**Project #1. Coffee Blending and Sales**. Hill-O-Beans Coffee Company blends four component beans into three brands of coffee for sale: one to luxury hotels, a second to restaurants, and a third to supermarkets for store-label brands. The bean suppliers are: Robusta, Javan Arabica, Liberica, and Brazilian Arabica. The company must decide how much of each bean type goes into each brand of coffee.

There are supply limitations for each of the four types of beans given by the blue table below, along with the cost of each type of bean per pound. The processor’s plant can handle no more than 100,000 pounds per week. There is virtually an unlimited demand for the brands, but the marketing department requires a minimum production level of 10,000, 25,000, and 30,000 respectively for the hotel, restaurant, and market brands.

The company has contractual requirements for the minimum amount of caffeine in each of the brands, shown in the second (orange) table. The caffeine contents of each of the beans in the supply chain are shown in the blue table.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Cost | Supply | Caffeine |
| *Robusta* | $ 0.60 | 40,000 | 12 |
| *Javan* | $ 0.80 | 25,000 | 30 |
| *Liberica* | $ 0.55 | 20,000 | 18 |
| *Brazilian* | $ 0.70 | 45,000 | 20 |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Price | Caffeine | Min Production |
| Hotel | $1.25 | 18 | 10,000 |
| Restaurant | $1.50 | 26 | 25,000 |
| Market | $1.40 | 22 | 30,000 |

1. In order to maximize weekly profit, how many pounds of each type of bean should be purchased?
2. What is the economic value of an additional pound’s worth of plant capacity?
3. How much (per pound) should Hill-O-Beans be willing to pay for an additional pound of Liberica in order to raise total profit?
4. Construct a graph to show how the optimal profit varies with the minimum weekly production level of the restaurant blend.
5. Construct a graph to show how the optimal profit varies with the unit cost of the Robusta beans.
6. What should the Robusta bean price be to ensure that profit is *exactly* $68,625.