

Syllabus for SM121A Calculus I
Spring Semester, 2011-2012

TEXT: *CALCULUS, Early Transcendentals*, Seventh Edition, by James Stewart

Ch	Wk	Lesson	Section	TOPIC	PROBLEMS	
1. Functions and Models	Rev	1	App B	Coordinate Geometry & Lines	p. A15: 1,6,9,12,18,26,27,29,36,42	
		1	2	App D	Trigonometry	p. A32: 3,10,13,20,23,37,59,67, Wave Lab
			3	1.1	Representing Functions	p. 19: 1,6,9,12,21,23,29,35,40,50,59,72,73
			4	1.2	Math models: essential functions	p. 33: 3,4, 6 ,13,17,19, 20,25
	2	5	1.3	New functions from old	p. 42: 1,3,4,10,13,20	
		6	1.3	(continued)	p. 43: 28,35,42,50,51,55	
		7	1.5	Exponential functions	p. 57: 3,8,15,17,20,21,25,30 , Parachute Lab	
		8	1.6	Inverse functions	p. 69: 1,3,5,6,11,18,19,22,29	
		9	1.6	Logs and inverse trig	p. 70: 35,37,41, 52,53,62,65,70	
	3	10		Review		
		11		Review		
		12		Test 1		
		13		Debrief		
2. Limits and Derivatives	4	14	2.1	Tangent and velocity	p. 86: 1,3,5,7, Tower Lab	
		15	2.2	Limit of a function	p. 96: 2, 5,7,8,11,17,18,21,30,38,46	
		16	2.3	Limit laws	p. 106: 1,2, 4,11,17,22,36,47,48,60	
		17		Review		
		18	2.5	Continuity	p. 127: 1,2,4,6,10,21,43,51,53,63	
	5	19	2.6	Limits involving infinity	p. 140: 1,2,3,7,12,17,20,44,59,61	
		20	2.7	Derivatives & rates of change	p. 150: 1,3,7,11,14,17,18,19	
		21	2.7	(continued)	p. 151: 27, 32,34,37,44,48	
		22		Review		
	23	2.8	Derivative as a function	p. 162: 1,3,6,9,10, 16,23&27 (PROOFS), 40,43, Radar Lab		
	6	24		Review		
		25		Review		
		26		Test 2		
27			Debrief			
3. Differentiation Rules	7	28	3.1	Derivatives of polynomials	p. 181: 3,6,7,10,13,19,23, 25,29,31,38,51,58	
		29	3.2	Product and quotient rules	p. 187: 1,2,4, 5,10,21,26,33,43,49,50	
		30	3.3	Trig derivatives	p. 197: 1,2,5, 6,15,17,18	
		31	3.3	(continued)	p. 197: 23,25,34,35,39,40	
		32	3.4	Chain Rule	p. 205: 1,5,7, 9,13,15,30,40,49	
	8	33	3.4	(continued)	p. 205: 55,61,63, 66,76,83,92 (PROOF)	
		34		Review		
		35	3.5	Implicit differentiation	p. 215: 1,8, 10,12,21,27	
		36	3.5	(continued)	p. 216: 50,51,62,67,77	
		37		Review		
	9	38	3.6	Derivatives of logs	p. 223: 2,3,7,11,23,26	
		39	3.6	(continued)	p. 223: 27, 34,39,43,48	
		40	3.7	Rates of change	p. 233: 1,8,11,13,15,17, 33,34	
41			Review			
42			Review			
10	43	3.9	Related rates	p. 248: 1,11,15,18,20, Rates Lab		
	44	3.9	(continued)	p. 249: 27,30, 31,33,35,40		
	45	3.10	Linear approximations	p. 253: 1,2,5,7,23, 26,43		
	46		Review			

