<u>Syllabus</u>

Mathematics Department
United States Naval Academy
SM223
Calculus III with Optimization
Fall 2017
Text: <u>Calculus</u>   James Stewart 8th edition

The underlined problems do not appear in WEB Assign.

1. Three dimensional space   12.1   p 796 #9, 12, <u>27</u>, <u>30</u>, 32, 35
2. Vectors   12.2 p .805 #<u>6</u>, <u>22</u>, 24, 32, 34, 37
3. Dot Product   12.3 p. 812   #8, 10, 11, <u>18</u>, <u>20</u>, 23
4. Dot Product   12.3 p.813   #25, 27, 39, <u>42</u>, 44, 55
5. Cross Product   12.4 p. 821   # <u>2</u>, <u>5</u>, 13, 14, 19, 27
6. Lines and Planes   12.5 p.831   #2, 4, 6, 7, 10, 13
7. Lines and Planes   12.5 p.831   #16, 19, <u>23</u>, 26, 27, <u>30</u>
8. Lines and Planes   12.5 p. 831   # 31, 35, 41, 45, <u>48</u>, <u>67</u>
9. Quadric Surfaces   12.6 p. 839 # 1, 5, 8, 11, <u>14</u>, <u>17</u>
10.   Quadric Surfaces   12.6 p.840   # 21-28
11.   Review
12.   Hour Exam
13.   Curves   13.1 p.854 #9, 12, 13, <u>14</u>, <u>16</u>, <u>28</u>
14.   Curves   13.1 p.854 #21, <u>22</u>, <u>23</u>, <u>24,</u> 25, <u>26</u>
15.   Derivatives   13.2 p.860 #4, 10, <u>11</u>, <u>24</u>, 28, 34
16.   Arc Length   13.3 p.868 #1, 4, <u>7</u>, <u>9</u>
17.   Motion   13.4 p. 878 # 3, 5, 9, 13, <u>15</u>, <u>16</u>
18.   Motion   13.4 p. 878 # 19, 23, 25, 26
19.   Motion   13.4 Hand out Problems
20.   Review
21.   Hour Exam
22.   Functions of Many

	Variables	14.1 p. 899 # 1, 2, 3, 7, <u>8</u>
23.	Functions of Many Variables	14.1 p. 890 #24, 25, <u>26</u>, 28, 32, <u>34</u>
24.	Functions of Many Variables	14.1 p.901 # 41, 44, 45, <u>46</u>, <u>48</u>, 68, <u>69</u>
25.	Functions of Many Variables	14.1 p. 902 # 61-66
26.	Partial Derivatives	14.3 p.923 #3, <u>4</u>, 5, 6, 7, 8, <u>86</u>
27.	Partial Derivatives	14.3 p.924 #9, 10, 11, 15, <u>18</u>, 20, 90
28.	Partial Derivatives	14.3 p. 924 #<u>22</u>, <u>26</u>, <u>32</u>, <u>34</u>, <u>35</u>, 42, <u>94</u>
29.	Partial Derivatives	14.3 p. 925 #53, <u>64</u>, <u>66</u>, <u>74</u>, <u>100</u>
30.	Tangent Planes	14.4 p. 934 # 1, <u>2</u>, <u>4</u>, <u>5</u>
31.	Linear Approximation	14.4 p.935 # <u>19</u>, 21, 22, <u>24</u>
32.	Chain Rule	14.5 p.943 #1, <u>2</u>, <u>13</u>, <u>14</u>, 35, <u>36</u>
33.	Chain Rule	14.5 p. 943 #3, <u>4</u>, 15, 37, 38
34.	Chain Rule	14.5 p. 943 #5, 6, 39, 40, <u>42</u>
35.	Gradients	14.6 p.956 #1, <u>2</u>, <u>3</u>, 7, 9, <u>10</u>, <u>30</u>
36.	Gradients	14.6 p. 957 #11, 13, 14, 15, <u>28</u>, 31
37.	Gradients	14.6 p. 957 #32, 33, <u>38</u>, 41, <u>42</u>, <u>44</u>
38.	Review	
39.	Hour Exam	
40.	Max-Min	14.7 p.967 #3, <u>7</u>, <u>8</u>, <u>9</u>, 41, 45
41.	Max-Min	14.7 p. 968 #<u>4</u>, 12, <u>13</u>, 48, 50
42.	Lagrange Multipliers	14.8 p. 977 #3, 5, 31, 35
43.	Lagrange Multipliers	14.8 p.977 #7, 9, 38, 40
44.	Integration Rectangular Regions	15.1 p.999 #<u>3</u>, 6, 15, 16, <u>17</u>, <u>18</u>
45.	Integration Rectangular Regions	15.1 p 999 #7, <u>8</u>, 19, 21, 27, <u>28</u>
46.	Non-Rectangular Regions	15,2 p. 1008 #<u>3</u>, 15, 19, 45, <u>46</u>, <u>47</u>

47. Non-Rectangular Regions   15.2 p. 1008 #<u>9</u>, 18, <u>20</u>, <u>48</u>, 51, <u>52</u>

48. Polar Coordinates   15.3 p. 1014 #<u>5</u>, 7, 8, 9, <u>10</u>, 11

49. Polar Coordinates   15.3 p. 1015 #12, 15, 29, <u>30</u>, <u>31</u>

50. Applications   15.4 p. 1024 #<u>3</u>, 7, 11, 13

51. Application   15.4 p. 1025 #27, <u>28</u>, 29

52. Triple Integrals   15.5 p. 1037 #4, 9, <u>13</u>, <u>19</u>, <u>20</u>

53. Triple Integrals   15.5 p. 1038 #<u>27</u>, <u>28</u>, <u>33</u>, <u>34</u>, <u>35</u>

54. Review

55. Hour Exam

56. Review

57.   Review

58.   Review

59.   Review

60. Review

   The final exam will consist of a multiple choice section and a long answer section. In lieu of a proof, the exam will have a problem in which a student will have to explain a concept in the student's own words.

Learning Goals and Objectives for Calculus III (SM223)

Upon successful completion of this course, students should be able to do the following:

1. Describe basic curves and space motion (including projectile motion) using vector functions and their derivatives and integrals
2. Draw and interpret level sets and graphs of a real valued function
3. Use partial derivatives, directional derivatives, and gradient vectors to describe the behavior of a real valued function.
4. Solve extreme value problems by finding and classifying critical points and by the method of Lagrange multipliers

5. Evaluate double and triple integrals in rectangular and polar coordinates and use integrals to find centers of mass and probabilities

6. Write well-organized, coherent solutions to applications problems