Due to the addition of a new chair lift, Big Mountain Resort will have an additional $1,540,000 in operating costs this season. Investors wanted to investigate how to increase revenue in order to cancel out this cost and keep the profit margin at or around 9.2%. To create a model, we were given a dataset consisting of 330 rows that contained general information about the previous ski season of resorts throughout the United States. The goal was to compare the information of these ski resorts with that of Big Mountain to see if we could justify an increase in ticket prices in order to increase revenue. In addition, we were interested in finding which variables correlated closely with higher ticket prices. We used both supervised and unsupervised learning in order to answer both of these questions.

We began by using k-means clustering to add a new column to our dataset which categorized each resort into one of three different clusters. We then dropped some columns that contained either non-numeric information, or data on things that we deemed outside of the control of management, such as which state the resort is located in, etc. We chose Adult Weekend ticket prices as our response variable and fit the data to a linear model after using a scaler to standardize the numerical values. This model gave us an explained variance score of **0.9300** and a mean absolute error of **5.3267**.

A close up of a map

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Description automatically generatedUsing this model, we found the predicted value of Big Mountain’s Adult Weekend ticket price to be **$88.50.** We were also able to identify the variables that had the greatest coefficients with respect to a correlation with Adult Weekend ticket prices. The top 5 of these included Adult Weekday prices, the difference between the highest and lowest altitude of the resort, the number of runs, and the number of quad and triple lifts. We also created a few figures in order to visualize the correlation between some of these variables:

The figures on the right and bottom demonstrate the positive correlation between ticket prices and number of runs and days open last year, respectively. On the left, we can see the three clusters we created earlier with k-means clustering. There is a clear correlation between which cluster a resort falls in and its summit elevation and vertical drop.

As Big Mountain currently charges $81.00 for a weekend ticket, my recommendation would be to increase the ticket price to $88.50 in order to increase revenue and stay in line with other resorts throughout the country. Next steps would be to create a similar model with the weekday price as the response variable in order to see if we could justify an increase in that price as well. In addition, management might want to look into increasing some of the variables that are correlated with higher ticket prices, such as number of runs and number of quad and triple lifts.