Libraries

In [6]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from scipy import stats
from sklearn.preprocessing import StandardScaler, PolynomialFeatures
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import r2_score, mean_squared_error
```

Import dataset

In [7]:
```
df = pd.read_csv('IceCreamData.csv')
df.head()
```

Out[7]:

	Temperature	Revenue
0	24.566884	534.799028
1	26.005191	625.190122
2	27.790554	660.632289
3	20.595335	487.706960
4	11.503498	316.240194

In [8]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 500 entries, 0 to 499
Data columns (total 2 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   Temperature  500 non-null    float64
 1   Revenue      500 non-null    float64
dtypes: float64(2)
memory usage: 7.9 KB
```

In [9]:
```
df.describe()
# We have a dataset of two columns: `Temperature` and `Revenue`

# Some questions I want to explore and test:

# 1. I hypothesize that temperature and revenue have a strong positive association
# 2. What
```

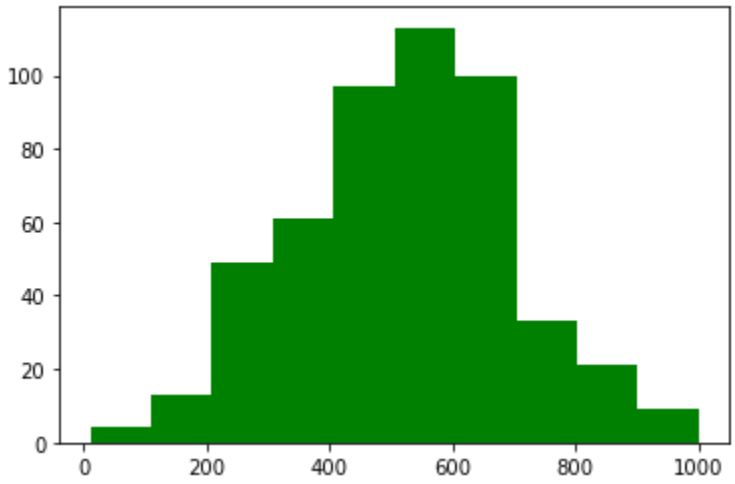
Out[9]:

	Temperature	Revenue
count	500.000000	500.000000
mean	22.232225	521.570777
std	8.096388	175.404751
min	0.000000	10.000000
25%	17.122258	405.558681
50%	22.392791	529.368565
75%	27.740674	642.257922
max	45.000000	1000.000000

Data Visualization

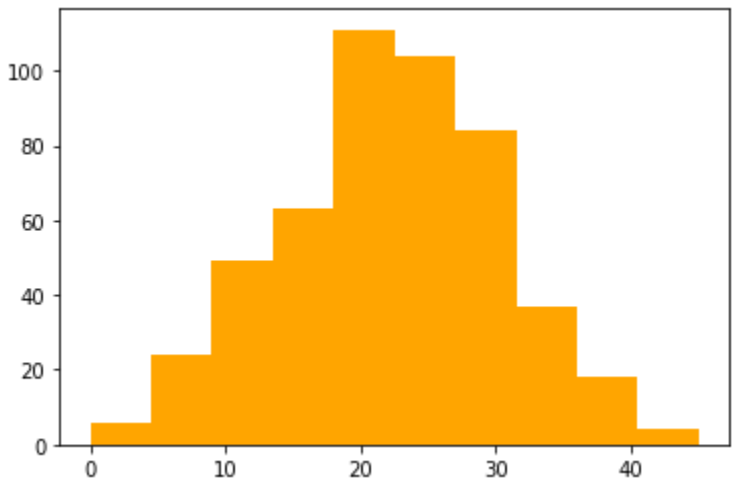
In [10]:
```
plt.hist(df['Revenue'],color='green')
```

Out[10]:
```
(array([  4.,  13.,  49.,  61.,  97., 113., 100.,  33.,  21.,   9.]),
 array([  10.,  109.,  208.,  307.,  406.,  505.,  604.,  703.,  802.,
         901., 1000.]),
 <BarContainer object of 10 artists>)
```



In [11]:
```
plt.hist(df['Temperature'],color='orange')
```

Out[11]:
```
(array([  6.,  24.,  49.,  63., 111., 104.,  84.,  37.,  18.,   4.]),
 array([ 0. ,  4.5,  9. , 13.5, 18. , 22.5, 27. , 31.5, 36. , 40.5, 45. ]),
 <BarContainer object of 10 artists>)
```



