

20 March 2005

02-04

## OUTCOMES ASSESSMENT REPORT FOR THE UVSC DEPARTMENT OF MATHEMATICS

### ASSESSMENT OF DEGREE PROGRAMS

The Department's outcomes assessment plan for its bachelor's degree and associate degree programs involves exit interviews and follow-up interviews. The exit interviews are conducted on a regular basis. With the mathematics majors (and any associate degree students that can be identified before graduation day), students are interviewed during their final semester at UVSC. With the mathematics education majors, students are interviewed during their penultimate semester, since these students do their student teaching during their final semester at UVSC and are not on campus for much of their last semester. The exit interviews and follow-up interviews have provided clear evidence that our graduates have achieved the goals the Department had set for them. Because the Department has received such positive comments from its mathematics graduates who have gone on to graduate school, the Department will have the same teachers continue teaching the upper-division analysis and algebra classes, and the same texts will be used. The graduates have all said in follow-up interviews that they felt the transition to graduate school was seamless and that they felt they were better prepared for graduate school than their graduate school classmates. Here is a summary of the information received from our graduates:

**Mathematics bachelor's degree graduates:** There have been eight graduates from the mathematics bachelor's degree program since the program began in Spring 2002. Six of these graduates took the GRE exam, and they all scored between 780 and 800 on the mathematics part of the exam. All of the graduates who wanted to go to graduate school were accepted at a graduate school. Of the four students who graduated in Spring 2003, two of them were accepted at the University of Houston, and one of these graduates received a teaching fellowship at that school. He completed a master's degree in mathematics at the University of Houston after only one year of study, and was accepted into a mathematics Ph.D. program at the University of Illinois at Chicago (a Group I school). The other student who went to the University of Houston completed his master's degree in two years, and is currently teaching classes for the UVSC Department of Developmental Mathematics. He is planning to return to graduate school to pursue a Ph.D. degree in the area of Mathematical Finance. The third of these four graduates has passed the first actuarial exam and is preparing for the second actuarial exam. He is also currently teaching developmental mathematics classes at UVSC, but hopes to eventually be employed as an actuary. The fourth graduate from Spring 2003 got a computer-related job in Denver immediately after graduation. Of the four students who graduated in Spring 2004, one received a teaching assistantship at Northern Arizona University and taught two lecture sections of college algebra in his first semester at NAU in Fall 2004. Another of the 2004 graduates was accepted into a mathematics master's degree program at the University of Utah (a Group I school). She is currently teaching developmental mathematics classes at UVSC as well. The third of these most recent four graduates got a teaching fellowship at the University of Houston and is pursuing a graduate degree there, and the fourth one has recently been accepted into a mathematics graduate program at Oregon State University. This fourth graduate is also currently teaching developmental mathematics classes at UVSC.

**Mathematics education bachelor's degree graduates:** The Department had its first mathematics education graduates in Spring 2004. There were four graduates. One of these graduates chose not to seek a teaching job when she graduated. The other three graduates got teaching positions immediately upon graduating. One of these three was teaching only part-time at a high school, because she is currently pursuing a mathematics master's degree at the University of Utah.

**Associate of science degree (with an emphasis in mathematics) graduates:** The Department has been able to track three of these graduates over several years. These three all got scholarships at the four-year schools to which they transferred from UVSC, and they all went on to graduate school to pursue graduate studies in mathematics. The first of the three students achieved a master's degree in mathematics from Brigham Young University and was chair of the mathematics department at Wasatch Academy (a small preparatory school located in Mount Pleasant, Utah). However, she recently accepted a full-time mathematics faculty position at Snow College. The second graduate achieved a master's degree in mathematical statistics at the University of Utah and quickly got a job as a systems engineer at the engineering firm Northrop Grumman in Clearfield, Utah. The Department lost track of the third one, who first earned a bachelor's degree in mathematics education at the University of Utah, but then she moved on to mathematics graduate studies in California.

