I was tasked with assessing the current ticket prices of Big Mountain Resort. Previously the ticket prices had been set by comparing market prices. My goal was to take available data and analyze it to determine if the current price makes the most sense financially with known industry factors.My initial data set was that of the resorts within the United States with details regarding prices and features for each resort.

The initial work involved organizing and cleaning the data for it to be compared based on price. I removed or corrected erroneous data points that may have skewed the final results unnecessarily.

Additionally, I incorporated public sourced state data to look at the ski data through the lens of the state in which the resort resides. This allowed me to compare resorts per state by population and land mass.

Big Mountain Resort resides in Montana. I was able to determine through the data that Montana is the 3rd largest state by area mass, although it is not highly populated. Also notable is that Montana has the 4th highest skiable area. Due to the size and population the calculation revealed that Montana has a high resorts per 100k capita but it is not high for resorts per 100k square miles. Although this information was gathered I ultimately made the pricing suggestions without the state specific conclusions.

Although the resort ski data contained both a weekday and weekend price, the weekend price was used for the pricing model as it had more available and consistent entries in the database.

Initially after cleaning the data, I reviewed a heat map to see the ski resort features that appeared to have a positive correlation with ticket prices. The correlation came back strongest for the presence of fast quads, number of runs, and snow making AC. Then I created a few more detailed looks at comparison of 2 features, namely total chairs/runs, total chairs/skiable terrain, fast quad/runs, fast quad/skiable terrain.

My next step was to split the data into a training and testing data set. I used the standard scaler fit method to put numbers on a consistent scale. This allowed me to create a prediction for both the train and test data model. In this work I identified vertical drop as one of the biggest positive correlated features in comparison to ticket prices. Fortunately, Big Mountain Resort performs well as its vertical drop statistic is significant.

Although I did analysis using the train/test model, I also performed an analysis using the Random Forest Model. This model was the preferred way forward, because it had a lower mean\_absolute\_error and less variability. Additionally beneficial, this model uses cross-validation as part of the fitting process.

Once the Random Forest Model was set I was able to dive in for a deeper exploration of the data. I found that based on the model that the expected Big Mountain ticket price was $95.87, a significant increase from the current weekend price of $81. The mean absolute error in this calculation was $10.39. This indicates that increasing ticket prices appears to be logical and justifiable.

The features that were determined most important were built into the predictive model and compared to the data points specific to Big Mountain Resort. The findings regarding these features showed that Big Mountain is on the high end for snow making and has one of the highest number of chair lifts. Big Mountain also stood out with having 3 fast quads, which is positive since most resorts have fewer or no fast quads at all. Big Mountain boasts a large total number of runs as well as one of the longest runs overall. Although there is no tram at Big Mountain, it is common for resorts to not have a tram. Lastly, skiable terrain for Big Mountain was ranked as one of the best against its competitors.

One of the final tasks of the project allowed me to evaluate some potential changes to the resort and determine how they would impact the ticket cost evaluation. The conclusion of these sample scenarios is that if one to six runs are closed the ticket price justification would have a small impact only. Closing more than six runs would cause a dip in the price however, and is not recommended.

I also investigated increasing the vertical drop by adding an additional lift. This scenario supported an $8.61 ticket price and a seasonal increase of over $15 million. This looks to be a lucrative decision for increasing the features for Big Mountain and warranting a premium ticket price.

In test scenarios, increases to snow making and longest run did not have a substantial impact on ticket price as these features were not as highly ranked by the predictive model.

In conclusion, my recommendation based on resort data, is that ticket prices for Big Mountain ski resort be increased to $95. Additionally, I recommend closing one underperforming run to save money. Lastly, I believe by adding an additional chair lift and increasing the vertical drop by 150 feet will justify a ticket increase to $100 and still offset the cost of building the additional lift.