

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.

TEXTS: A custom edition by McGraw-Hill:

- 1) Intermediate Algebra by Miller, O'Neill, and Hyde, 5th edition, and
- 2) Trigonometry by Coburn, 2nd edition

CREDITS: 4

PREREQUISITES: MAT 1175 OR high school mathematics GPA of at least 70 and a successful completion of at a high school math course of least Algebra 1 OR NYS Regents Algebra 1 score of at least 75 OR NYS Regents Geometry score of at least 70.

Updated Spring 2020 by H. Carley, A. Masuda, and K. Poirier

- 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**

Textbooks: McGraw-Hill Custom Textbook containing material from:

- 1) Intermediate Algebra by Miller, O'Neill, and Hyde, 5th edition (Classes 1-16 and 26-29)
- 2) Trigonometry by Coburn, 2nd edition (Classes 18-25).

WeBWorK: WeBWorK for MAT1275 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.

Class	Lesson	Section	Homework	WeBWorK Set
1	Properties of Integer Exponents Addition and Subtraction of Rational Expressions	4.1, p.320-323 5.3, p.437-444	<u>p.327</u> : 11-29 odd, 33, 35, 41, 47, 63, 67, 75 <u>p.445</u> : 7-23, 27-49 odd	IntegerExponents ReducingRationalExpressions AddRationalExpressions AddRationalExpressions2
2	Complex Fractions	5.4, p.447-452	<u>p.452</u> : 9-15, 17-23 odd, 31, 33	ComplexFractions-Method1 ComplexFractions-Method2
3	Solving Rational Equations	5.5, p.454-460	<u>p.460</u> : 9-33 odd, 49, 53	FractionalEquations
4	Roots Rational Exponents	6.1, p.496-502 6.2, p.508-511	<u>p.505</u> : 9-37 odd, 59, 65, 67, 79, 81 <u>p.513</u> : 9, 13, 17, 19, 25, 29, 33, 41, 45, 53, 65, 73, 81, 93	HigherRoots HigherRoots-Algebraic RationalExponents
5	Simplifying Radical Expressions Addition and Subtraction of Radicals	6.3, p.515-519 (skip Ex. 2, 5) 6.4, p.522-525	<u>p.520</u> : 9, 13, 17, 21, 25, 33, 55, 59, 63, 79 <u>p.526</u> : 15, 19, 23, 35, 37, 41, 51, 55, 57, 61, 81	SimplifyingRadicals AddSubtractRadicals
6	Multiplication of Radicals	6.5, p.528-532 (skip Ex. 1c, 5b, 5c, 8)	<u>p.534</u> : 11, 17, 19, 21, 23, 25, 29, 31, 35, 37, 55, 57, 61, 63, 67, 77, 79, 87	MultiplyRadicals
7	Division of Radicals and Rationalization	6.6, p.536-543 (skip Ex. 1b, 2, 3b, 3c, 4, 6)	<u>p.544</u> : 11, 13, 17, 21, 31, 35, 39, 53, 57, 63, 67, 71, 77, 81	RationalizeDenominators
8	Solving Radical Equations	6.7, p.546-549 (skip Ex. 2, 3, 5)	<u>p.554</u> : 13-18, 25-28, 41-46	RadicalEquations
9	Exam 1 Complex Numbers	6.8, p.556-563	<u>p.564</u> : 15-27, 31-35, 53-57, 61-69, 81-89 odd	ComplexNumbers
10	Solving Equations by Using the Zero Product Rule	4.8, p.394-397 (skip Ex. 5)	<u>p.404</u> : 21-40	
11	Square Root Property and Completing the Square Quadratic Formula	7.1, p.582-587	<u>p.589</u> : 3-19, 27-33, 37-53 odd	SquareRootProperty
		7.2, p.592-594, p.596-602, derive the quadratic formula	<u>p.603</u> : 9-25, 49-55 odd, 63-67 odd, 69, 73, 77, 81, 85	QuadraticFormula
12	Applications of Quadratic Equations	4.8, p.398-400 7.2, p.594-596	<u>p.405</u> : 65, 69, 71, 73, 75 <u>p.603</u> : 39-47 odd	
13	Graphs of Quadratic Functions Vertex of a Parabola	7.4, p.612-620 7.5, p.626-631 (skip Ex. 5)	<u>p.621</u> : 11-15, 19-23, 29-35, 45, 47, 51-61 odd <u>p.633</u> : 17-23 odd, 29, 31, 37, 41, 43, 55, 57	ShiftingParabolas ParabolaLab ParabolaVertices-CtS ParabolaVertices-VertexFormula