		47		Review	
		48		Test 3	
		49		Debrief	
4. Applications of Differentiation	11	50	4.1	Max and min values	p. 280: 1,2,3,6,9,11,22,29,38,43,47,48,56
		51	4.2	Mean Value Theorem	p. 288: 1,7,11,13,17,34
		52	4.3	Derivatives and shapes	p. 297: 1,3,6,7,9,16, Prove the Increasing Test (p. 290)
		53	4.3	(continued)	p. 298: 19,25,26,31,33,45,64
		54		Review	
	12	55	4.4	Indeterminate forms	p. 307: 1,2,5,6,17,21
		56	4.4	(continued, with L'Hospital)	p. 308: 33,34,39,46,51,61
		57		Review	
		58	4.5	Summary of curve sketching	p. 317: 1,3,9,12
		59	4.5	(continued)	p. 317: 21,31,33,49
13	60		Review		
	61	4.7	Optimization problems	p. 331: 1,4,11,14,19	
	62	4.7	(continued)	p. 332: 22,32,34,35,46	
	63	4.9	Antiderivatives	p. 348: 2,12,17,25,30,49,51,54,74	
	64	5.1	Areas and Distances	p. 369: 2,4,10,13,18,21, Deck Lab	
5. Integrals	14	65		Review	
		66	5.2	The Definite Integral	p. 382: 1,5,7,11,16,34,37,49
		67	5.3	The Fundamental Thm of Calc	p. 395: 3,9,11,16,19,24, FTC applet
		68	5.3	(continued)	p. 396: 26,29,31,32,42,43,45
		69	5.4	Indefinite Integrals	p. 403: 1,3,9,16,19,25,27,62,68
	15	70		Review	
		71		Review	
		72		Test 4	
		73		Debrief	
		74		Review for Final Exam	

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NOTES:

1. All students should use the access card information from their individual textbook to enroll in WebAssign. Even if their instructor does not use WebAssign this semester, they should enroll now so that they will be able to use it in future semesters. **Bold face** problems in this syllabus are not available in WebAssign.

2. Objectives:

- To review algebra and trigonometry through their use in calculus.
- To review and expand upon the concepts of functions and graphs.
- To introduce the concepts of limit and continuity.
- To study the concept of the derivative along with its graphical, numerical, and algebraic properties.
- To study methods for evaluating derivatives.
- To apply derivatives to a number of practical problems including optimization, related rates, graphing, etc.
- To study the concept of integration.
- To use the calculator to reinforce the above concepts and objectives in an appropriate manner.

3. A web site at <http://www.usna.edu/MathDept/website/local/courses/spring2012.html> will have the most up to date information about the course, including this syllabus, practice exams, web links, and the online labs which appear in the homework assignments (also at the site

http://www.usna.edu/MathDept/website/local/courses/calc_labs/labs.html).

4. Three proofs are assigned in the syllabus. At least one of them will be asked for on the final exam. The goal is for students to participate in the rigorous justification of a few mathematical concepts, thereby gaining a better appreciation of that aspect of mathematics and a better understanding of those concepts. The proofs are:
- Proving the formula for the derivative of a quadratic root from the definition as in Lesson 20, Section 2.8, exercises 23 or 27.
 - Proving the quotient rule using the product rule and chain rule as in Lesson 29, Section 3.4, exercise 92.
 - Proving the Increasing Test, Lesson 43, Section 4.3, page 290.
5. If you would like help in the course, you should contact your instructor for extra-instruction. If your instructor is not available, try the **Math Lab** in CH130. It is staffed all six class periods every class day with instructors who should be able to answer your questions. Also see the Midshipmen Group Study Program (MGSP) for group study in the evening led by upper classmen.
6. Exercises that ask for verbal explanations should be answered with complete sentences.
7. All students in this course are expected to have the TI-Nspire CX CAS calculator with the capability of doing symbolic calculations. There will be assignments that use such a calculator as well as questions on the common final exam on which it is expected that the student has such a calculator. There will also be problems for which no calculator is allowed. An on line handbook for the calculator is available at:
http://education.ti.com/calculators/downloads/US/Software/Download/en/6829/7210/TI-Nspire_CX_Handheld_GettingStarted_EN.pdf
8. Good advice on how to study mathematics can be found at <http://intranet.usna.edu/AcCenter/docs.php>
9. There will be two “gateway” quizzes: one on precalculus and one on differentiation. For samples and explanation see: <http://www.usna.edu/MathDept/website/local/courses/gateways/gateways.html>