

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

DEPARTMENT: Mathematics

COURSE: MAT 1275

TITLE: College Algebra and Trigonometry

DESCRIPTION: An intermediate and advanced algebra course. Topics include quadratic equations, systems of linear equations, exponential and logarithmic functions; topics from trigonometry, including identities, equations and solutions of triangles.

TEXT: College Algebra and Trigonometry by Alexander Rozenblyum, 2023 edition

CREDITS: 4

PREREQUISITES: MAT 1175 OR for New Students, scores of at least 45 on the Pre-Algebra part and 45 on the Algebra part of the CUNY Assessment Test in Mathematics.

Prepared by Professor Alexander Rozenblyum (Spring 2023)

- A. Testing/Assessment 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 INTENDED LEARNING OUTCOMES/ASSESSMENT METHODS

LEARNING OUTCOMES	ASSESSMENT METHODS
1. Solve <ul style="list-style-type: none">• Linear and fractional equations• One-variable quadratic equations by factoring, completing the square, and the quadratic formula• Radical and exponential equations• Systems of equations	Classroom activities and discussion, homework, exams.
2. Perform operations with and simplify polynomial, rational, radical, complex, exponential, and logarithmic expressions.	Classroom activities and discussion, homework, exams.
3. Apply their knowledge of algebra and trigonometry to solve verbal problems.	Classroom activities and discussion, homework, exams.
4. <ul style="list-style-type: none">• Solve problems involving right and oblique triangles.• Prove trigonometric identities.• Solve trigonometric equations• Graph the sine and cosine function.	Classroom activities and discussion, homework, exams.
5. Apply the distance and midpoint formulas and determine the graphs of circles and parabolas.	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.

MAT 1275 - College Algebra and Trigonometry Course Outline

Textbook: College Algebra and Trigonometry by Alexander Rozenblyum, 2022 edition

Link to textbook: <https://openlab.citytech.cuny.edu/groups/mat-1275-d534-rozenblyum-spring-2018/files/>

Video Resources: All video resources listed below can be found at <https://openlab.citytech.cuny.edu/math1275videolibrary/syllabus-with-links-to-videos/>

Class	Chapter/Lesson	Suggested Class Problems (Even numbers)	Homework (Odd numbers)	WebWork Sets	Video Resources
1	1) Systems of Three Linear Equations in Three Variables 1A) Determinants and Cramer's Rule (Optional)	<u>P. 8:</u> 1.2 <u>P. 16:</u> 1A2 – 1A.6 even	<u>P. 8:</u> 1.1 <u>P. 16:</u> 1A1 – 1A.5 odd	3x3-Systems	Linear Systems of Three Variables Determinants and Cramer's Rule
2	2) Quadratic Equations: Factored Form	<u>P. 22:</u> 2.2 – 2.8	<u>P. 22:</u> 2.1 –2.7	ZeroProductProperty	Factoring and the Zero Product Rule (review)
3	3) Integer Exponents	<u>P. 30:</u> 3.2 – 3.24	<u>P. 30:</u> 3.1 – 3.23	IntegerExponents	
4	4)Rational Expressions and Complex Fractions	<u>P. 42:</u> 4.2 – 4.48	<u>P. 42:</u> 4.1 – 4.47	ReducingRationalExpressions AddRationalExpressions AddRationalExpressions2 ComplexFractions-Method1 ComplexFractions-Method2	Nested Fractions
5	5) Rational Equations	<u>P. 50:</u> 5.2 – 5.20	<u>P. 50:</u> 5.1 – 5.19	FractionalEquations	Solving Rational Equations
6	6) Radicals and Fractional Exponents	<u>P. 59:</u> 6.2 – 6.16	<u>P. 59:</u> 6.1 – 6.15	HigherRoots HigherRoots-Algebraic RationalExponents SimplifyingRadicals	Introduction to Rational Exponents and Radicals Roots and Radicals—Simplifying Radical Expressions I
7	7) Multiplication, Addition and Subtraction of Radical Expressions	<u>P. 65:</u> 7.2 – 7.26	<u>P. 65:</u> 7.1 – 7.25	MultiplyRadicals AddSubtractRadicals	Adding and Subtracting Rational Expressions Multiplying and Dividing Rational Expressions (review)

