Syllabus for SM121A
Calculus I
Spring Semester, 2010-2011

BOLD PROBLEMS ARE NOT INCLUDED IN WEBASSIGN

Highlighted problems are watch it or master it problems.

TEXT: *CALCULUS, Early Transcendentals*, Edition 6e by James Stewart

LESSON	SECTION	TOPIC	PROBLEMS
1 1/11	App B	Coordinate Geometry & Lines	p. A15: 3,6,7,12,19,25,28,29,36,41,59
2 1/12	App D	Trigonometry	p. A32: 1,9,15,19,21,23,27,35,59,65, WAVE LAB
3 1/13	1.1	Representing functions	p. 20: 1,6,7,**12,20**,23,25,37,39,43,**50**,57,**64**
4 1/14		Review	
5 1/18	1.2	Math models: essential functions	p. 34: **3,4,5**,9,13,17,**19,20**
6 1/19	1.3	New functions from old	p. 43**: 1**,3,**5,10,13,23**
7 1/20	1.3	(continued)	p. 44: **28**,35,45,50,51,56
8 1/21		Review	
9 1/24	1.5	Exponential functions	p. 58: **3,6,10**,13,,**16,**17,,**21**,25, PARACHUTE LAB
10 1/25	1.6	Inverse functions	p. 70: **1**,4,6,8,10,18,**19**,21,**30**
11 1/26	1.6	Inverse logs and trig functions	p. 71: 33,35,38,47,48,57,59,63,67
12 1/27		Review	
13 1/28		Review	
14 1/31		**Test 1**	
15 2/1	2.1	Tangent and Velocity	p. 87: 1,3,5,7 TOWER LAB
16 2/2	2.2	Limit of a function	p. 96: **2**,5,7,9,**12,14**,19,25,34,40
17 2/3	2.3	Limit Laws	p. 106: 1,2,4,8,11,17
18 2/4	2.3	(continued)	p. 107: 22,**33**,39,45,46,**58**(hint: see example 10)
19 2/7		Review	
20 2/8	2.5	Continuity	p. 128: **1**,2,3,**6**,8,**19**,39,**47,49**
21 2/9	2.6	Limits involving infinity	p. 140: **1,2**,4,**9**,12,17,20,42,55,57
22 2/10	2.7	Derivatives and rates of change	p. 150: **1**,3,6,11,13,**17**,18,**19**
23 2/11	2.7	(continued)	p. 151: 25,29,31,34,**39**,41,**46**
24 2/14		Review	
25 2/15	2.8	Derivative as a function	p. 162: 1,3,4,9,10,**14**, RADAR LAB
26 2/16	2.8	(continued)	21&24(PROOFS),38,41
27 2/17		Review	
28 2/18		**Test 2**	
29 2/22	3.1	Derivatives of polynomials	p. 180: 3,6,7,10,12,15,23,25,29,31,38,52,58
30 2/23	3.2	Product and quotient rules	p. 187: 1,2,4,5,9,18,26,33,43,47,**56**
31 2/24	3.3	Trig derivatives	p. 195: 1,2,6,8,15,**17,18**
32 2/25	3.3	(continued)	p. 195: 21,25,**33**,35,39,40
33 2/28	3.4	Chain rule	p. 203: 1,5,**8**,9,13,15,30,40,49
34 3/1	3.4	(continued)	p. 204: 55,61,63,65,**66**,74,81,**90**(PROOF)
35 3/2		Review	
36 3/3	3.5	Implicit differentiation	p. 213: 2,7,**10**,12,21,25
37 3/4	3.5	(continued)	p. 214: 45,47,**61,67**
38 3/7	3.6	Derivatives of logs	p. 220: 2,3,5,8,23,26
39 3/8	3.6	(continued)	p. 220: 28,33,37,41,45
40 3/9	3.7	Rate of change	p. 230: 1,10,13,15,17,33,**35**
41 3/10	3.9	Related rates	p. 245: **1**,11,15,18, RATES LAB