Class	Lesson	Section	Homework	WeBWorK Set
14	Distance Formula, Midpoint Formula, and Circles Perpendicular Bisector	9.1, p.754-759	<u>p.760</u> : 5, 9, 11, 13, 23-31 odd, 39, 41, 45, 61, 63, 65, 69, 75 Supplemental problems on perpendicular bisectors	DistanceFormula CircleLab Circles
15	Systems of Linear Equations in Three Variables	3.6, p.283-289	<u>p.290</u> : 11-17 odd, 21, 23, 27, 35-39 odd	3 × 3-Systems
16	Determinants and Cramer's Rule (optional) Nonlinear Systems of Equations in Two Variables	A.1, p.A-1 to A-9 9.4, p.784-788	<u>p.A-10</u> : 35-45 odd, 49, 55, 57 <u>p.790</u> : 23-37 odd, 49, 53 (optional)	NonLinearSystems
17	Exam 2 (Midterm)			
18	Angle Measure and Special Triangles The Trigonometry of Right Triangles	1.1, p.2-6 2.1, p.46-50	<u>p.7</u> : 45-57 odd <u>p.51</u> : 7-21 odd	SpecialTriangles TrigonometryRatios
19	Solving Right Triangles Applications of Static Trigonometry	2.2, p.54-56 2.3, p.63-66	<u>p.57</u> : 7-47 odd <u>p.69</u> : 35-38	SolvingRightTriangles SolvingRightTriangles- InverseTrig
20	Angle Measure in Radian Trigonometry and the Coordinate Plane	3.1, p.90-93 1.3, p.22-27	<u>p.95</u> : 25-39 odd, 43, 45, 49-61 odd, 67-71 odd <u>p.28</u> : 25-31 odd, 45, 47, 55-63 odd, 64, 73-79 odd	AngleMeasure-Radians CoordinatePlaneTrig
21	Unit Circles	3.3, p.108-113	<u>p.115</u> : 29-35 odd, 37-40	UnitCircle
22	Graphs of the Sine and Cosine Functions Graphs of the Tangent and Cotangent Functions (optional)	4.1, p.134-144 4.2, p.153-159	<u>p.145</u> : 1-3, 17-29 odd, 33-39 odd <u>p.160</u> : 15, 19, 21, 39, 43, 47	GraphingSineCosine
23	Fundamental Identities and Families of Identities	1.4, p.31-35 5.1, p.212-214	<u>p.35</u> : 11-37 odd <u>p.216</u> : 13-29 odd, 37, 43, 51	
24	Trigonometric Equations	6.3, p.284-290	<u>p.292</u> : 13, 17, 21, 25, 31, 35, 43-49 odd, 79, 80	TrigEquations
25	Oblique Triangles and the Law of Sines The Law of Cosines	7.1, p.316-322 7.2, p.329-332	<u>p.324</u> : 7-23 odd <u>p.338</u> : 7-11 odd, 21-29 odd	LawOfSines LawOfCosines
26	Exam 3 Exponential Functions	8.3.1, 8.3.2, 8.3.4, p.680-686	<u>p.687</u> : 9-25 odd, 43, 49	ExponentialFunctions
27	Logarithmic Functions	8.4, p.690-693, and Ex. 8, 9	<u>p.699</u> : 11-61 odd	LogarithmicFunctions
28	Properties of Logarithms Compound Interest	8.5, p.704-709 8.6, p.712-715 (skip Ex. 3)	<u>p.710</u> : 17-29 odd, 45-55 odd, 63-64, 67-71, 79, 81, 91 <u>p.721</u> : 11,13	LogarithmicProperties CompoundInterest
29	Logarithmic and Exponential Equations	8.7, p.726-734	<u>p.735</u> : 39-49 odd, 55-61 odd, 73, 75, 77, 79, 87	ExponentialEquations ExponentialEquations- Calc
30	Final Exam			