HOMEWORK 4

1. You should do the following problem by hand. Maximize $P = 3x + 4y$ given the constraints, $x \geq 0$, $y \geq 0$,$x + y \leq 10$, $5x - 3y \geq 1$. In particular (i) Sketch the feasible region, (ii) Find the corner points, (iii) evaluate P at each point and get the answer.

2. A poultry food manufacturer make 4 types of feed containing corn, grain, and minerals with the given fractions as specified below with the given costs. They are asked to make 8000 pounds of feed that contains at least 1600 pounds of corn, 1200 pounds of grain, and 1200 pounds of minerals. (a) Find a mixture of the four feeds that minimizes the cost. (b) Compute the shadow price of corn, grain, minerals (eg changing the corn, etc constraints) (c) How does your answer change if Feed 1 has 0.25 fraction of corn? Here are fractions of each substance in the feeds

	Feed 1	Feed 2	Feed 3	Feed 4
corn	.3	.5	.2	.1
grain	.1	.3	.15	.1
minerals	.2	.2	.2	.3
cost/lb	0.25	0.30	0.32	0.15

3. Do problems 15, 23 in Chapter 3.5 of Meerschaert. Here is a start for 23. Let x_{ij} be 0 or 1 according as whether file i is assigned to block j. Note that you get the equality constraint: $x_{i1}+x_{i2}+x_{i3}+x_{i4} = 1$ since each file i must be assigned to exactly one block j. Then you must constrain the files to remain in the blocks, for example $18x_{11}+23x_{21}+12x_{31}+125x_{41}+45x_{51} \leq 15$. You also want $x_{ij} \geq 0$.