### **ASSESSMENT OF COLLEGE ALGEBRA**

In the Spring 2001 semester, the Department tried to analyze how well students were learning college algebra. A pretest and a post-test were given in five randomly selected MATH 1050 (College Algebra) classes. The pretest and post-test each had five problems on them, and the problems on the post-test were similar to each problem on the pretest (Problem 1 on the post-test was like Problem 1 on the pretest, etc.). The average post-test gain in points on the 38-point test was 6.3 points. This Spring 2001 cycle of testing was part of a joint effort of the nine state schools in Utah to test for quantitative literacy in our schools. This testing was done at the request of the Board of Regents' General Education Task Force. Because a solid knowledge of college algebra is so essential to good performance in subsequent mathematics courses, the Department did another cycle of pretest and post-test in MATH 1050 classes in Fall 2003 to help measure the effectiveness of the college algebra course. Six randomly selected MATH 1050 classes were involved in the Fall 2003 testing. The pretest and post-test that were used in Spring 2001 were also used in Fall 2003 so that a year to year comparison of data might be done. The average post-test gain in points on the 38-point test was 11.9 in Fall 2003. (The tabulated data from the Spring 2001 and the Fall 2003 pretests and post-tests are attached to this report.) The data from the Fall 2003 testing seems to indicate that the students are weak in solving quadratic equations, so the student tests themselves are being closely reviewed to see why students scored so low on the quadratic equation problem and to identify the skills that students are lacking in this particular area. During a departmental faculty meeting, the mathematics faculty discussed students' difficulty with quadratic equations, and then a proposal was made that faculty revisit quadratic equations throughout their teaching of the MATH 1050 course and subsequent mathematics courses. One faculty member suggested that perhaps we should require a grade of B instead of a C in the prerequisite course MAT 1010 (Intermediate Algebra). However, the Department of Developmental Mathematics is making its own changes in the teaching of MAT 1010 that may make requiring a B grade unnecessary. The Department of Developmental Mathematics has begun giving a departmental comprehensive final exam that students must pass with at least a 70% score to achieve a grade of C- or better in the MAT 1010 course. They also have changed the number of credit hours for the MAT 1010 course from three credit hours to four credit hours.

Results &  
Use of  
results

Our department is making some changes to try to improve student learning and success in our mathematics courses, especially in our MATH 1050 and our MATH 1100 (INTRODUCTION TO CALCULUS, known informally as "business calculus") courses. First, we have recently been hiring new part-time faculty with unquestionably strong mathematical backgrounds to teach college algebra classes. (Most of our full-time faculty teach college algebra as well, but generally we have at least 44 sections of college algebra each semester, so we need part-time teaching help to handle all the sections.) Applicants for part-time teaching positions in our department must now have at least a master's degree in mathematics, with completed course work in traditional graduate-level mathematics courses such as real analysis, complex analysis, topology, and abstract algebra. We carefully scrutinize the undergraduate and graduate transcripts of applicants for part-time teaching positions, and they must give a teaching demonstration. Another change that is being made is that we are strengthening prerequisite requirements so that placement test scores and prerequisite course grades that are more than two years old will no longer be accepted for entry into any mathematics courses for which the COMPASS placement test is applicable. (The COMPASS mathematics placement test can place students into MATH 1030, 1040, 1050, 1060, 1100, 2010, 2040, or 1210.) Finally, we are studying the final letter grades given in our mathematics courses to see if there is significant grade inflation.

