NEW YORK CITY COLLEGE OF TECHNOLOGY
The City University of New York

DEPARTMENT:	Mathematics
COURSE:	MAT 1375
TITLE:	Precalculus
DESCRIPTION:	Topics include an in-depth study of functions such as polynomial functions, radical functions, rational functions, trigonometric functions, exponential and logarithmic functions; connections to vectors and complex numbers; solving trigonometric equations, and identities involving sum, double and half-angle formulas; Binomial Theorem and progressions.
TEXTS:	Precalculus Second Edition By Thomas Tradler and Holly Carley Available on www.lulu.com PDF available from: websupport1.citytech.cuny.edu/faculty/ttradler/precalculus.html
CREDITS:	4
PREREQUISITES:	MAT 1275 or MAT 1275CO OR high school mathematics GPA of at least 85 and a successful completion of a high school math course of at least Algebra 2 OR NYS Regents Trigonometry score of at least 70 (or equivalent on Common Core Algebra 2).
	Prepared by Professor Thomas Tradler (Spring 2021)

A. Testing Guidelines:
The following exams should be scheduled:
1. A one-hour exam at the end of the First Quarter
2. A one-session exam at the end of the Second Quarter
3. A one-hour exam at the end of the Third Quarter
4. A one-session Final Examination

B. Graphing calculators are required.

Course Learning Outcomes

Course Learning Outcomes	General Education Learning Outcomes	Required Core: Mathematical and Quantitative Reasoning
Be able to graph functions involving polynomial, rational, radical, exponential, or trigonometric functions. Understand the relationship between the formula of a function, the domain and range of a function, the graph of a function, and equations involving a function.	Be able to draw conclusions and related outcomes from formulas and graphs of functions.	Interpret and draw appropriate inferences from quantitative representations, such as formulas, graphs, or tables.
Be able to analytically and graphically solve equations involving polynomial, rational, exponential, or trigonometric functions. Be able to identify features of a function such as maxima, minima, or asymptotes to identify features of the original problem.	Be able to analyze a function and its behavior.	Use algebraic, numerical, graphical, or statistical methods to draw accurate conclusions and solve mathematical problems .
Be able to frame word problems in terms of mathematical equations and/or graphs. Be able to interpret the mathematical solutions in terms of the original language of the problem.	Be able to use existing knowledge or views to phrase an application in terms of a mathematical problem, and be aware of the influence of its context and underlying assumptions. Be able to convert and represent relevant information into various mathematical forms.	Represent quantitative problems expres sed in natural language in a suitable mathematical format.
Be able to write solutions of mathematical problems involving polynomial, rational, exponential, or trigonometric functions with full detailed explanations. Be able to represent a mathematical setup using technology. Be able to answer questions concerning mathematical problems involving polynomial, rational, exponential, or trigonometric expressions orally or in written form.	Be able to perform calculations involving functions, and apply this to analyze a mathematical setup, including drawing appropriate conclusions based on quantitative analysis of data. Be able to give explanations of your conclusions, including its evidence.	Effectively communicate qua ntitative analysis or solutions to mathematical problems in written or oral form.
Be able to find solutions of equations and be able to identify the behavior of a mathematical setup using graphs of functions. Be able to use technology to find and check expected features. Be able to recognize error in proposed solutions and explain in written or oral form the nature of such an error as well as be able to correct it.	Be able to evaluate the underlying assumptions of an argument. Be able to recognize the limitations and implications of a mathematical setup.	Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation.
Be able to use a variety of mathematical representations of functions to express qualitative and quantitative features of a problem.	Be able to select an appropriate model of a given setup and interpret the information presented in mathematical form.	Apply mathematical methods to problems in other fields of study.

New York City College of Technology Policy on Academic Integrity

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

MAT 1375 - Precalculus

Textbook: "*Precalculus*" by Thomas Tradler and Holly Carley, Second Edition, available on www.lulu.com
PDF available from: http://websupport1.citytech.cuny.edu/faculty/ttradler/precalculus.html
WeBWorK: WeBWorK for MAT 1375 uses the OpenLab Q&A site: https://openlab.citytech.cuny.edu/ol-webwork/
Students will need an OpenLab account in order to post new questions.

