

# MATH 111 Mathematical Models for the Management Sciences

## Fall 2018

**Instructor:** Roger Reakes

**Office:** 161B Trexler Hall

**Phone:** 375-2450

**Email:** reakes@roanoke.edu

### Office Hours:

Monday and Wednesday 1:00 pm to 3:00 pm

Tuesday and Thursday 8:30 am to 10:00 am

All office hours are by appointment. To make an appointment, please use the link:

<https://rreakes24.youcanbook.me>

*If these hours do not work with your schedule, please call or email me to set up an appointment.*

**Text:** *Mathematical Applications for the Management, Life, and Social Sciences, (10th edition)*,  
by Ronald Harshbarger and James J. Reynolds.

**Required Materials:** All students will need a graphing calculator, preferably a TI-83 or TI-84.

**Recommended Materials:** All students should use a notebook which contains graph paper.

**Note:** This course may not be taken for credit if credit has been received for Mathematics 112 or higher. If you have questions concerning this, please contact your advisor immediately. Also, you need to earn a C or better in this course or in INQ 240 to declare a major in Business Administration. Once again, please contact your advisor if you have questions regarding the necessary grades/courses.

**Academic Integrity:** You are expected to be familiar with the Academic Integrity Code outlined in the booklet,

[Academic Integrity at Roanoke College.](#)

[https://www.roanoke.edu/inside/a-z\\_index/academic\\_affairs/academic\\_integrity](https://www.roanoke.edu/inside/a-z_index/academic_affairs/academic_integrity)

- 1) The use of any electronic device other than a calculator during a quiz or exam is strictly prohibited. Any use of such devices during a quiz or exam will be considered a breach of academic integrity. You will not be allowed to share a calculator.
- 2) Cell phones must be turned off prior to entering the classroom. You are not to either send or receive text messages during class!
- 3) You are expected to do all work graded for accuracy independently. This includes tests, quizzes, and graded practice problems. You are allowed to work alone, with a partner or a group on the daily independent practice problems which will only be checked for completion.

**Course Objective:** to provide the background in the quantitative techniques necessary to better understand more advance courses in Business and Economics.

**Course Outcomes:** Upon completing this course, the student should be able to:

- 1) solve linear equations (and applications) in one or more variables.
- 2) solve systems of linear equations (and applications) by utilizing graphing, elimination, and matrix row-reduction techniques.
- 3) solve quadratic functions and to utilize these functions in applications.
- 4) utilize both graphical methods and the simplex method to find the optimal value of a linear function, subject to constraints.
- 5) find the derivative of a function, interpret the derivative, and use the derivative for business applications.

**Policy on expected number of hours of work per week:** Per the Academic Catalog, "For each one-unit course, students are expected to complete 12 hours of work inside and outside of class each week." Realistically, this may vary due to the strength of the background of each individual student with respect to course content.

**Grading:**

Accuracy of Graded Practice Problems:	5%
Completion of Independent Practice Problems:	5%
Unannounced Quizzes:	10%
Tests:	80%

Grades will be assigned using the scale below:

A	93-100	C	73-76
A-	90-92	C-	70-72
B+	87-89	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	Below 60

<b>Tentative Test Schedule:</b>	Test 1	Wednesday, September 19th
	Test 2	Wednesday, October 10th
	Test 3	Wednesday, November 7th
	<b>Final Exam</b>	<b>Friday, December 14 8:30 - 11:30 am</b>

**Late Work Policy:** Independent practice problems will be collected the day they are due and checked for completion. This work will only be accepted on the day it is due. No late papers will be accepted without arrangements approved prior to absence OR without written documentation from a college official. Graded practice problems will be checked for accuracy and may be submitted until solved correctly. They will not be accepted after the last day our class meets prior to the final exam. Make-up quizzes or tests will be given only with arrangements approved prior to absence OR written documentation from a college official is provided. You must schedule a time to make up the quiz within 24 hours of the quiz being administered. Your lowest quiz grade, which may be a missed quiz, will be dropped at the end of the semester.

**Attendance:** Attendance is critical to the understanding of the material in the course; it is both required and expected. Any absence that is not discussed with the instructor prior to the missed class is considered unexcused. When absent, excused or unexcused, you are responsible for all material covered in class. Work missed due to either an unexcused or excused absence can only be made up when arrangements are made in advance of the absence OR with written documentation from a college official.

**MCSP Conversation Series:** The Department of Mathematics, Computer Science and Physics offers a series of discussions that appeal to a broad range of interests related to these fields of study. These co-curricular sessions will engage the community to think about ongoing research, novel applications and other issues that face our discipline. Members of this class are invited to be involved with all of these meetings; however participation in at least one of these sessions is mandatory. After attending, students will submit a one page paper within a week reflecting on the discussion. This should not simply be a regurgitation of the content, but rather a personal contemplation of the experience. This does not have to be a formal paper. This reflection paper will be counted as a graded practice assignment.