UVSC Math 1050 Assessment for data Fall 2003

Data compiled by Chris Merrin Date: September 2004

stud no	pre 1	pre 2	pre 3	pre 4	pre 5	pre total	post 1	post 2	post 3	post 4	post 5	post total	post minus pre
1	2	0	0	0	5	7	6	2	3	6	5	22	15
2	8	8	0	0	4	20	0	8	5	6	10	29	9
3	2	0	0	0	3	5	8	1	5	0	3	17	12
4	2	0	0	0	0	2	4	1	0	3	4	12	10
5	0	0	0	0	5	5	4	0	3	6	5	18	13
6	0	0	0	0	1	1	4	0	1	0	4	9	8
7	2	1	0	0	1	4	4	0	0	0	2	6	2
8	0	0	0	0	1	1	3	1	6	6	5	21	20
9	0	0	0	0	1	1	5	5	5	6	4	25	24
10	8	0	0	0	1	9	4	1	6	5	3	19	10
11	0	1	0	0	0	1	2	1	0	0	5	8	7
12	6	0	1	0	5	12	6	8	1	0	7	22	10
13	2	0	0	5	5	12	3	1	0	5	5	14	2
14	4	1	0	0	0	5	8	8	5	6	9	36	31
15	0	0	0	0	0	0	4	5	6	6	10	31	31
16	2	1	0	0	4	7	1	4	0	0	5	10	3
17	3	1	0	0	1	5	4	1	6	3	5	19	14
18	0	0	0	0	1	1	3	0	1	5	1	10	9
19	4	1	0	0	2	7	4	1	0	0	1	6	-1
20	0	0	0	0	0	0	3	0	4	6	5	18	18
21	8	0	3	6	2	19	8	8	6	6	10	38	19
22	3	0	0	5	10	18	8	5	0	5	5	23	5
23	8	0	1	0	5	14	6	1	0	4	7	18	4
24	0	1	0	0	2	3	4	1	0	5	2	12	9
25	2	1	0	0	0	3	3	4	0	1	5	13	10
26	4	2	0	5	5	16	8	5	5	6	8	32	16
27	1	0	0	0	0	1	2	1	6	0	4	13	12
28	7	0	0	0	0	7	5	5	5	5	5	25	18
29	4	8	0	4	5	21	4	8	4	5	10	31	10
30	8	5	0	0	0	13	4	1	0	0	0	5	-8
31	3	0	0	0	0	3	6	1	1	0	4	12	9
32	3	0	0	0	1	4	7	4	6	6	6	29	25
33	3	0	0	0	1	4	3	0	0	4	5	12	8
34	8	0	0	0	4	12	8	7	6	6	10	37	25
35	8	0	0	0	2	10	8	8	3	6	10	35	25
36	1	1	0	0	1	3	5	8	3	6	7	29	26
37	4	1	0	0	5	10	4	1	4	4	5	18	8
38	4	0	0	0	0	4	5	8	4	6	10	33	29
39	4	0	0	0	0	4	6	0	2	0	4	12	8
40	4	1	0	0	0	5	8	1	6	6	5	26	21
41	4	0	0	0	1	5	4	0	0	5	1	10	5
42	2	0	0	0	0	2	3	5	6	4	3	21	19
43	2	0	0	0	0	2	0	0	0	0	1	1	-1
44	4	0	0	0	5	9	8	1	1	5	10	25	16
45	8	1	0	0	0	9	6	5	6	6	5	28	19
46	2	1	1	0	6	10	8	7	1	5	5	26	16
47	2	0	0	0	0	2	7	3	1	0	5	16	14
48	3	0	0	0	2	5	5	0	0	5	3	13	8
49	6	0	3	0	1	10	4	3	1	6	8	22	12
50	5	1	0	0	0	6	6	0	4	0	5	15	9
51	4	1	0	0	0	5	8	1	6	6	10	31	26
52	0	1	1	0	0	2	2	1	3	0	2	8	6
53	4	1	0	0	5	10	3	4	1	0	3	11	1

