Big Mountain ski resort recently added a new ski lift that increased their overall operation costs $1.54 million. In order to increase profits as well as ensure that Big Mountain resort was pricing their tickets appropriately to match the quality of their facilities, Big Mountain has asked us to look into the market data and create some suggestions.

We started off looking at the raw data with 27 columns, which were the different facilities of each resort, and 330 resorts. The raw data did include our resort, Big Mountain, within it. We removed unusable data, which was data that would not affect our query or data that was missing too much and reduced the data to 25 columns and 277 rows. We cleaned the data to ensure no duplicate values and replaced outliers, which were caused by incorrect entry, with the correct information.

Since our main focus are the ticket prices, we compared adult weekday and adult weekend prices to see if there is much of a difference. There was little to no difference between the two values so we removed the adult weekday data as it was missing more values than the weekend pricing.

Our next step was to find relationships between different variables and the ticket prices. For instance, when relating state and ticket price, there did not seem to be a significant correlation between the two variables. Some other relationships that came to surface at this time was the night skiing state ratio information that seems to be correlated with ticket price. A few others would include, runs, shairs and snow making.

We then worked with a train and test split on the data in order to assess the best model for this data. I used R-squared to test the training set and predictions on how close they are to the true values. Next, I used the mean absolute error and mean squared error to find that I would be $19 off if I guessed the ticket price based on the average of known values. Then I created a linear model and the biggest positive features found were fast quads, runs, snow making then vertical drop. Through the train and test splits, we found that the random forest model had a lower cross-validation by $1 showing that the performance on the test split was consistent but the test set may be a little messier. This also concludes that probably the best model to move forward with would be the random forest model, as it is cleanest and accurate with consistent cross-validation results.

Currently Big Mountain charges $81 for Adult Weekend ticket prices. With Big Mountain's current facilities, the modeled price would land at $93.93, which shows that there is a good amount of room to increase if Big Mountain chooses to. Given the fact that Big Mountain currently is in need of $1.54 million more in order to break even in the next ski season, and they are expected to have a number of 350,000 visitors, who on average would ski for 5 days, a low increase of $1 per ticket per day would be enough to cover the price of the operating cost of the new lift. Suggesting that Big Mountain should make a ticket increase of at least $1 in order to break even.

Big Mountain executives are also considering some changes including closing down runs or increasing the vertical drop. So we created some modeling to look at what this would suggest. Through the modeling, we found that the suggested changes of closing down runs would begin to see a decrease of ticket price at 2-3 runs and even further losses at 3-5 runs. Increasing the vertical drop or installing an additional chair lift could support an increase in ticket price for as much as $2. Increasing snow making acreage, or increasing the longest run would have no change on ticket

price. So if Big Mountain would want to continue pursuing any changes, we would suggest closing 2-3 runs and increasing the vertical drop to increase profits while still supporting a potential increase in ticket pricing.

We hope that this information is helpful and informative to Big Mountain Resort! For further consideration, perhaps considering more facilities offered such as ski lodge, resort or food options, or even ski/snowboard lessons would be interesting to look into.