

Homework #1

- 1 **Air pollution problem** Consider an airshed in which there is one major contributor to air pollution – a cement-manufacturing plant whose annual production capacity is 2,500,000 barrels of cement. Figures are not available to determine whether the plant has been operating at capacity. Although the kilns are equipped with mechanical collectors for air pollution control, the plant still emits 2.0 lb of dust per barrel of cement produced. There are two types of electrostatic precipitators that can be installed to control dust emission. The four-field type would reduce emissions by 1.5 lb of dust per barrel and would cost \$0.14 per barrel to operate. The five-field type would reduce emissions by 1.8 lb of dust per barrel and would cost \$0.18 per barrel to operate. The EPA requires that particulate emissions be reduced by at least 84%. How many barrels of cement should be produced using each new control process to minimize the cost of controls and still meet the EPA requirements?

- 2 Sketch the set of feasible solutions to the following set of inequalities:

$$\begin{aligned} -x + y &\leq 2 \\ 2x + y &\leq 2 \\ y &\leq 1 \\ x &\geq 0 \end{aligned}$$