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Summer Problem Set (Problem Set 1)

These problems come from the text by Simon & Blume. Note that you can check your answers to many of these problems in the back of the book. However, you should attempt each problem independently, and check your answer only after you have either solved the problem or struggled with the problem unsuccessfully for at least 15 minutes.

I estimate that each problem will take you 15 minutes on average, though that figure could be much higher if some of the material is unfamiliar to you from previous classes. At 15 minutes per problem, it should take you a total of around 30 hours to complete the problem set. At half an hour per day during the next two months, I hope that's not too daunting. This work will prepare you quite well for the fast-paced course in August.

1. Problem 2.1.
2. Problem 2.3. Note that the (2) refers to equation (2) on page 12.
3. Problem 2.4.
4. Problem 2.5.
5. Problem 2.8.
6. Problem 2.9.
7. Problem 2.10(b). The proof of Theorem 2.2 can be found in Example 2.6.
8. Problem 2.11(b,d,f,h,j,l).
9. Problem 2.12.
10. Problem 2.13.
11. Problem 2.14.
12. Problem 2.16.
13. Problem 2.17.
14. Problem 2.18. You are asked to describe for what values of x the function is continuous, and for what values of x it is differentiable.
15. Problem 2.19. On separate graphs, plot both the function and its first derivative. Label the point where the second derivative does not exist. Is this a C^1 function? Is this a C^2 function?
16. Problem 2.20(omit k, l, m).
17. Problem 2.22.
18. Problem 2.23.
19. Problem 2.24.
20. Problem 3.2.
21. Problem 3.3. Graph the functions in question 3.1, using whatever technique you like, and then label the regions of convexity and concavity.
22. Problem 3.5.
23. Problem 3.7(d,e,f).
24. Problem 3.8.
25. Problem 3.9(e,f,g,h).
26. Problem 3.10.

27. Problem 3.12.
28. Problem 3.13.
29. Problem 3.15. You are asked to demonstrate the truth of the three properties in Theorem 3.7 for this specific function, and then graph the average and marginal cost functions as in Figure 3.19.
30. Problem 3.16.
31. Problem 3.18.
32. Problem 4.1(d,e).
33. Problem 4.2.
34. Problem 4.3(d,e).
35. Problem 4.4(d).
36. Problem 4.5(e,f,g).
37. Problem 4.7.
38. Problem 4.8.
39. Problem 4.9.
40. Problem 5.2(a,b).
41. Problem 5.4.
42. Problem 5.5(a,b,c).
43. Problem 5.6.
44. Problem 5.8.
45. Problem 5.16.
46. Problem 5.17.
47. Problem A4.1.
48. Problem A4.2.
49. Problem A4.3.
50. Problem A4.4.
51. Problem A4.5.
52. Problem A5.1.
53. Problem A5.2.
54. Problem A5.3.
55. Problem 6.3.
56. Problem 6.4.
57. Problem 7.1.
58. Problem 7.2.
59. Problem 7.3.
60. Problem 7.7.
61. Problem 7.8.
62. Problem 7.10 (omit d,e).
63. Problem 7.11 (omit c).
64. Problem 7.12.
65. Problem 7.13 (omit c).
66. Problem 7.14.
67. Problem 7.15.
68. Problem 7.16 (omit c,d).
69. Problem 7.18.
70. Problem 7.20 (omit e).

71. Problem 7.21.
72. Problem 7.22.
73. Problem 7.23.
74. Problem 7.25.
75. Problem 7.30.
76. Problem 8.1.
77. Problem 8.2.
78. Problem 8.3.
79. Problem 8.4. Two examples will suffice.
80. Problem 8.5.
81. Problem 8.6.
82. Problem 8.7.
83. Problem 8.9.
84. Problem 8.10.
85. Problem 8.11. You are asked to multiply all four of the matrices together, and demonstrate that you get the row echelon form.
86. Problem 8.15.
87. Problem 8.16.
88. Problem 8.18.
89. Problem 8.19 (omit d,e,f).
90. Problem 8.22.
91. Problem 8.23. You are asked to prove the three statements involving permutation matrices and scalar numbers.
92. Problem 8.26.
93. Problem 8.27. Don't worry about the case for general k; just prove these statements for k=2.
94. Problem 8.31.
95. Problem 8.38. You may find it unfamiliar to write matrices in block form. Believe it or not, it will come in handy in econometrics class to be able to understand this notation.
96. Problem 8.39. The first part of this question is poorly worded. Instead of saying "show that the matrix D exists," it should say "show that the matrix D is well-defined." That is, I want you to check to make sure the dimensions of the matrix work out correctly.
97. Problem 9.1.
98. Problem 9.2.
99. Problem 9.3.
100. Problem 9.4.
101. Problem 9.7.
102. Problem 9.8.
103. Problem 9.9 (omit d,e).
104. Problem 9.10.
105. Problem 9.11.