Homework #7

This is an individual assignment. All work that you submit for credit must be your own.

1. Better Products, Inc. manufactures three products on two machines. Every product must be processed on both machines. In a typical week, 40 hours are available on each machine. The profit contribution and production time in hours per unit are given in the table below

	Product 1	Product 2	Product 3
Profit/unit	$30	$50	$20
Machine 1 hours/unit	0.50	2.00	0.75
Machine 2 hours/unit	1.00	1.00	0.50

   Two operators are required to run machine 1 which means 2 hours of labor are required for each hour of production time on machine 1. However, only one operator is required to run machine 2. A maximum of 100 labor hours are available each week. Product 1 cannot account for more than 50% of the total units produced, and product 3 must account for at least 20% of the total units produced.
   a. Construct a linear optimization model in excel Excel spreadsheet for this problem and use it to find an optimal solution. (35 points)
   b. Develop an optimization model in a Jupyter Notebook using python to find an optimal solution. (50 points)
   c. What is the value of an additional hour of labor? (5 points)
   d. If the labor capacity can be increased by 20 hours would you use them? If so, what would be the new optimal solution using these additional hours? (use your Excel model to answer this part) (10 points)