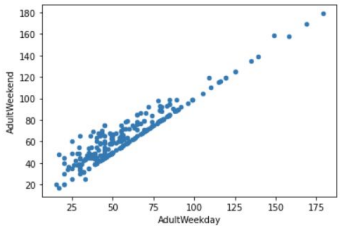
The goal of this project is to build a pricing model for Big Mountain Ski Resort in Montana in order to help the resort price their ticket and select future investments i.e. what should big mountain price their ticket at in order to maintain profits.

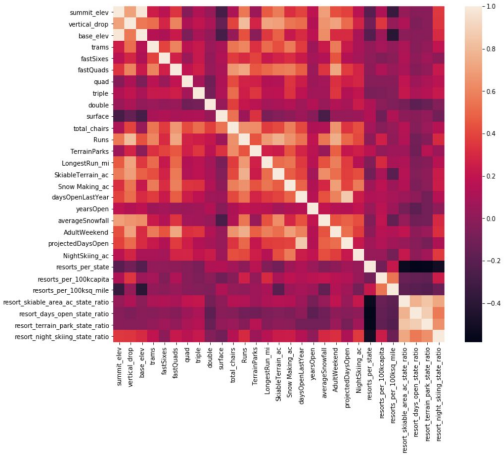
Starting out with data wrangling on ski_data.csv, we removed rows containing erroneous data (fast8s) and made corrections to some misreported data (state population) which resulted in reducing the shape from (330, 27) to (277,25). Upon analysis on missing values of weekend and weekday ticket price we decided to conduct the analysis on weekend prices since fewer values were missing.

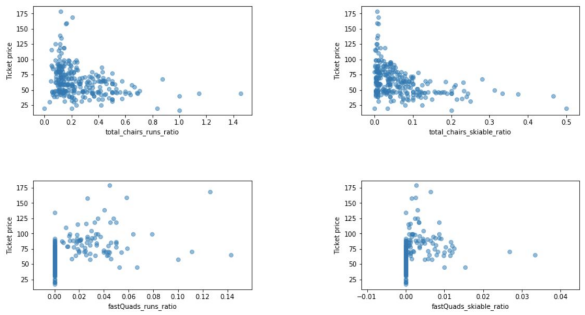
```
In [78]: ski_data[['AdultWeekend', 'AdultWeekday']].isnull().sum()

Out[78]: AdultWeekend    4
         AdultWeekday    7
         dtype: int64
```

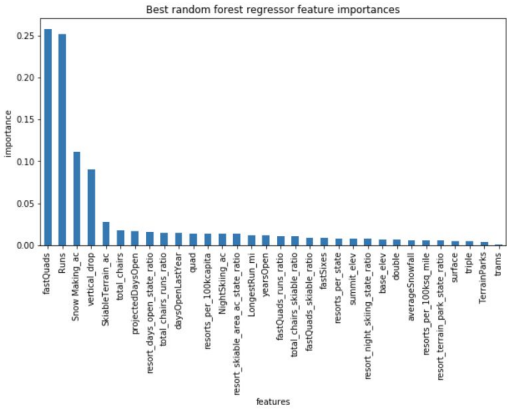


During the exploratory data analysis stage, we wanted to try and predict a few ticket prices. We saw that Utah and Colorado had the highest weekend ticket prices and that certain features were more correlated than others especially runs and snowmaking i.e. more snowable area could mean you could charge more for tickets. Although it doesn't mean feature and ticket price are entirely related since we don’t have data on # of visitors per year.





Before we began building out a machine learning model In the preprocessing and training section we needed to test whether or not simply the mean was going to be a useful metric. We then incorporated pipeline and created a linear model to identify feature importance (negative and positive associations). We chose to go with the random forest model going forward.



Lastly, we leveraged our model to see the results of changes in certain features in order to predict the ticket price Big Mountain Resort should set. We predicted Big Mountain's ticket price based on several features we found to be important 'vertical_drop', 'Snow Making_ac', 'total_chairs', 'fastQuads','Runs', 'LongestRun_mi', 'trams', 'SkiableTerrain_ac'. Originally priced at $81 we remodeled the price to be $95 with a $10.39 MAE. Further analysis had to be done in order to determine whether Big Mountain was priced low in the market or other resorts were priced low. We determined that Big Mountain could support a $1.99 increase in prices if they added a chair lift and increased the vertical drop on their runs and each visitor bought on average 5 tickets. There are other potential scenarios or shortlisted items that could be tested.

In [37]:
```
#Code task 5#
#Repeat scenario 2 conditions, but add an increase of 2 to `Snow Making_ac`
ticket3_increase = predict_increase(['Runs', 'vertical_drop', 'total_chairs', 'Snow Making_ac'], [1, 150, 1, 2])
revenue3_increase = 5 * expected_visitors * ticket3_increase
```

In [38]:
```
print(f'This scenario increases support for ticket price by ${ticket3_increase:.2f}')
print(f'Over the season, this could be expected to amount to ${revenue3_increase:.0f}')
```

```
This scenario increases support for ticket price by $1.99
Over the season, this could be expected to amount to $3474638
```

In this scenario, Big Mountain is adding a run, increasing the vertical drop by 150 feet, and installing an additional chair lift.

In [35]:
```
#Code task 4#
#Call `predict_increase` with a list of the features 'Runs', 'vertical_drop', and 'total_chairs'
#and associated deltas of 1, 150, and 1
ticket2_increase = predict_increase(['Runs', 'vertical_drop', 'total_chairs'], [1, 150, 1])
revenue2_increase = 5 * expected_visitors * ticket2_increase
```

In [36]:
```
print(f'This scenario increases support for ticket price by ${ticket2_increase:.2f}')
print(f'Over the season, this could be expected to amount to ${revenue2_increase:.0f}')
```

```
This scenario increases support for ticket price by $1.99
Over the season, this could be expected to amount to $3474638
```