Homework, Section 7.3

1. Given transportation tableau below, write out the original linear program and its dual (be sure to use u, v notation for the dual).

	2	3	5	6	5
	2	1	3	5	10
	3	8	4	6	15
Demand	12	8	4	6	30

2. Given the BFS below, compute the solution to the dual and determine if the BFS gives the optimal solution. If not, say which cell should come into the basis.

	$v_1 =$	$v_2 =$	$v_3 =$	$v_4 =$	Supply
$u_1 =$	cost 2; 5	cost 3	cost 5	cost 6	5
$u_2 =$	cost 2; 7	cost 1; 3	cost 3	cost 5	10
$u_3 =$	cost 3	cost 8; 5	cost 4; 4	cost 6; 6	15
Demand	12	8	4	6	30

3. Continuing from the previous answer, update the tableau and check if it is optimal:

	$v_1 =$	$v_2 =$	$v_3 =$	$v_4 =$	Supply
$u_1 =$	2	3	5	6	5
$u_2 =$	2	1	3	5	10
$u_3 =$	3	8	4	6	15
Demand	12	8	4	6	30

4. In the previous problem, at least one cell should have (0), which means that entry could be used in the BFS, which would give an alternate BFS- Find an alternate BFS to the one you found above.

5. Here is a transportation tableau. Use any method to get a BFS, then use MODI to find the optimal solution.

	$v_1 =$	$v_2 =$	$v_3 =$	Supply
$u_1 =$	2	2	3	10
$u_2 =$	4	1	2	15
$u_3 =$	1	2	1	40
Demand	20	15	30	65

6. If we have 4 warehouses and 5 customers, (i) How many decision variables are in the original linear program for the transporation problem? (ii) How many variables need to be determined to make up a basic feasible solution? Are there any other restrictions on those variables (to make up a BFS)?