

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

<b>DEPARTMENT:</b>	Mathematics
<b>COURSE:</b>	MAT 1275CO
<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, 6 <sup>th</sup> edition, and  2) Trigonometry by Coburn, 2 <sup>nd</sup> edition
<b>CREDITS:</b>	4
<b>PREREQUISITES:</b>	CUNY proficiency in math OR credit for MAT 1190/MAT 1190CO.

Updated by Professors Holly Carley and Ariane Masuda in Spring 2022

- 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 1275CO - College Algebra and Trigonometry  
Course Outline**

**Textbooks:** McGraw-Hill Custom Textbook containing material from:

- 1) Intermediate Algebra by Miller, O'Neill, and Hyde, 6<sup>th</sup> edition (Classes 1-23 and 39-42)
- 2) Trigonometry by Coburn, 2<sup>nd</sup> edition (Classes 26-38).

**WeBWorK:** WeBWorK for MAT 1275CO 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	<u>Lines Review:</u> - Equations: Slope-intercept and Point-slope - Slope Formula and Intercepts - Parallel and Perpendicular Through Points - Graphing	2.1, p.142-151 (skip Ex. 7) 2.2, p.160-166 (skip Ex. 1, 8) 2.3, p.173-179	<u>p.155:</u> 15-29 odd <u>p.169:</u> 13-23 odd, 39-51 odd <u>p.183:</u> 7-17 odd, 25-29 odd, 33-73 odd	LinesReview GraphingLines LineLab
2	2-D Systems of Equations Substitution and Elimination Applications of Systems of Linear Equations in Two Variables (optional)	3.2, p.262-266 3.3, p.271-275 (skip Ex. 3-4) 3.4, p.279-284 (skip Ex. 3)	<u>p.269:</u> 9-21 odd, 25, 35-37 <u>p.277:</u> 5-11 odd, 15, 19, 23, 33, 35, 41 <u>p.287:</u> 5, 9, 11, 27, 23, 29	LinearSystems
3	3-D Systems of Equations	3.6, p.305-312	<u>p.315:</u> 11-17 odd, 21, 23, 27, 35-39 odd	3 × 3-Systems
4	GCF Factoring and Factoring by Grouping	4.5, p.388-392 (skip Ex. 6)	<u>p.394:</u> 3-19 odd, 25-31 odd, 39-43 odd, 65	GCF-Grouping
5	Difference of Squares and <i>ac</i> -method	4.6, p.396-407 4.7, p.411-418	<u>p.409:</u> 9-35 odd, 55-58, 87, 88, 91, 93-95 <u>p.420:</u> 11-17, 59, 60, 95, 96	DifferenceOfSquares AC-Method
6	Solving Equations by Using the Zero Product Rule	4.8, p.425-428 (skip Ex. 5)	<u>p.437:</u> 21-40	ZeroProductProperty
7	Square Root Property and Completing the Square	7.1, p.626-631	<u>p.634:</u> 3-19, 27-33, 37-53 odd	SquareRootProperty
8	Quadratic Formula and Applications	7.2, p.638-648 (derive the quadratic formula)	<u>p.650:</u> 9-25, 39-47 odd, 49-55 odd, 63-69 odd, 73, 77, 81, 85	QuadraticFormula
9	Complex Numbers	6.8, p.602-609	<u>p.611:</u> 15-27, 31-35, 53-57, 61-69, 81-89 odd	ComplexNumbers
10	Graphs of Quadratic Functions Vertex Formula and Standard Form	7.4, p.662-669 7.5, p.677-681	<u>p.672:</u> 11-15, 19-23, 29-35, 45, 47, 51-61 odd <u>p.685:</u> 3-9 odd, 15, 17, 23, 27, 29, 41, 43	ParabolaLab ShiftingParabolas ParabolaVertices-CtS ParabolaVertices-VertexFormula
11	<b>Review</b>			
12	<b>Exam 1</b> Distance Formula (Pythagorean Theorem)	9.1, p.810-814	<u>p.817:</u> 5, 9, 11, 13, 23-31 odd, 39, 41, 45, 61, 63, 65, 69, 75  Supplemental problems on perpendicular bisectors	DistanceFormula Circles CircleLab
13	Midpoint Formula Circles (complete the square and standard form) Perpendicular Bisector			

