# Retail Pricing Optimization Analysis

## 1. How effective was your model in achieving the amusement park’s goals?

The model effectively meets the amusement park’s primary objective of maximizing revenue over a 13-week planning horizon by:  
- Enforcing ladder pricing, which aligns with the company's pricing policy and operational constraints.  
- Incorporating a data-driven demand model, leveraging historical price and seasonal trends to predict future demand with improved realism.  
- Utilizing Gurobi's optimization engine to explore all feasible price combinations across the ladder and select those that yield the highest revenue.  
  
Additionally, by excluding week 164, the model respects real-world constraints or exceptions in the planning calendar, adding to its practical relevance.  
  
The outcome is a set of strategically chosen prices that are both actionable and optimized, helping the park to generate higher revenue without violating business rules.

## 2. How could the model be further improved?

While the current model provides a solid foundation, several enhancements could increase its effectiveness and realism:

* Model Enhancements
* - Add capacity or attendance constraints to prevent over-promising demand beyond operational capacity.
* - Introduce a promotion budget constraint to model trade-offs between price cuts and marketing spend.
* Demand Model Improvements
* - Consider a non-linear or piecewise demand function if demand is not linearly responsive to price.
* - Add external variables like weather, holidays, or local events which may impact attendance and revenue.
* Behavioral & Competitive Factors
* - Integrate consumer behavior insights, such as price elasticity clusters or advanced segmentation.
* - Include competitor pricing as an input to adjust strategy dynamically.
* Validation & Simulation
* - Use backtesting with historical data to compare predicted vs. actual revenue.
* - Run what-if simulations (e.g., if ladder prices change, or constraints shift).