 3.1 Exponential Functions 448/ 11-17, 19-31, 35-37, 41, 43

 3.2 Logarithmic Functions 463/ 1-29, 43, 44, 47-53, 55, 59, 63, 71, 75-79, 81-89

 3.3 Properties of Logarithms 475/ 1-27, 35, 37, 41-57, 67, 71-77, 83-86

* 1. Exponential and Logarithmic Equations 488/ 1-21, 27-43, 49-57, 69-71, 87, 89

**Trigonometric Functions**

 4.1 Angles and Radian Measure 532/ 1-10, 13-28, 41-56, 60-63

* 1. Trigonometric Functions: 547/ 1-55

 The Unit Circle

 4.3 Right Triangle Trigonometry 560/ 3-15, 21-31

 4.4 Trigonometric Functions of Any Angle 575/ 1-21, 23-27, 35-43, 61-73

 4.5 Graphs of Sine and Cosine Functions 595/ 1-25 (odd), 43-49

 4.7 Inverse Trigonometric Functions 626/ 1-11, 19-41, 47-53, 63-67

**Analytic Trigonometry**

 5.1 Verifying Trigonometric Identities 658/ 1-35

 5.2 Sum and Difference Formulas 668/ 1, 3, 5, 13, 15, 21, 23, 33-36

 5.5 Trigonometric Equations 703/ 11, 15, 19-22, 25-28, 39, 41, 57, 59

8/06 (MM)

12/06 (AW)

01/16 (EA) for new edition

10/17 (EA) for Pathways compliance

03/18 (YH)