

Functions and Models in College Algebra MTH 122, Spring 2022 Course Outline

Text: *Functions, Data, and Models: An Applied Approach to College Algebra*, S.P. Gordon and F.S. Gordon, 2010, Mathematical Association of America (MAA). ISBN 978-0-88385-767

Notes: Lesson labels **1a**, **1b**, etc, give the expected week and lesson.

Reading refers to sections in the text and should be completed before the next lesson. Supplementary notes will be given in class as needed.

Homework Problems refer to text sections. “AS” means “Algebraic skills practice”. Homework problems in **bold** face refers to exercises on the WebAssign system, which must be turned in on line.

This outline is a guide only: changes will be announced in class.

#	Reading	Topic	Homework
1a	(Handouts)	Introduction to course	
1b	1.1 (p1-2) 1.3	Two-variable data; scatterplots; independent vs dependent variable.	1.3) 1, 4, 9
1c	2.1	Functions: tables, graphs, formulas, descriptions.	2.1) 1, 2, 3, 4, 6
1d	2.2	Function behavior and graph shape: increase, decrease, and concavity.	2.2) 1, 4, 9, 10, 12, 16, 18
2a	2.3	Representing functions symbolically (with formulas); domain and range.	2.3) 3, 9, 12, 16,
2b	2.4	Mathematical models: patterns in data; parameters vs variables.	2.4) 5, 6, 8, 10
2c	3.1 (p53-7)	Linear functions: rate of change and slope	3.1) 1, 2, 3, 5
3a	3.1 (p57-63) Appendix D	Slope-intercept form and point-slope form for equation of a line. Algebra of linear functions	3.1) 8, 10
3b	3.2	Modeling with linear functions	3.2) 2, 7, 8
3c	3.3 (p71-81)	Linearity: determining whether data is linear; fitting a line to data by eye.	3.3) 1, 2, 4, 8, 11
4a	3.4 (p87-94) Appendix G	Linear regression (finding a “best-fit” line for data) using a spreadsheet. Regression using Excel (adding a trendline to a scatterplot.)	TBA
4b	3.4 (p94-95)	Determining whether data is linear using the correlation coefficient	3.4) 5, 6, 7, 14
4c		Review	
5a		Test 1	

5b	4.1 (p114-19, 134-5)	Systems of linear equations. Solving 2 x 2 systems.	4.1) 1, 2, 10, 12
6a	5.1 (p166-76)	Exponential growth; growth rate and growth factor; linear vs exponential growth.	5.1) 1, 2, 4, 5, 6, 10, 11
6b	5.1 (p176-80)	Exponential formula $P = P_0 b^t$; doubling time. Fitting an exponential to two points.	5.1) 14, 16, 17, 18
7a	5.2	Exponential decay; decay rate and decay factor; half-life	5.2) 1, 2, 4, 6, 7, 8 15, 21
7b	5.3 Appendix J	Fitting an exponential to data (regression) using a spreadsheet. The base "e" (Euler's number). Fitting curves to data using Excel	5.3) 1, 6, 12, 17
8a	5.4 (p207-11)	Logarithm functions; log base 10.	5.4 AS) 7, 8, 9, 19, 20
8b	5.4(p211-13)	More log properties.	5.4 AS) 2, 10, 13 5.4) 3, 5, 8, 10
8c	5.5 (p223-26)	Modeling with log functions: pH, Richter scale, decibels.	5.5) 3, 4, 6
9a		Review	
9b		Test 2	
10a	5.6 (232-38)	Power functions (Cx^p)	5.6) 2, 5, 6 abej
10b	5.6 (238-43)	Power function applications	5.6) 7, 10, 16
11a	6.1 (p277-80)	Polynomial functions; zeros and roots	6.1) 3, 4, 5, 7 6.1 AS) 11, 16, 17, 20, 36
11b	6.1 (p280-81) Appendix E	Quadratics: factoring and quadratic formula. Solving equations on a calculator with "zoom and trace".	6.2 AS) 1, 3, 4, 6, 8, 12, 16, 18
11c	6.1 (p281-82)	Polynomials of degree three and higher	6.1) 8ac, 9
12a	6.2 (p285-90)	Behavior of quadratics [and other polynomials]	6.2) 1, 5, 6, 10, 15
12b	7.1	Shifting and scaling graphs of functions	7.1) 1, 2, 3, 5, 6, 13
13a		Review	
13b		Test 3	
14a		Additional topic(s)	
14b		Review	
15		Final Exam	

As time allows, additional topic(s) may be covered, such as:

Linear regression on a (TI) calculator (Appendix F)

4.1-4.2: using matrices to solve systems of linear equations, and applications.

5.5 or 5.7: fitting log functions or power functions to data