Session	Topic	Homework	WeBWorK Set
1	1. The Absolute Value	1.1, 1.2, 1.3 (a)-(e), 1.4 (a)-(f), 1.6, 1.7 (a)-(f)	Interval Notation Absolute Value Inequalities
2	2. Lines and Functions	2.1 (a)-(c), 2.3 (a)-(c), 2.5-2.8 all	Lines Review Functions - Introduction to Functions
3	3. Functions by Formulas and Graphs	3.1 (a)-(b), 3.2, 3.4 (a)-(f), 3.6 (a)-(f), 3.7 (a)-(g) and (m)-(t), 3.8, 3.9	Functions - Difference Quotient Functions - Function Notation Functions - Piecewise
4	4. Introduction to the TI-84	4.1, 4.2 (a), 4.3 (c)-(i), 4.6	Graphing Calculator
5	5. Basic Functions and Transformations	5.1, 5.2 (a)-(f), 5.3 (a)-(d), 5.5 (a)-(e)	Functions - Symmetries Functions - Translations
6	6. Operations on Functions	6.1 (a)-(c), 6.2 (a)-(b), 6.3 (a)-(d), 6.4 (a)-(c), 6.5 (a)-(b), 6.6, 6.7	Functions - Operations
7	7. The Inverse of a Function	7.1 (a)-(c), 7.2 (a)-(f) and (l)-(p), 7.3 (a)-(c), 7.4 (a)-(c), 7.5 (a) and (d)	Functions - Inverse Functions
8	**First Examination**		
9	8. Dividing Polynomials (8.3 Synthetic Division is *optional*)	8.1 (a)-(c) and (j)-(k), 8.2, 8.3, 8.4 (a)-(d) (*optional*: 8.5 (a)-(d))	Polynomials - Division
10	9. Graphing Polynomials (9.3 Graphing Polynomials by Hand is *optional*)	9.1-9.3 all, 9.4 (a)-(c), 9.5 (a)-(c) (*optional*: 9.6)	Polynomials - Graphs Polynomials - Rational Roots
11	10. Roots of Polynomials (10.1 Rational Root Theorem is *optional*)	10.2 (a)-(d), 10.3 (a)-(c), 10.4 (a)-(c) and (f)-(h), 10.5 (a)-(c) and (f)-(i) (*optional*: 10.1)	Polynomials - Theory
12	11. Rational Functions (11.2 Graphing Rational Functions by Hand is *optional*)	11.1-11.4 all	Rational Functions - Domains Rational Functions - Asymptotes Rational Functions - Intercepts Rational Functions - Comprehensive
13	12. Polynomial and Rational Inequalities	12.1 (a)-(c), 12.2 (g)-(j), 12.4 (a)-(f), 12.5	Polynomials - Inequalities Rational Functions - Inequalities
14	13. Exponential and Logarithmic Functions	13.1 (a)-(f), 13.2 (a)-(e), 13.4, 13.5 (a)-(b), 13.6 (a)-(h)	Exponential Functions - Graphs Logarithmic Functions - Graphs

Session	Topic	Homework	WeBWorK Set
15	**Midterm Examination**		
16	14. Properties of Exp and Log	14.1 (a)-(e), 14.2 (a)-(f), 14.3 (a)-(c) and (e), 14.4 (e)-(g), 14.5 (a)-(e)	Logarithmic Functions - Properties Exponential Functions - Equations Logarithmic Functions - Equations
17	15. Applications of Exp and Log	15.1 (a)-(b), 15.3-15.8 all	Exponential Functions - Growth and Decay
18	16. Half-life and Compound Interest	16.1-16.7 all, 16.9 (a)-(c), 16.10 (a)-(e)	
19	17. Trigonometric Functions	17.1 (a)-(d) and (g)-(h), 17.3, 17.4, 17.5 (a)-(d), 17.6 (a)-(g)	Trigonometry - Unit Circle Trigonometry - Graphing Amplitude Trigonometry - Graphing Period Trigonometry - Graphing Phase Shift Trigonometry - Graphing Comprehensive
20	18. Addition of Angles and Multiple Angle Formulas	18.1 (a)-(e), 18.2 (a)-(b), 18.3 (a)-(d), 18.4 (a)-(d)	Trigonometry - Sum and Difference Formulas Trigonometry - Double and Half Angle Formulas
21	19. Inverse Trigonometric Functions	19.1, 19.2 (a)-(j), 19.3 (a)-(c) and (g)-(i)	Trigonometry - Inverse Functions
22	20. Trigonometric Equations	20.1 (a)-(d), 20.2 (a)-(c), 20.4 (a)-(k), 20.5 (a)	Trigonometry - Equations
23	**Third Examination**		
24	21. Complex Numbers	21.1 (a)-(c), 21.2 (b)-(e), 21.3 (a)-(c), 21.4 (a)-(d), 21.5 (c)-(d), 21.6 (a)-(d), 21.7 (a)-(d)	Complex Numbers - Operations Complex Numbers - Magnitude Complex Numbers - Direction Complex Numbers - Polar Form
25	22. Vectors in the Plane	22.1 (a) and (d), 22.2 (a)-(d), 22.3 (b)-(f) and (k)-(m), 22.4 (a)-(b)	Vectors - Magnitude and Direction Vectors - Operations Vectors - Unit Vectors
26	23. Sequences and Series	23.1 (a)-(c), 23.3 (a)-(d), 23.4 (a)-(d), 23.5 (a)-(b), 23.7 (a)-(b) and (e)-(i)	Sequences - Intro Series - Intro Sequences - Arithmetic Series - Finite Arithmetic
27	24. The Geometric Series	24.1 (a)-(d), 24.2 (a)-(c), 24.3 (a)-(b) and (e)-(i), 24.4 (c) and (f)-(i), 24.5 (a)	Sequences - Geometric Series - Geometric
28	25. The Binomial Theorem	25.1 (a) and (i)-(l), 25.2 (b), 25.3 (a)-(d), 25.4 (a)-(d), 25.5 (a)-(d), 25.6 (a)-(d)	Sequences - Binomial Theorem
29	**Review**	Final Exam Review Problems	
30	**Final Exam**		