**CSE 5319/6319 Homework 4**

Due April 30, 5:00 p.m. on Canvas

1. KP p. 266, problem 14.18. (10 points)

2. Similar to p. 4-5 of notes03.2.mech.pdf, analyze the Allocation Algorithm for Downward Sloping Valuations for following *vi*(*k*) values for buyer *i*. Note that *vi*(*k*) = *vi*1 + *vi*2 + . . . + *vik*. The result is a table of clearing prices and allocations like the one at the top of p. 5. (10 points)

 *k*

 *vi*(*k*) 0 1 2 3 4 5 6 7 8

 1 0 50 100 140 180 210 230 240 250

 50 50 40 40 30 20 10 10

 *i* 2 0 70 130 181 216 249 279 304 314

 70 60 51 35 33 30 25 10

 3 0 60 110 150 190 225 251 276 301

 60 50 40 40 35 26 25 25

3. Compute the VCG payments for the minimum spanning tree for this graph. (10 points)

 

4. Determine the optimal fixed price for the following bids for copies of a digital good: (10 points)

10 9 8 6 6 5 5 5 5 5 5 4 4 2 2 2 2 1 1 1

5. For https://ranger.uta.edu/~weems/NOTES6319/AUCTION/auction2.dat: (20 points)

a. Find a maximum-weight bipartite matching via ascending auction.

b. Compute the lowest envy-free price vector (KP Theorem 17.2.6).

c. Compute the highest envy-free price vector (Corollary 17.2.9).

d. Solve fair division (KP section 17.3) using the above envy-free price vectors for a 5-room apartment with monthly rent of $500.

6. Determine a minimum-weight bipartite matching for https://ranger.uta.edu/~weems/NOTES6319/AUCTION/auction2.dat. (10 points)

7. How many maximum-weight bipartite matchings are there for https://ranger.uta.edu/~weems/NOTES6319/AUCTION/auction4.dat? (10 points)

8. How many maximum-weight bipartite matchings are there for https://ranger.uta.edu/~weems/NOTES6319/AUCTION/auction5.dat? (10 points)

9. Use Gambit to compute Nash equilibria for: (10 points)

  