

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

<b>DEPARTMENT:</b>	Mathematics
<b>COURSE:</b>	MAT 1275
<b>TITLE:</b>	College Algebra and Trigonometry
<b>DESCRIPTION:</b>	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.
<b>TEXTS:</b>	A custom edition by McGraw-Hill:  1) Intermediate Algebra by Miller, O'Neill, and Hyde, 5 <sup>th</sup> edition, and  2) Trigonometry by Coburn, 2 <sup>nd</sup> edition
<b>CREDITS:</b>	4
<b>PREREQUISITES:</b>	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

Course Learning Outcomes	General education Learning Outcomes	Required Core: Mathematical and Quantitative Reasoning
Be able to simplify and manipulate linear, quadratic, radical, rational, exponential, logarithmic, and trigonometric expressions.	FS: Transfer; Be able to refer to prior knowledge or skill and can apply such to new situations.	Be able to use algebraic, numerical, graphical, or statistical methods to draw accurate conclusions and solve mathematical problems.
Be able to solve equations involving linear, quadratic, radical, rational, exponential, logarithmic, or trigonometric expressions as well as systems of linear/quadratic equations.	Foundation and skills: Curiosity: Explore a topic in depth yielding insight indicating interest.; QL: Interpretation, presentation: Be able to explain information presented in mathematical forms and to convert relevant information into various mathematical forms.	Interpret and draw appropriate inferences from quantitative representations, such as formulas, graphs, or tables.
Be able to graphically solve equations involving linear and quadratic expressions (including systems of such). Be able to use the unit circle to solve trigonometric equations. Understand the relationships between solutions to equations and their graphs.	FS: Transfer; Be able to refer to prior knowledge or skill and can apply such to new situations. QL: Calculation, Application/Analysis: Be able to carry out accurate calculations in order to solve a problem and to make judgements and draw appropriate conclusions based on the quantitative analysis of data, while recognizing the limits of this analysis.	Be able to 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.	FS: Independence, reflection: Pursue knowledge beyond classroom requirements and/or show interest in independent educational experiences and reviews prior learning leading to clarification and broader perspectives.	Be able to represent quantitative problems expressed in natural language in a suitable mathematical format and apply mathematical methods to problems in other fields of study.
Be able to write solutions of mathematical problems involving linear, quadratic, radical, rational, or trigonometric expressions with full detailed explanations.	QL: Communication: Be able to express quantitative evidence in support of the argument or purpose of the work.	Be able to effectively communicate quantitative analysis or solutions to mathematical problems in written or oral form.
Be able to recognize errors 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 estimate solutions of equations using graphs.	FS: Initiative: Complete required work and identifies and pursues additional expansion or knowledge or skills. QL: Assumption. Be able to make and evaluate important assumptions in estimation and modeling.	Be able to evaluate solutions to problems for reasonableness using a variety of means, including informed estimation.

**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, 5<sup>th</sup> edition (Classes 1-16 and 26-29)
- 2) Trigonometry by Coburn, 2<sup>nd</sup> 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	<b>Exam 1</b> 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	<b>Exam 2 (Midterm)</b>			
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	<b>Exam 3</b> 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	<b>Final Exam</b>			