Module 02 – Transportation Modeling

Exploratory Data Analysis

Model Formulation

MIN $\quad$ $0.124X_1+0.132X_2+0.155X_3+0.151X_4+0.096X_5+0.128X_6$ $\quad$ } profit

Subject to: $\quad$ $58X_5+51x_6 \leq 109$ $\qquad$ } *cinnamon constraint*

$\qquad$ $23x_1+56x_4+38x_6 \leq 117$ $\qquad$ } *butter constraint*

$\qquad$ $96x_2+44x_5 \leq 140$ $\qquad$ } *fudge constraint*

$\qquad$ $71x_1+99x_2 \leq 170$ $\qquad$ } *candy cane constraint*

$\qquad$ $1x_1$ $\qquad$ ≥ 0 $\qquad$ } *simpler lower bound*

$\qquad$ $1x_2$ $\qquad$ ≥ 0 $\qquad$ } *simpler lower bound*

$\qquad$ $1x_3$ $\qquad$ ≥ 0 $\qquad$ } *simpler lower bound*

$\qquad$ $1x_4$ $\qquad$ ≥ 0 $\qquad$ } *simpler lower bound*

$\qquad$ $1x_5$ $\qquad$ ≥ 0 $\qquad$ } *simpler lower bound*

Model Optimized for Profit

Average of Total_Cost	Starburst Starlit Skies	Mallow Melt Mountains	Peppermint Peninsula	Soda Pop Springs	Marzipan Metropolis	Pudding Peaks	Actual	Capacity
Cinnamon Swamp	-	-	-	-	58	51	109	109
Butter Rum Reef	23	-	-	56	-	38	117	117
Fudge Falls	-	96	-	-	44	-	140	140
Candy Cane Canyon	71	-	99	-	-	-	170	170
Received	94	96	99	56	102	89		
Max	94	96	99	89	102	89		
Total Profit	$ 48.17							

My models show to minimize costs capacity can still be filled but a certain amount of each candy must be produced.

Model with Stipulation

If you add an additional constraint the so that the capacity is 190 units for cinnamon swamp the data becomes a lot more scattered. For example, numbers are either near 0 or closing in on 100. If demand MUST be met the model is still possible as long as the numbers are not astronomical in comparison to the others (i.e. 100,000,000 to 1).