Class	Chapter/Lesson	Suggested Class Problems (Even numbers)	Homework (Odd numbers)	WebWork Set	Video Resources
8	8) Rationalizing the Denominators and Solving Radical Equations	<u>P. 73</u> : 8.2 – 8.30	<u>P. 73</u> : 8.1 – 8.29	RationalizeDenominators RadicalEquations	Division of Radicals and Rationalization Solving Radical Equations
9	Exam 1				
10	9) Complex Numbers and Squared Form of Quadratic Equations	<u>P. 81</u> : 9.2 – 9.12	<u>P. 81</u> : 9.1 – 9.11	ComplexNumbers SquareRootProperty	Complex Numbers Square Root Property
11	10) Completing the Square and the Quadratic Formula	<u>P. 89</u> : 10.2 – 10.8	<u>P. 89</u> : 10.1 – 10.7	QuadraticFormula	Completing the Square Quadratic Formula Applications of Quadratic Equations
12	11) Parabolas	<u>P. 101</u> : 11.2 – 11.8	<u>P. 101</u> : 11.1 – 11.7	ShiftingParabolas ParabolaVertices ParabolaVertices-CtS ParabolaVertices-VertexFormula	Graphing Quadratic Functions
13	12) Distance Formula, Midpoint Formula, and Circles	<u>P. 110</u> : 12.2 – 12.14	<u>P. 110</u> : 12.1 – 12.13	DistanceFormula Circles	Pythagorean Theorem (review!) Distance Formula Midpoint Formula
14	13) Nonlinear Systems of Equations in Two Variables	<u>P. 116</u> : 13.2 – 13.4	<u>P. 116</u> : 13.1 – 13.3	NonLinearSystems	Nonlinear Systems of Equations
15	14) Geometric and Trigonometric Angles	<u>P. 125</u> : 14.2 – 14.6	<u>P. 125</u> : 14.1 – 14.5	SpecialTriangles	Special Triangles

Class	Chapter/Lesson	Suggested Class Problems (Even numbers)	Homework (Odd numbers)	WebWork Set	Video Resources
16	15) Trigonometric Functions for Acute Angles	P. 133 : 15.2 – 15.32	P. 133 : 15.1 – 15.31	TrigonometryRatios SolvingRightTriangles SolvingRightTriangles-InverseTrig TrigApplications	Trigonometry of Right Triangles
17	Exam 2 (Midterm)				
18	16) Trigonometric Functions for Arbitrary Angles	P. 144 : 16.2 – 16.12	P. 144 : 16.1 – 16.11	CoordinatePlaneTrig	Unit Circle
19	17) Solving Oblique Triangles – Law of Sines	P. 153 : 17.2 – 17.18	P. 153 : 17.1 – 17.19	LawOfSines	Law of Sines
20	18) Solving Oblique Triangles – Law of Cosines	P. 161 : 18.2 – 18.10	P. 161 : 18.1 – 18.9	LawOfCosines	Law of Cosines
21	19) Radian Measure of Angles	P. 168 : 19.2 – 19.12	P. 168 : 19.1 – 19.11	AngleMeasure-Radians UnitCircle	Angle Measure in Radians
22	20) Graph and Basic Function for Sine	P. 176 : 20.2 – 20.6	P. 176 : 20.1 – 20.5	GraphingSineCosine	Graphs of Sine, Cosine, and Tangent (Basic) Trigonometric Equations
23	21) Graphs and Basic Functions for Cosine and Tangent	P. 183 : 21.2 – 21.10	P. 183 : 21.1 – 21.9	GraphingSineCosine	Graphs of Sine, Cosine, and Tangent (Basic) Trigonometric Equations

24	22) Trigonometric Identities and None-Basic Equations	P. 189: 22.2 – 22.26	P. 189: 22.1 – 22.25	TrigEquations	Pythagorean Identity (The Fundamental Identity of Trigonometry)
Class	Chapter/Lesson	Suggested Class Problems (Even numbers)	Homework (Odd numbers)	WebWork Set	Video Resources
25	Exam 3				
26	23) Logarithms	P. 198: 23.2 – 23.22	P. 198: 23.1 – 23.21	LogarithmicProperties	Properties of Logarithms
27	24) Exponential and Logarithmic Functions	P. 207: 24.2 – 24.12	P. 207: 24.1 – 24.11	ExponentialFunctions LogarithmicFunctions ExponentialEquations ExponentialEquations-Calc	Exponential Functions Logarithmic Functions
28	25) Compound Interest and Number e	P. 215: 25.2 – 25.8	P. 215: 25.1 – 25.7	CompoundInterest	Compound Interest
29	Review				Selected final exam review questions
30	Final Exam				