

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

Prepared by Professor Thomas Tradler
(Spring 2013)

- 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 Intended Learning Outcomes/Assessment Methods

Learning Outcomes	Assessment Methods
1. <ul style="list-style-type: none"> • Solve absolute value equations algebraically. • Solve equations graphically. 	Classroom activities and discussion, homework, exams.
2. <ul style="list-style-type: none"> • Determine the domain, and range of a given function. • Find the sum, difference, product, quotient, and composition of functions. • Determine the effects of basic operations on graphs of functions. • Determine the inverse of a function, if it exists. • Determine the roots and relative extrema of polynomials. • Sketch the graphs of polynomial, rational, exponential, and logarithmic functions. • Solve equations involving polynomial, rational, exponential, and logarithmic functions. • Solve polynomial, rational and absolute value inequalities. 	Classroom activities and discussion, homework, exams.
3. <ul style="list-style-type: none"> • Find the amplitude, phase shift, and period of trigonometric functions. • Use the trigonometric identities, half- and double-angle formulas to modify trigonometric formulas. • Solve trigonometric equations 	Classroom activities and discussion, homework, exams.
4. <ul style="list-style-type: none"> • Write a complex number in rectangular and polar forms. • Multiply and divide two complex numbers in polar form. • Find the magnitude, direction angle, horizontal, and vertical components of a vector. 	Classroom activities and discussion, homework, exams.
5. Find <ul style="list-style-type: none"> • The n-th term of arithmetic and geometric sequences. • The n-th partial sums of arithmetic and geometric sequences. • Terms of a binomial expansion using the Binomial Theorem. 	Classroom activities and discussion, homework, exams.
6. Use a graphing calculator to assist in the above.	Classroom activities and discussion, homework, exams.

General Education Learning Outcomes/Assessment Methods

Learning Outcomes	Assessment Methods
1. Understand and employ both quantitative and qualitative analysis to solve problems.	Classroom activities and discussion, homework, exams.
2. Employ scientific reasoning and logical thinking.	Classroom activities and discussion, homework, exams.
3. Communicate effectively using written and oral means.	Classroom activities and discussion, homework, exams.
4. Use creativity to solve problems.	Classroom activities and discussion, homework, exams.

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.

Video Resources: All video resources listed below can be found at <https://openlab.citytech.cuny.edu/-groups-mat-1375-student-video-resources-/syllabus-with-links-to-videos/>

Session	Topic	Homework	WeBWorK Set	Video Resource
1	1. The absolute value	1.1, 1.2, 1.3 (a)-(e), 1.4 (a)-(f), 1.6, 1.7 (a)-(f)	Absolute Value Inequalities Interval Notation	The absolute value Interval notation
2	2. Lines and functions	2.1 (a)-(c), 2.3 (a)-(c), 2.5-2.8 all	Lines Functions - Intro	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 - Notation Functions - Difference Quotient	The difference quotient
4	4. Introduction to the TI-84	4.1, 4.2 (a), 4.3 (c)-(i), 4.6		
5	5. Basic functions and transformations	5.1, 5.2 (a)-(f), 5.3 (a)-(d), 5.5 (a)-(e)	Functions - Translations	Transformation of graphs
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	Operations on functions
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	The inverse of a function
8	First Examination			
9	8. Dividing polynomials (8.3 Synthetic division is <i>optional</i>)	8.1 (a)-(c) and (j)-(k), 8.2, 8.3, 8.4 (a)-(d) (<i>Optional</i> : 8.5 (a)-(d))	Polynomials - Division	Long division The remainder theorem
10	9. Graphing polynomials (9.3 Graphing polynomials by hand is <i>optional</i>)	9.1-9.3 all, 9.4 (a)-(c), 9.5 (a)-(c) (<i>Optional</i> : 9.6)	Polynomials - Graphs	Graphing polynomials
11	10. Roots of polynomials (10.1 Rational root theorem is <i>optional</i>)	10.2 (a)-(d), 10.3 (a)-(c), 10.4 (a)-(c) and (f)-(h), 10.5 (a)-(c) and (f)-(i) (<i>Optional</i> : 10.1)	Polynomials - Theory Polynomials - Rational Roots	Polynomials
12	11. Rational functions (11.2 Graphing rational functions by hand is <i>optional</i>)	11.1-11.4 all	Rational Functions - Domains Rational Functions - Intercepts Rational Functions - Asymptotes	Rational functions
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	Polynomial 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	Exponential and logarithms
15	Midterm Examination			

Session	Topic	Homework	WeBWorK Set	Video Resource
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 Logarithmic Functions - Equations Exponential Functions - Equations	Properties of logarithms Exponential equations
17	15. Applications of exp and log	15.1 (a)-(b), 15.3-15.8 all	Exponential Functions - Applications	Applications of exponential and logarithmic functions
18	16. Half-life and compound interest	16.1-16.7 all, 16.9 (a)-(c), 16.10 (a)-(e)	Exponential Functions - Half-life Exponential Functions - Compound Interest	Half-life and Compound Interest
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	Graphing trigonometric functions
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	Addition of angles and multiple angle formulas
21	19. Inverse trigonometric functions	19.1, 19.2 (a)-(j), 19.3 (a)-(c) and (g)-(i)	Trigonometry - Inverses	Inverse trigonometric functions
22	20. Trigonometric equations	20.1 (a)-(f), 20.2 (b)-(c), 20.4 (a)-(k), 20.5 (a)	Trigonometry - Equations	Trigonometric 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	Complex numbers
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 - Components Vectors - Magnitude and Direction Vectors - Unit Vectors	Vectors in the plane
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 - Arithmetic Series - Finite Arithmetic	Sequences and series
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	The geometric series
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	The binomial theorem
29	Review	Final Exam Review Problems		Selected final exam review questions solved
30	Final Exam			