

Homework 1 - Math 381 A - Winter 2016 - Dr. Matthew Conroy

1. Solve the following LP graphically by hand. Include figures and a detailed description of your method. Minimize $x + y$ subject to

$$10x + 3y \leq 60$$

$$5x + 6y \geq 50$$

$$y - 3x \leq 2$$

2. Consider the salsa-and-guacamole scenario from lecture. Suppose we sell salsa for \$1 per unit, and guacamole for \$ z per unit. Depending on the value of z , we would maximize revenue by making all salsa, all guacamole, or some of each. Describe the range of z values corresponding to each type of solution, and give plenty of justification.
3. Suppose you have the following objects, each with a weight, a volume and a value, as shown.

object	weight	volume	value
1	10	5	72
2	11	6	80
3	7	10	66
4	12	4	75
5	3	9	68
6	4	8	50
7	9	12	85
8	2	10	55
9	8	8	82

Which objects should you put in a knapsack with weight capacity 40 and volume capacity 40 such that the total value is maximized?

Define an IP for this problem. Then solve it with lpsolve. Include all input and output to lpsolve, and comment on the solution (i.e., don't just post the output of lpsolve).

Are the constraints binding or not?