stud no	pre-1	pre 2	pre 3	pre 4	pre 5	pre total	post 1	post 2	post 3	post 4	post 5	post total	post minus pre
54	4	1	0	0	1	6	8	4	6	5	7	30	24
55	5	4	0	0	5	14	6	8	3	5	5	27	13
56	4	0	1	0	5	10	4	1	6	6	8	25	15
57	8	0	0	0	3	11	5	8	3	6	10	32	21
58	4	1	0	0	0	5	8	7	4	5	8	32	27
59	0	0	0	0	0	0	4	1	2	6	5	18	18
60	5	0	4	0	3	12	4	3	4	6	3	20	8
61	8	0	0	0	1	9	5	4	1	6	7	23	14
62	8	0	0	0	1	9	8	8	6	6	10	38	29
63	2	1	0	0	1	4	4	0	0	0	6	10	6
64	4	0	0	0	0	4	4	5	0	0	5	14	10
65	5	0	0	0	3	8	0	1	0	0	3	4	-4
66	3	0	0	0	0	3	7	1	2	0	5	15	12
67	7	0	0	0	1	8	6	1	5	0	5	17	9
68	8	3	4	0	10	25	8	5	4	6	7	30	5
69	4	4	0	0	0	8	6	6	0	0	5	17	9
70	2	4	1	0	5	12	8	8	6	0	5	27	15
71	4	1	0	0	1	6	4	1	0	0	3	8	2
72	4	0	0	0	4	8	3	3	1	0	5	12	4
73	4	1	0	0	0	5	4	1	0	0	3	8	3
74	8	0	0	0	3	11	8	0	0	6	10	24	13
75	0	0	0	0	0	0	0	1	0	0	6	7	7
76	3	0	0	0	3	6	3	0	0	0	7	10	4
77	4	0	1	6	3	14	8	2	0	6	2	18	4
78	0	0	0	0	1	1	8	2	0	0	1	11	10
79	8	0	0	0	5	13	3	1	0	0	5	9	-4
80	4	0	0	0	3	7	8	8	6	6	9	37	30
81	2	0	0	0	3	5	3	4	0	0	5	12	7
82	4	0	1	0	5	10	8	8	6	6	5	33	23
83	4	0	0	0	0	4	6	8	0	6	8	28	24
84	4	0	0	0	4	8	6	0	1	0	0	7	-1
85	0	0	0	0	0	0	3	0	0	0	0	3	3
86	6	0	0	0	3	9	7	6	5	6	7	31	22
87	8	0	0	0	0	8	8	3	0	0	5	16	8
88	3	0	0	0	0	3	0	1	3	6	4	14	11
89	4	0	1	0	4	9	6	1	2	2	4	15	6
90	4	1	4	0	3	12	5	1	6	5	7	24	12
91	2	0	0	0	1	3	1	1	2	6	4	14	11
92	4	0	0	0	4	8	4	1	4	0	3	12	4
93	0	1	0	0	3	4	1	1	4	6	4	16	12
94	4	1	0	0	5	10	4	1	6	6	5	22	12
95	0	0	0	0	0	0	7	1	6	6	3	23	23
96	4	0	0	0	3	7	4	0	6	5	5	20	13
97	4	1	0	0	1	6	6	3	6	3	2	20	14
98	0	1	0	0	9	10	6	1	4	6	3	20	10
99	0	1	0	0	1	2	0	1	3	0	4	8	6
100	2	1	0	0	5	8	8	4	6	4	3	25	17
101	0	1	0	0	1	2	0	1	4	3	2	10	8
102	0	0	0	0	5	5	1	1	6	0	0	8	3
103	0	1	0	0	3	4	2	1	1	6	4	14	10
104	3	0	0	0	5	8	8	0	6	3	10	27	19
105	4	1	0	0	0	5	4	0	1	6	4	15	10
106	0	0	0	0	1	1	1	1	4	6	2	14	13
107	7	5	0	0	10	22	1	1	0	5	2	9	-13
108	0	0	0	0	1	1	0	1	4	6	4	15	14
109	3	0	0	0	5	8	6	4	1	6	10	27	19
110	0	1	0	0	1	2	4	1	0	0	5	10	8

stud no	pre 1	pre 2	pre 3	pre 4	pre 5	pre total	post 1	post 2	post 3	post 4	post 5	post total	post minus pre
111	4	4	0	0	5	13	5	5	6	2	9	27	14
112	0	0	0	0	5	5	6	1	1	6	1	15	10
113	2	0	0	0	1	3	4	0	1	6	1	12	9
114	0	0	0	0	0	0	1	1	4	0	5	11	11
115	0	0	0	0	0	0	8	1	5	2	10	26	26
116	5	1	1	0	4	11	4	1	6	6	4	21	10
117	4	0	0	0	3	7	4	0	4	5	3	16	9
118	4	0	2	0	7	13	8	1	6	6	6	27	14
119	3	0	0	0	1	4	4	3	2	6	10	25	21
120	0	8	0	0	5	13	6	7	2	5	4	24	11
121	2	2	1	0	0	5	4	1	6	6	10	27	22
122	2	1	0	0	1	4	3	7	4	6	5	25	21
123	1	0	0	0	0	1	4	1	0	6	4	15	14
124	1	1	0	0	3	5	0	1	6	6	1	14	9
125	0	0	0	0	0	0	4	2	0	6	6	18	18
126	0	0	0	0	5	5	3	0	1	0	5	9	4
127	0	1	0	0	0	1	0	1	2	3	5	11	10
128	0	8	0	5	1	14	0	4	6	4	4	18	4
129	0	0	0	0	0	0	0	1	3	6	1	11	11
130	2	0	0	0	1	3	1	1	0	2	4	8	5
131	1	1	0	0	0	2	0	0	0	0	0	0	-2
132	8	4	2	0	5	19	7	7	6	6	10	36	17