42	3/11	3.9	(continued)	p. 246: 20,27,30,31,38
43	3/21		Review	
44	3/22	3.10	Linear approximations	p. 252: 1,2,5,10,23,26,43
45	3/23		Review	
46	3/24		Review	
47	3/25		**Test 3**	
48	3/28	4.1	Max and min values	p. 277: **1,2,3,5,8,11**,22,29
49	3/29	4.1	(continued)	p. 278: 40,43,47,48,52,56
50	3/30	4.2	Mean Value Theorem	p. 285: **7**,10,13,**17,34**
51	3/31	4.3	Derivatives and shapes	p. 295:1,**3**,6,7,9,16,PROVE the Increasing Test p287
52	4/1	4.3	(continued)	p. 295: 19,**25,26**,31,**33**,46,**64**
53	4/4		Review	
54	4/5	4.4	Indeterminate forms (L'Hospital)	p. 304: 1,2,5,8,11,15
55	4/6	4.4	(L'Hospital's Rule continued)	p. 304: 20,31,33,46,52,59
56	4/7	4.5	Summary of curve sketching	p.314: **3**,5,9,12
57	4/8	4.5	(continued)	p.314: 20,29,**31**,47
58	4/11	4.7	Optimization problems	p. 328: 1,4,**9**,12,17
59	4/12	4.7	(continued)	p. 329: 20,30,31,33,44
60	4/13		Review	
61	4/14		Review	
62	4/15	4.9	Antiderivatives	p. 345: 1,**9**,15,25,**27**,**47,49**,**52**,72
63	4/18	5.1	Areas and Distances	p.364: 2,4,**8**,11,16,17, Deck Lab
64	4/19	5.2	The Definite Integral	p.376: 1,5,7,11,**16**,34,36,49
65	4/20	5.3	The Fundamental Thm of Calc	p.387: 3,7,11,14,19,24, FTC applet
66	4/21	5.3	The Fundamental Thm of Calc	p.387: 26,29,31,32,38,41,**44**
67	4/22	5.4	Indefinite Integrals	p.397: **1,2**,9,16,**19**,25,35,62
68	4/25		Review	
69	4/26		Review	
70	4/27		**Test 4**	
71	4/28		Review for Final Exam	
72	4/29		Review for Final Exam	
73	5/2		Review for Final Exam	
74	5/3		Review for Final Exam	

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NOTES:

A web site at http://www.usna.edu/MathDept/website/local/courses/fall2011.html will have the most up to date information about the course, including this syllabus, practice exams, web links, and especially 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).

1. 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:

a. Proving the formula for the derivative of a quadratic root from the definition as in Lesson 20, Section 2.8, exercises 21 or 24.

b. Proving the quotient rule using the product rule and chain rule as in Lesson 28, Section 3.4, exercise 90.

c. Proving the Increasing Test, Lesson 42, Section 4.3, page 287.

2. 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.

3. Exercises that ask for verbal explanations should be answered with complete sentences.

CALCULATOR NOTES

All students in this course are expected to have a calculator like the VOYAGE 200 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. The above web site also has a link to a file with a list of the minimal competences expected of all students.

The latest version of the VOYAGE 200 guidebook in PDF format is at
http://education.ti.com/guidebooks/graphing/89ti/Voyage200Guidebook_Part2_EN.pdf

Appendix D: Note, for example, that tExpand(sin(x+y)) gives the sum formula. One way to change from degrees to radians is to enter 2nd D (for degrees) in radian mode. One way to reverse is to use 2nd Y D D (decimal degrees).

1.1 Be sure you can define your own functions on the calculator, either by define or store. (Piecewise functions are hard to enter - beyond the course expectations.)

1.3 Use the calculator to compose functions. Sometimes g(f(x))will give an error. It can be avoided by defining f and g using a variable other than x (say t) but then using x for the composition. Try drawing shifted and stretched graphs with the calculator. In the Y= screen, F4 unchecks/checks a function to not draw/draw it and F3 may be needed to edit (change) a function or clear and re-enter it.

1.4 Using Y=, GRAPH, TABLE gives a function algebraically, visually, and numerically. If a graph is taking too long to draw, the ON key interrupts.
Zoomdec (F2 4) gives correct aspect ratio - makes circles circular. To get roughly Figure 6, change the xmin/xmax window to plus or minus a)15, b)12.5, c)11.25, d)7.5. To get Figure 11, try x^(1/3.) - note decimal point

2.1 All the many points in a problem like number 3 can be done quickly by defining a secant slope function on the calculator. For example, define f(x) then use f(x)|x={.5,.9,.99,.999}. Old assigned variables can cause errors - recommend using single letter variable names and then erasing with F6.
2.2 The VOYAGE 200 takes limits! For example define g(x)=x/x. Then g(0) is undefined. But limit(g(x),x,0)=1. And it does one sided limits, e.g. limit(abs(x)/x,x,0,-7) = -1 (where -7 can be replaced by any negative) for limit from the negative side.

2.3 Graph the floor (called greatest integer function in the text but floor on the Voyage 200) and ceiling functions and understand in what way the calculator graphs are wrong.

2.6 Graph functions with infinite limits and understand how the calculator graphs can be wrong (drawing vertical asymptotes). The VOYAGE 200 can use (2nd J) for infinity in taking limits at infinity.

2.7 The VOYAGE 200 will draw tangent lines and give the equation (graph and then use F5 math A).