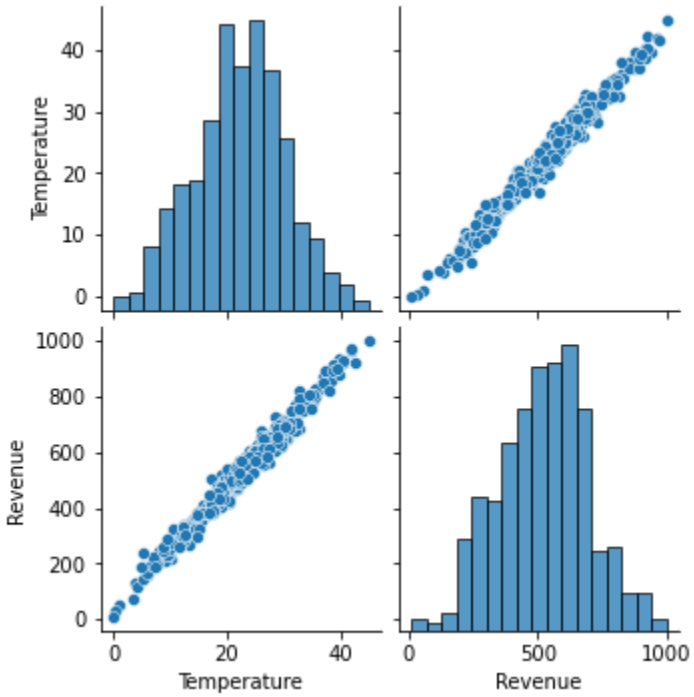
In [12]:
```
# The variables are roughly normal according to the histograms
```

```
# We can verify according to the Shapiro Normality Test

temp_shapiro = stats.shapiro(df['Temperature'])
rev_shapiro = stats.shapiro(df['Revenue'])

print(f"The Results are {temp_shapiro} & {rev_shapiro}")


# We can conclude that the variables are normally distributed
# based on the Shapiro Wilk's normality tests

#
```

```
The Results are ShapiroResult(statistic=0.9968999028205872, pvalue=0.45983168482780457)
& ShapiroResult(statistic=0.9967576265335083, pvalue=0.4173350930213928)
```

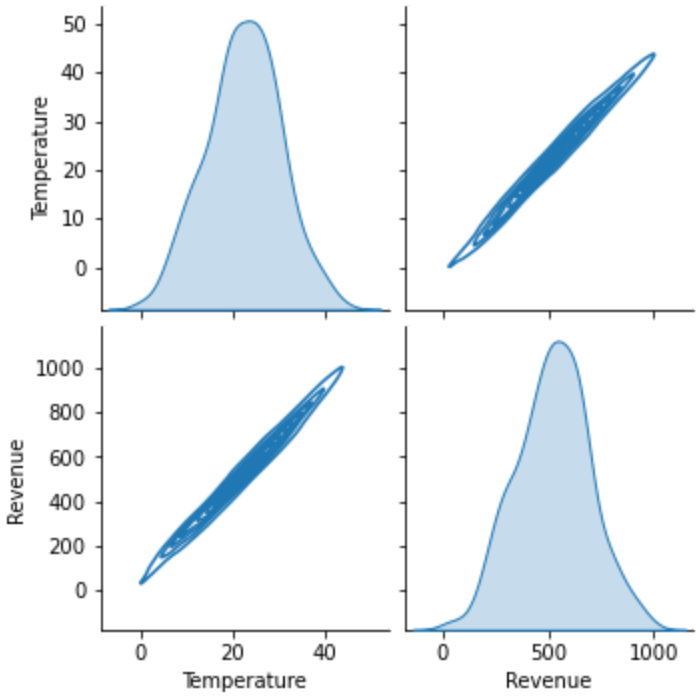
In [13]:
```
plt.figure(dpi=(500))
sns.pairplot(df)
```

Out[13]:
```
<seaborn.axisgrid.PairGrid at 0x156971a5b50>

<Figure size 3000x2000 with 0 Axes>
```



In [14]:
```
sns.pairplot(df, kind="kde")
```

Out[14]:
```
<seaborn.axisgrid.PairGrid at 0x15697332c70>
```



Checking Linear Regression Assumptions

Fitting the Model

In [17]:
```
df.iloc[:,:-1]
```

Out[17]:

	Temperature
0	24.566884
1	26.005191
2	27.790554
3	20.595335
4	11.503498
...	...
495	22.274899
496	32.893092
497	12.588157
498	22.362402
499	28.957736

500 rows × 1 columns

Splitting the dataset using `train_test_split`

In [21]:
```
# Splitting the dataset

X = df.iloc[:,:-1].values
Y = df.iloc[:,-1].values
```

```
TempTrain, TempTest, RevTrain, RevTest = train_test_split(X,Y,test_size=0.3,random_state
```

