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, inverse functions, radical functions, rational functions, trigonometric functions, exponential and logarithmic functions; solving inequalities; elements of vectors and complex numbers; solving trigonometric equations and identities involving sum, double and half-angle formulas; and progressions. A scientific calculator is required.
TEXT:	*Precalculus* by Thomas Tradler and Holly Carley, Third Edition
CREDITS:	4
PREREQUISITES:	MAT 1275 or MAT 1275CO OR Meet the Math Placement for MAT 1375
	Prepared by Prof. Thomas Tradler (Revised Fall 2023)

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. A scientific calculator is required.

Course-Based Learning Outcomes and Alignment with General Education Goals

Upon satisfactory completion of this course, the student will be able to:

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 expressed 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 quantitative 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, Third Edition, available on www.lulu.com
PDF available from: https://openlab.citytech.cuny.edu/mat1375coursehub/resources/textbook/

Class	**Topic**	**Homework**	**WeBWorK Set** *(Challenge Problems are optional.)*
1	1. Numbers and functions	1.1, 1.2, 1.3, 1.5, 1.6, 1.7	Interval Notation Functions - Introduction to Functions
2	2. Functions via formulas	2.1 (a)-(b), 2.2, 2.4 (b), (f)-(h), 2.6 (a), (c), (d), (f)-(h)	Functions - Difference Quotient Functions - Function Notation
3	3. Functions via graphs	3.1 (a)-(c), 3.2(a)-(c), 3.3 (a)-(g) and (m)-(t), 3.4, 3.5	Functions - Linear Functions Functions - Graphs
4	4. Basic functions and transformations *(4.2 Exploring Functions with Desmos is optional)*	4.1 (a)-(b), 4.2 (a)-(c) and (e), 4.8, 4.9 (a)-(f), 4.10 (a)-(d), 4.12 (a)-(e), *(optional: 4.3 (a)-(d), 4.4 (c))*	Functions - Graphing Calculator Functions - Translations Functions - Symmetries
5	5. Operations on functions	5.1 (a)-(c), 5.2 (a)-(b), 5.3 (a)-(d), 5.4 (a)-(c), 5.5 (a)-(b), 5.6, 5.7	Functions - Operations
6	6. The inverse of a function	6.1 (a)-(c), 6.2 (a)-(f) and (l)-(p), 6.3 (a)-(c), 6.4 (a)-(c), 6.5 (a) and (d)	Functions - Inverse Functions
7	7. Dividing polynomials *(7.3 Synthetic Division is optional)*	7.1 (a)-(c) and (j)-(k), 7.2, 7.3, 7.4 (a)-(d) *(optional: 7.5 (a)-(d))*	Polynomials - Division
8	8. Graphing polynomials *(8.3 Graphing Polynomials by Hand is optional)*	8.1-8.4 all, 8.5 (a)-(c), 8.7 (b), (g), (i), (j) *(optional: 8.8)*	Polynomials - Graphs
9	**First Examination**		
10	9. Roots of polynomials *(9.1 Rational Root Theorem is optional)*	9.3 (a), (c), (d), (e), (g), 9.4 (a), (b), (e), 9.5 (a), (b), (d), 9.6 (a)-(c) and (f)-(i) *(optional: 9.1 (a)-(c))*	Polynomials - Theory *(Polynomials - Rational Roots is optional)*
11	10. Rational functions *(10.2 Graphing Rational Functions by Hand is optional)*	10.1, 10.2, 10.3, 10.4 (a), (b)	Rational Functions - Domains Rational Functions - Asymptotes Rational Functions - Intercepts Rational Functions - Comprehensive
12	11. Exploring discontinuities and asymptotes *(11.2 Limits is optional)*	11.1, 11.2, 11.3 (a)-(d), 11.4 (a) *(optional: 11.5, 11.6 (a), (d)-(f))*	Rational Functions - Graphs *(Limits is optional)*
13	12. Solving inequalities	12.1 (a), (b), 12.2 (a)-(c), (h), 12.4 (a)-(c), 12.5 (a), (c)-(g)	Polynomials - Inequalities Rational Functions - Inequalities

Class	Topic	Homework	WeBWorK Set
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
15	14. Properties of log and log equations	14.1 (a)-(e), 14.2 (a)-(f), 14.3 (a), (b), (e)-(h)	Logarithmic Functions - Properties Logarithmic Functions - Equations
16	**Midterm Examination**		
17	15. Equations and applications of exp	15.1 (a)-(c) and (e), 15.2 (a)-(e) 15.3 (a)-(b), 15.5-15.10 all	Exponential Functions - Equations
18	16. Compound interest and half-life	16.2 (a)-(c), 16.3 (a)-(e), 16.4-16.10 all	Exponential Functions - Growth and Decay
19	17. Trigonometric functions reviewed	17.1 (a)-(d), 17.2 (a)-(d) 17.3 (a)-(i) and (q)-(s) 17.4 (a)-(c), 17.5 (a), (b), and (d)	Trigonometry - Unit Circle Trigonometry - Sum Difference and Half Angle Formulas
20	18. Graphing trigonometric functions	18.2, 18.3, 18.4 (a)-(d), 18.5 (c)-(j)	Trigonometry - Graphing Amplitude Trigonometry - Graphing Period Trigonometry - Graphing Phase Shift Trigonometry - Graphing Comprehensive
21	19. Inverse trigonometric functions	19.1, 19.2 (a)-(j), 19.3 (a)-(c) and (g)-(i)	Trigonometry - Inverse Functions
22	20. Solving trigonometric equations	20.1 (a)-(d), 20.2 (a)-(c), 20.4 (a)-(c), 20.5 (a)-(f)	Trigonometry - Equations
23	21. Trigonometric identities ***(21.2 Further Identities Revisited is optional)***	21.1 (a)-(b), 21.2 (a), 21.3 (c)-(g), 21.4 (a) and (e)-(f) ***(optional: 21.5 (a)-(b), 21.6 (b)-(c))***	Trigonometry - Identities
24	**Third Examination**		
25	22. Vectors in the plane	22.1 (a) and (d), 22.2 (a)-(c) and (e)-(h), 22.3 (b)-(e) and (k)-(l), 22.4 (a)-(b)	Vectors - Magnitude and Direction Vectors - Operations
26	23. Complex numbers	23.1 (a)-(c), 23.2 (b)-(e), 23.3 (a)-(c), 23.4 (a)-(d), 23.5 (a), 23.6 (a)-(d), 23.7 (a)-(d)	Complex Numbers - Operations Complex Numbers - Magnitude and Direction Complex Numbers - Polar Form
27	24. Sequences and series	24.1 (a)-(c), 24.3 (a)-(d), 24.4 (a)-(d), 24.5 (a)-(b), 24.7 (a)-(b) and (e)-(i)	Sequences - Intro Series - Intro Sequences - Arithmetic Series - Finite Arithmetic
28	25. The geometric series	25.1 (a)-(d), 25.2 (a)-(c), 25.3 (a) and (h) 25.4 (a) and (f)-(j), 25.5 (a)	Sequences - Geometric Series - Geometric
29	**Review**	Final Exam Review Problems	Final Exam Review
30	**Final Exam**		