Exploration 16B: Sensitivity Analysis

In this exploration, we will learn a little about “Sensitivity analysis”. We’ll use the example of producing chairs, tables, and juice carts (Examples 16.A.1, 16.A.2 and 16.B.1) and see how the optimal solution changes as we adjust the information about costs and labor hours. Use the file “C16 Furniture2.xls”. Each of the following scenarios is a slight modification to the existing data – simply change the numbers from the original values and run the solver routine to see what happens. Summarize your results in the tables provided.

**Scenario A.** It is probably not realistic to assume that each and every chair is assembled in 1 hour. Suppose your assembly crews are a little faster (0.9 assembly hours per chair) or a little slower (1.1 assembly hours per chair). How does the optimal solution change?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Value Being Adjusted | Assembly time for chairs | | | |
| Change being made | Value | Optimal # chairs | Optimal # tables | Optimal # carts |
| Lower | 0.9 |  |  |  |
| Original value | 1.0 | 62 | 34 | 76 |
| Higher | 1.1 |  |  |  |

**Scenario B.** The market probably changes a little, resulting in slight differences in actual selling prices for the products. What happens if the selling price of juice carts fluctuates between \$35 and \$37?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Value Being Adjusted | Selling price for juice carts | | | |
| Change being made | Value | Optimal # chairs | Optimal # tables | Optimal # carts |
| Lower | $35 |  |  |  |
| Original value | $36 | 62 | 34 | 76 |
| Higher | $37 |  |  |  |

**Scenario C.** Just as your selling prices fluctuate, you should expect your material costs to change slightly. Explore what happens if the material cost for the tables is between \$14 and \$16.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Value Being Adjusted | Material cost for tables | | | |
| Change being made | Value | Optimal # chairs | Optimal # tables | Optimal # carts |
| Lower | $14 |  |  |  |
| Original value | $15 | 62 | 34 | 76 |
| Higher | $16 |  |  |  |

**Scenario D.** Suppose the union demands that the workers in the assembly portion get higher wages. Explore what happens if the wages are raised from \$4 to \$5 or \$6 per hour of assembly work.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Value Being Adjusted | Labor cost for assembly | | | |
| Change being made | Value | Optimal # chairs | Optimal # tables | Optimal # carts |
| Lower | $4 |  |  |  |
| Original value | $5 | 62 | 34 | 76 |
| Higher | $6 |  |  |  |