In [24]:
```
# Brief look at the splits

print('Training Temperature: ', TempTrain.shape, 'Training Revenue: ', RevTrain.shape,
     'Testing Temperature: ', TempTest.shape, 'Testing Revenue: ', RevTest.shape)
```

```
Training Temperature:  (350, 1) Training Revenue:  (350,) Testing Temperature:  (150, 1)
Testing Revenue:  (150,)
```

In [27]:
```
lnr = LinearRegression()
lnr.fit(TempTrain,RevTrain)
```

Out[27]:
```
LinearRegression()
```

Regression Formula:

$$ \hat{Revenue} = slope \times \hat{Temperature} + intercept $$

In [31]:
```
print('Linear Model Coefficient (slope): ', lnr.coef_)
print('Linear Model Coefficient (intercept): ', lnr.intercept_)
```

```
Linear Model Coefficient (slope):  [21.38]
Linear Model Coefficient (intercept):  46.91550104676253
```

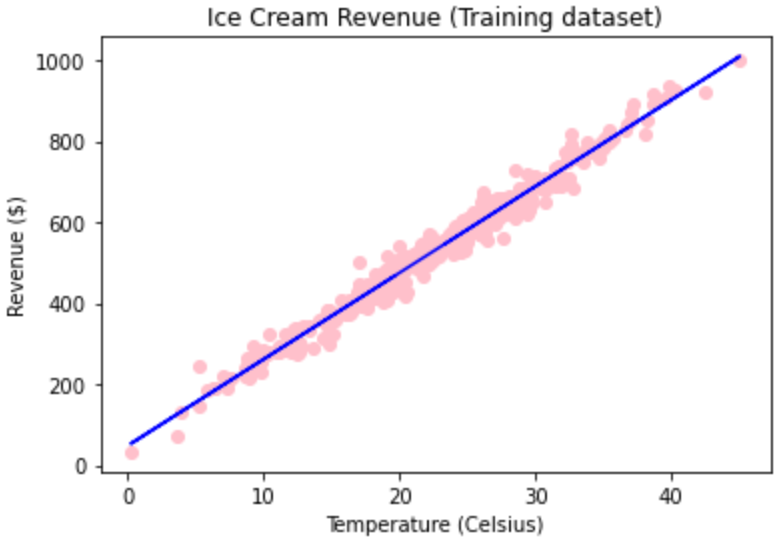
In [32]:
```
# Prediction

RevPred = lnr.predict(TempTest)
np.set_printoptions(precision=2)
print('Revenue Predictions Preview')
print((np.concatenate((RevPred.reshape(len(RevPred),1),RevTest.reshape(len(RevTest),1)),
```

```
Revenue Predictions Preview
[[697.41 704.28]
 [652.68 632.9 ]
 [664.01 662.56]
 [451.15 449.81]
 [664.75 636.3 ]
 [442.05 469.91]
 [583.85 587.22]
 [623.36 581.07]
 [666.75 675.83]
 [469.24 493.71]
 [546.85 506.43]]
```

Assessing the Predictions

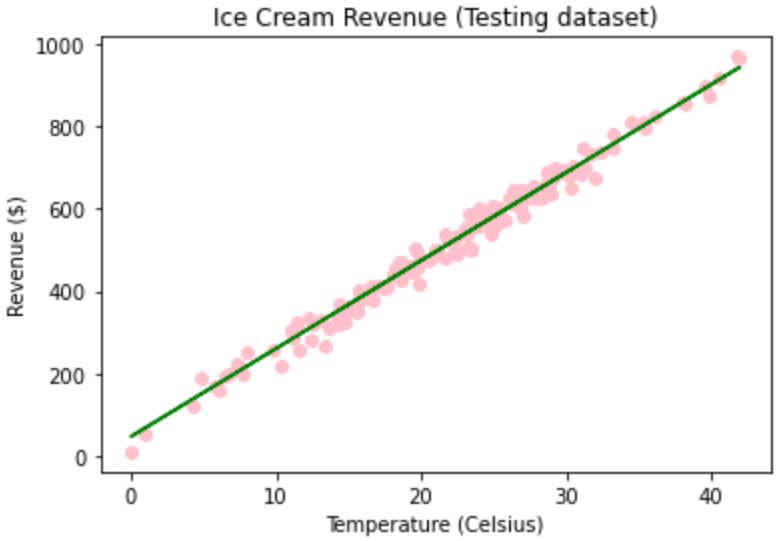
In [41]:
```
# plotting the Training set predictions

plt.scatter(TempTrain, RevTrain, color='pink')
plt.plot(TempTrain, lnr.predict(TempTrain), color = 'blue')
plt.ylabel('{} ($)'.format(df.columns[1]))
plt.xlabel('{} (Celsius)'.format(df.columns[0]))
plt.title('Ice Cream Revenue (Training dataset)')
```