**Subject Tutoring:** Subject Tutoring is a CRLA Nationally Certified Program located on the lower level of Fintel Library in room 005. Subject Tutoring offers individual appointments in 30-minute intervals for Lab Sciences, Modern Languages, Math and CPSC, Social Sciences, Business and Economics. Hours are Sunday - Thursday 4 p.m. - 9 p.m. For a list of tutorials or to make an appointment, go to [www.roanoke.edu/tutoring](http://www.roanoke.edu/tutoring).

### Tentative Schedule and Assignments:

Date	Section	Topic	Independent Practice
8/29		Introduction	
8/31	7.5	Permutations, Combinations	pp470-471/ 1,3,15,17,27,31,41,43
9/3	1.1	Linear equations in one variable	p62/ 1,3,7,9,11,13,17,19,25, 31
9/5	1.2	Functions	pp73-74/ 1,3,4,5,13,15,17,19a,b
9/7	1.3	Linear functions , graphing lines	pp85-87/ 5,7,9,13,19,23,27,29,33,35,37
9/10	1.5	Solutions of systems of linear equations graphically	p104/ 1-8 all
9/12	1.5	Solutions of systems of linear equations algebraically	p104/ 9,11,15,17,23,29,33
9/14	1.6	Applications of functions in Business and Economics	pp112-115/ 1,3,5,9,13,17,19,23,45,47
9/17		No Classes due to School Closing	
9/19	Review	Review Day for Test 1	p487/ 37 & 39 pp118-121/ 5,6,7,15,17,18,19,22,24,26,29, 32,35,45,47,50,53,67,69,70
9/21	<b>Test 1</b>		Read Section 0.6 pp 35-38 p39/ 1,3,9-15 odd, 29,33
9/24	2.1	Quadratic equations, factoring	p134/ 13,21,23,25,29,35,41,47
9/26	2.1	Quadratic Equations	
9/28	2.2	Quadratic Functions: parabolas	pp143-145/ 3,5,9,31,35
10/1	2.3	Business Applications of Quadratic Functions	pp151-153/ 5,7,9,11,15,25
10/3	2.4	Special Functions and their Graphs	pp162-165/ 3,5,8,7,9,10,13,15,19,21,23,34,3 7,38,40
10/5	3.1	Matrices	p194/ 11,15,17,19
10/8	3.2	Multiplication of Matrices	pp206-207/ 1,3,5,11*, 13*
10/10	review		
10/12	<b>Test 2</b>		
Break			
10/22	3.3	Gauss Jordan Elimination and set up the system of equations	p219-221/ 1,3,5,7,11*,13*,17,19,23*, 55
10/24	3.3	Gauss Jordan elimination	p219-223
10/26	4.1	Linear Inequalities	pp265-267/ 1,3,7,9,13,19,set up 29
10/29	4.2	Linear Programming: Graphical Methods	pp275-279/ 3,5,9,15, set up 25
10/31	4.3	The Simplex method	pp293-294/ 3,5,9,13ab, 17ab, 19,21

11/2	4.3	The Simplex method	p294
11/5	4.3	The Simplex method	pp294-295/ 29,31, set up the inequalities and objective for 51
11/7	review		
11/9	<b>Test 3</b>		
11/12	9.1, 9.2	Limits, Continuous functions	pp553-554/ 1,5,7,17,27,33
11/14	9.3-9.4	The Derivative, Derivative formulas	577-8/ 2,12 pp588-589/ 3,7,15,21,25,27,47
11/16	9.5	The Product Rule and the Quotient Rule	pp596-597/ 3,7,9,11,13,17,21,39
11/19	9.6	The Chain Rule and the Power Rule	pp603-604/ 5,7,11,15,17,25,27,41
		Review derivatives	
11/26		<b>Thanksgiving</b>	
11/28	9.7	Using Derivative formulas	pp610-611/ 13,15,17,37
11/30	9.8 - 9.9	Higher order Derivatives, Applications of derivatives in Business and Economics	pp615-616/ 3,11,17; pp624-626/ 3,13,17,27
12/3	10.1	Relative Maxima and Minima	pp647-649/ 1,3,5,7,17,25;
12/5	10.2	Concavity and points of inflection	pp660-662/ 13,17,19
12/7	Review		
12/14	<b>Final</b>	<b>Block 1 Exam Friday, December 14 8:30 - 11:30 am</b> <b>Yes it IS comprehensive!</b>	