Class	Lesson	Section	Homework	WeBWorK Set
14	Nonlinear Systems of Equations in Two Variables	9.4, p.843-845	<u>p.848</u> : 15-29 odd, 41 (optional), 47	NonLinearSystems
15	Rational Expressions Multiplication and Division of Rational Expressions Addition and Subtraction of Rational Expressions	5.1, p.454-460 (skip Ex. 1, 2, 5) 5.2, p.465-467 5.3, p.471-478	<u>p.463</u> : 31-39 odd, 43, 48, 65-73 odd <u>p.469</u> : 7-17 odd, 23-31 odd <u>p.480</u> : 7-23, 27-49 odd	ReducingRationalExpressions AddRationalExpressions AddRationalExpressions2
16	Complex Fractions	5.4, p.483-486	<u>p.489</u> : 3-9, 11-17 odd, 25, 27	ComplexFractions-Method1 ComplexFractions-Method2
17	Solving Rational Equations	5.5, p.491-496	<u>p.498</u> : 9-33 odd, 49, 53	FractionalEquations
18	Properties of Integer Exponents	4.1, p.342-345	<u>p.350</u> : 11-29 odd, 33, 35, 41, 47, 63, 67, 75	IntegerExponents
19	Roots Rational Exponents	6.1, p.534-540 6.2, p.547-550	<u>p.543</u> : 9-37 odd, 59, 65, 67, 79, 81 <u>p.552</u> : 9, 13, 17, 19, 25, 29, 33, 41, 45, 53, 65, 73, 81, 93	HigherRoots HigherRoots-Algebraic RationalExponents
20	Simplifying Radical Expressions Addition and Subtraction of Radicals	6.3, p.555-559 (skip Ex. 2, 5) 6.4, p.563-566	<u>p.561</u> : 9, 13, 17, 21, 25, 33, 55, 59, 63, 79 <u>p.567</u> : 15, 19, 23, 35, 37, 41, 51, 55, 57, 61, 81	SimplifyingRadicals AddSubtractRadicals
21	Multiplication of Radicals	6.5, p.570-574 (skip Ex. 1c, 5b, 5c, 8)	<u>p.576</u> : 11, 17, 19, 21, 23, 25, 29, 31, 35, 37, 55, 57, 61, 63, 67, 77, 79, 87	MultiplyRadicals
22	Division of Radicals and Rationalization	6.6, p.579-585 (skip Ex. 1b, 2, 3b, 3c, 4, 6)	<u>p.587</u> : 3, 5, 9, 13, 23, 27, 31, 45, 49, 55, 59, 63, 69, 73	RationalizeDenominators
23	Solving Radical Equations	6.7, p.591-594 (skip Ex. 2, 3, 5)	<u>p.600</u> : 13-18, 25-28, 41-46	RadicalEquations
24	<b>Review</b>			
25	<b>Exam 2 (Midterm)</b>			
26-27	Angle Measure Special Triangles	1.1, p.2-6	<u>p.7</u> : 45-57 odd	SpecialTriangles
28	Similar Triangles and Proportions	2.1, p.46-50	<u>p.51</u> : 7-21 odd	
29	Trigonometric Ratios of Right Triangles Inverse Trigonometric Functions	2.2, p.54-56	<u>p.57</u> : 7-47 odd	TrigonometryRatios SolvingRightTriangles- InverseTrig
30	Solving Right Triangles Applications	2.3, p.63-66	<u>p.69</u> : 35-38	SolvingRightTriangles TrigApplications
31	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
32	Unit Circles	3.3, p.108-113	<u>p.115</u> : 29-35 odd, 37-40	UnitCircle
33	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
34	Fundamental Identities Proving Trigonometric Tautologies	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	
35	Trigonometric Equations	6.3, p.284-290	<u>p.292</u> : 13, 17, 21, 25, 31, 35, 43-49 odd, 79, 80	TrigEquations

Class	Lesson	Section	Homework	WeBWorK Set
36	<b>Review</b>			
37	<b>Exam 3</b> Law of Sines	7.1, p.316-322	<u>p.324</u> : 7-23 odd	LawOfSines
38	Law of Cosines	7.2, p.329-332	<u>p.338</u> : 7-11 odd, 21-29 odd	LawOfCosines
39	Exponential Functions	8.3.1, 8.3.2, 8.3.4, p.680-686	<u>p.687</u> : 9-25 odd, 43, 49	ExponentialFunctions
40	Logarithmic Functions	8.4, p.690-693 and p.696-697	<u>p.699</u> : 11-61 odd	LogarithmicFunctions
41	Properties of Logarithms	8.5, p.704-709	<u>p.710</u> : 17-29 odd, 45-55 odd, 63-64, 67-71, 79, 81, 91	LogarithmicProperties
	Compound Interest	8.6, p.712-715 (skip Ex. 3)	<u>p.721</u> : 11,13	CompoundInterest
42	Exponential Equations Applications to Compound Interest, Population Growth	8.7, p.726-734	<u>p.735</u> : 39-49 odd, 55-61 odd, 73, 75, 77, 79, 87	ExponentialEquations ExponentialEquations-Calc
43-44	<b>Review</b>			
45	<b>Final Exam</b>			