Out[41]:
```
Text(0.5, 1.0, 'Ice Cream Revenue (Training dataset)')
```



In [43]:
```
# plotting the Testing set predictions

plt.scatter(TempTest, RevTest, color='pink')
plt.plot(TempTest, lnr.predict(TempTest), color = 'green')
plt.ylabel('{} ($)'.format(df.columns[1]))
plt.xlabel('{} (Celsius)'.format(df.columns[0]))
plt.title('Ice Cream Revenue (Testing dataset)')
```

Out[43]:
```
Text(0.5, 1.0, 'Ice Cream Revenue (Testing dataset)')
```



$$R^2, RMSE, MSE, MAE $$

In [36]:
```
from sklearn import metrics
r2_score = metrics.r2_score(RevTest, RevPred)
mae = metrics.mean_absolute_error(RevTest, RevPred)
mse = metrics.mean_squared_error(RevTest, RevPred)
rmse = np.sqrt(mean_squared_error(RevTest, RevPred))
```

In [67]:
```
# print(f'The R2 score for Linear Regression Predictions are {r2_score}')
# print(f'The MAE for Linear Regression Predictions are {mae}')
# print(f'The MSE for Linear Regression Predictions are {mse}')
# print(f'The RMSE for Linear Regression Predictions are {rmse}')
ols_results = pd.DataFrame([['OLS Linear Regression', mae, mse, rmse, r2_score]],
                           columns = ['Model', 'MAE', 'MSE', 'RMSE', 'R2 Score'])

ols_results
```

Out[67]:

	Model	MAE	MSE	RMSE	R2 Score
0	OLS Linear Regression	17.976808	503.354709	22.435568	0.985401

Regression Tree

In [45]:
```
from sklearn.tree import DecisionTreeRegressor

regtree = DecisionTreeRegressor(random_state = 0)

regtree.fit(TempTrain,RevTrain)
```

Out[45]:
```
DecisionTreeRegressor(random_state=0)
```

In [53]:
```
# Testing Set predictions
RevPredTree = regtree.predict(TempTest)
print('Some Revenue Predictions:',(RevPredTree)[:11])
```

```
Some Revenue Predictions: [690.79 655.43 682.81 475.21 655.66 427.21 571.43 643.65 655.6
6 458.86
 542.84]
```

Evaluation metrics for the regression tree

In [57]:
```
tree_mae = metrics.mean_absolute_error(RevTest, RevPredTree)
tree_mse = metrics.mean_squared_error(RevTest, RevPredTree)
tree_rmse = np.sqrt(metrics.mean_squared_error(RevTest, RevPredTree))
tree_r2 = metrics.r2_score(RevTest, RevPredTree)

tree_results = pd.DataFrame([['Decision Tree Regression', tree_mae, tree_mse, tree_rmse,
               columns = ['Model', 'MAE', 'MSE', 'RMSE', 'R2 Score'])

tree_results
```

Out[57]:

	Model	MAE	MSE	RMSE	R2 Score
0	Decision Tree Regression	27.476058	1214.953466	34.856183	0.964763

In [48]:
```
from sklearn.tree import plot_tree
plt.figure(figsize=(10,8), dpi=200)
plot_tree(regtree)
```