column average 3.13 0.81 0.25 0.27 2.26 6.72 4.52 2.64 2.84 3.61 5.06 18.7 11.939

max possible 8 8 6 6 10 38 8 8 6 6 10 38

UVSC Math 1050 Assessment Spring 2001														
Data compiled by Chris Merrin Date: 14 May 01														
stud no	pre 1	pre 2	pre 3	pre 4	pre 5	pre total	post 1	post 2	post 3	post 4	post 5	post total	post minus pre	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	
2	5	1	0	4	0	10	1	5	0	0	2	8	-2	
3	3	8	2	0	10	23	8	8	2	0	3	21	-2	
4	3	4	0	0	4	11	2	5	2	0	10	19	8	
5	1	1	2	0	1	5	4	6	4	0	5	19	14	
6	2	2	0	0	0	4	3	3	3	0	3	12	8	
7	1	0	0	0	0	1	0	5	0	0	2	7	6	
8	0	0	0	0	5	5	0	5	1	4	10	20	15	
9	3	0	0	0	0	3	8	5	6	6	3	28	25	
10	4	0	0	0	0	4	1	1	0	0	4	6	2	
11	0	2	0	0	0	2	6	7	4	0	10	27	25	
12	2	0	0	0	4	6	3	3	3	0	7	16	10	
13	8	4	1	0	0	13	5	2	2	6	5	20	7	
14	1	0	0	0	2	3	8	6	0	6	3	23	20	
15	0	0	0	0	0	0	0	4	0	0	3	7	7	
16	5	0	0	0	0	5	5	7	3	0	9	24	19	
17	8	4	2	0	5	19	5	5	3	6	5	24	5	
18	3	4	0	0	0	7	5	6	3	6	8	28	21	
19	8	8	0	6	6	28	8	0	6	6	10	30	2	
20	8	8	5	0	10	31	8	8	5	6	9	36	5	
21	5	5	0	0	7	17	4	4	3	4	10	25	8	
22	5	0	0	0	3	8	5	4	0	0	3	12	4	
23	4	0	2	0	2	8	2	1	2	0	1	6	-2	
24	8	1	0	0	6	15	8	5	5	6	10	34	19	
25	7	5	0	0	10	22	8	8	5	6	9	36	14	
26	8	0	5	0	8	21	8	8	5	6	10	37	16	
27	4	0	0	0	5	9	4	4	5	6	1	20	11	
28	8	0	4	0	5	17	5	8	4	6	2	25	8	
29	8	5	6	0	5	24	8	4	6	6	6	30	6	
30	5	0	0	0	7	12	5	5	0	0	5	15	3	
31	6	0	1	6	4	17	1	5	3	6	6	21	4	
32	5	0	0	0	7	12	2	8	2	0	10	22	10	
33	8	0	4	0	3	15	5	7	0	0	10	22	7	
34	0	1	3	5	0	9	5	0	0	0	9	14	5	
35	5	0	0	0	6	11	2	8	5	0	10	25	14	
36	7	4	3	0	0	14	8	5	6	0	7	26	12	
37	4	0	5	5	3	17	4	5	6	6	5	26	9	
38	5	0	4	0	0	9	8	8	6	3	10	35	26	
39	2	0	0	0	0	2	2	0	0	0	4	6	4	
40	8	8	1	0	5	22	5	6	2	0	5	18	-4	
41	8	6	0	0	5	19	1	6	4	0	6	17	-2	
42	4	1	3	0	6	14	3	4	3	6	5	21	7	
43	7	8	0	0	4	19	2	8	0	6	4	20	1	
44	5	0	0	0	10	15	3	4	0	0	8	15	0	
45	4	0	0	0	9	13	2	6	0	6	8	22	9	
46	2	1	0	0	3	6	5	1	0	0	1	7	1	
47	8	8	6	0	1	23	8	8	0	5	8	29	6	
48	3	0	0	0	1	4	3	1	0	0	0	4	0	
49	5	1	0	0	3	9	5	3	0	5	2	15	6	

50	1	0	0	0	0	1	8	0	0	6	3	17	16
51	5	1	0	0	0	6	8	1	0	0	0	9	3
52	6	7	0	0	3	16	2	5	0	0	5	12	-4
53	5	0	0	0	0	5	4	1	0	0	3	8	3
54	3	0	0	0	3	6	8	1	0	0	3	12	6
55	7	1	0	0	4	12	4	4	2	6	3	19	7
56	7	0	0	0	0	7	6	1	0	5	4	16	9
57	2	0	0	0	2	4	4	0	0	0	2	6	2
58	2	0	0	0	1	3	6	0	0	6	1	13	10
59	4	1	0	0	5	10	4	0	0	6	3	13	3
60	6	5	0	0	0	11	2	1	0	5	0	8	-3
61	0	1	0	0	0	1	4	0	0	0	1	5	4
62	0	1	0	0	3	4	5	1	0	0	0	6	2
63	2	1	0	0	3	6	4	1	0	0	0	5	-1
64	6	0	0	0	3	9	5	0	0	0	1	6	-3
65	3	1	0	0	5	9	4	0	0	0	0	4	-5
66	2	0	0	0	4	6	4	0	0	6	5	15	9
67	7	4	0	0	5	16	8	5	3	0	5	21	5
68	7	1	0	0	3	11	5	1	0	6	1	13	2
69	8	1	2	0	10	21	8	8	3	6	0	25	4
70	6	1	0	0	10	17	3	1	0	6	6	16	-1
71	6	1	0	6	7	20	6	1	2	0	4	13	-7
72	0	1	5	0	10	16	5	1	3	6	10	25	9
73	6	1	0	0	3	10	5	2	2	5	1	15	5
74	8	8	2	0	8	26	6	8	5	6	9	34	8
75	2	0	0	0	2	4	6	3	0	6	6	21	17
76	8	8	4	0	10	30	6	8	2	5	10	31	1
77	6	1	0	0	1	8	6	4	0	6	7	23	15
78	5	1	0	0	6	12	4	5	0	0	6	15	3
79	5	4	0	0	5	14	4	5	0	5	6	20	6
80	8	8	3	5	10	34	8	8	5	5	7	33	-1
81	1	0	0	0	6	7	6	8	4	6	10	34	27
82	4	4	0	0	0	8	2	0	2	0	0	4	-4
83	8	0	2	0	2	12	5	3	0	0	6	14	2
84	8	7	0	0	7	22	8	3	0	0	10	21	-1
85	8	6	3	0	10	27	5	1	3	6	10	25	-2
86	5	6	0	0	5	16	4	4	0	0	4	12	-4
87	1	4	0	0	3	8	3	4	0	6	10	23	15
88	0	1	0	0	2	3	0	0	1	0	3	4	1
89	2	0	0	0	0	2	6	0	3	5	7	21	19
90	8	0	1	0	7	16	6	4	0	4	6	20	4
91	6	6	0	0	5	17	8	1	2	6	3	20	3
92	0	5	6	0	5	16	4	2	6	5	5	22	6
93	8	8	5	5	10	36	6	2	3	5	7	23	-13
94	5	0	2	5	0	12	8	1	6	6	10	31	19
95	6	8	6	0	3	23	8	8	3	4	8	31	8
96	1	1	1	0	0	3	0	0	0	0	5	5	2
97	8	6	4	0	3	21	4	5	6	0	10	25	4
98	0	1	5	0	5	11	2	1	4	6	5	18	7
99	1	4	4	0	3	12	0	5	3	4	4	16	4
100	0	1	0	0	3	4	2	2	6	6	3	19	15
column average	4.46	2.27	1.14	0.47	3.8	12.14	4.6	3.65	1.98	3	5.24	18.47	6.33
max possible	8	8	6	6	10	38	8	8	6	6	10	38	