Out[48]:
```
[Text(0.48941627358490564, 0.96875, 'X[0] <= 20.971\nsquared_error = 29082.985\nsamples
= 350\nvalue = 522.774'),
 Text(0.19643278301886793, 0.90625, 'X[0] <= 14.882\nsquared_error = 10049.334\nsamples
= 149\nvalue = 366.15'),
 Text(0.08557389937106918, 0.84375, 'X[0] <= 9.192\nsquared_error = 4201.044\nsamples =
63\nvalue = 267.436'),
 Text(0.021069182389937106, 0.78125, 'X[0] <= 4.647\nsquared_error = 3341.704\nsamples =
21\nvalue = 198.749'),
 Text(0.007547169811320755, 0.71875, 'X[0] <= 3.826\nsquared_error = 1663.75\nsamples =
3\nvalue = 78.455'),
 Text(0.005031446540880503, 0.65625, 'X[0] <= 1.966\nsquared_error = 372.751\nsamples =
2\nvalue = 51.853'),
 Text(0.0025157232704402514, 0.59375, 'squared_error = 0.0\nsamples = 1\nvalue = 32.54
7'),
 Text(0.007547169811320755, 0.59375, 'squared_error = 0.0\nsamples = 1\nvalue = 71.16'),
 Text(0.010062893081761006, 0.65625, 'squared_error = 0.0\nsamples = 1\nvalue = 131.65
7'),
 Text(0.03459119496855346, 0.71875, 'X[0] <= 8.074\nsquared_error = 807.61\nsamples = 18
\nvalue = 218.798'),
 Text(0.01509433962264151, 0.65625, 'X[0] <= 5.323\nsquared_error = 670.817\nsamples = 9
\nvalue = 199.928'),
 Text(0.012578616352201259, 0.59375, 'squared_error = 0.0\nsamples = 1\nvalue = 242.5
1'),
 Text(0.01761006289308176, 0.59375, 'X[0] <= 5.58\nsquared_error = 499.69\nsamples = 8\n
value = 194.606'),
 Text(0.01509433962264151, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 145.62
5'),
 Text(0.02012578616352201, 0.53125, 'X[0] <= 6.751\nsquared_error = 179.388\nsamples = 7
\nvalue = 201.603'),
 Text(0.011320754716981131, 0.46875, 'X[0] <= 6.087\nsquared_error = 5.028\nsamples = 3
\nvalue = 189.604'),
 Text(0.00880503144654088, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 186.47
6'),
 Text(0.013836477987421384, 0.40625, 'X[0] <= 6.373\nsquared_error = 0.208\nsamples = 2
\nvalue = 191.167'),
 Text(0.011320754716981131, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 191.62
3'),
 Text(0.016352201257861635, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 190.71
1'),
 Text(0.028930817610062894, 0.46875, 'X[0] <= 7.279\nsquared_error = 121.181\nsamples =
4\nvalue = 210.602'),
 Text(0.02389937106918239, 0.40625, 'X[0] <= 7.165\nsquared_error = 6.804\nsamples = 2\n
value = 218.792'),
 Text(0.021383647798742137, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 221.4'),
 Text(0.026415094339622643, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 216.18
3'),
 Text(0.033962264150943396, 0.40625, 'X[0] <= 7.448\nsquared_error = 101.421\nsamples =
2\nvalue = 202.413'),
 Text(0.031446540880503145, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 192.34
2'),
 Text(0.03647798742138365, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 212.48
4'),
 Text(0.05408805031446541, 0.65625, 'X[0] <= 9.005\nsquared_error = 232.277\nsamples = 9
\nvalue = 237.668'),
 Text(0.04905660377358491, 0.59375, 'X[0] <= 8.613\nsquared_error = 145.098\nsamples = 7
\nvalue = 243.364'),
 Text(0.04654088050314465, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 221.22
3'),
 Text(0.05157232704402516, 0.53125, 'X[0] <= 8.793\nsquared_error = 73.966\nsamples = 6
\nvalue = 247.054'),
 Text(0.04654088050314465, 0.46875, 'X[0] <= 8.773\nsquared_error = 10.359\nsamples = 4
\nvalue = 242.016'),
 Text(0.0440251572327044, 0.40625, 'X[0] <= 8.756\nsquared_error = 5.775\nsamples = 3\nv
alue = 243.434'),
```

```
 Text(0.04150943396226415, 0.34375, 'X[0] <= 8.697\nsquared_error = 0.229\nsamples = 2\n
value = 241.757'),
 Text(0.0389937106918239, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 241.279'),
 Text(0.0440251572327044, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 242.236'),
 Text(0.04654088050314465, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 246.78
7'),
 Text(0.04905660377358491, 0.40625, 'squared_error = -0.0\nsamples = 1\nvalue = 237.76
4'),
 Text(0.05660377358490566, 0.46875, 'X[0] <= 8.893\nsquared_error = 48.945\nsamples = 2
\nvalue = 257.128'),
 Text(0.05408805031446541, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 264.12
4'),
 Text(0.05911949685534591, 0.40625, 'squared_error = -0.0\nsamples = 1\nvalue = 250.13
2'),
 Text(0.05911949685534591, 0.59375, 'X[0] <= 9.046\nsquared_error = 26.423\nsamples = 2
\nvalue = 217.732'),
 Text(0.05660377358490566, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 212.59
2'),
 Text(0.061635220125786164, 0.53125, 'squared_error = -0.0\nsamples = 1\nvalue = 222.87
2'),
 Text(0.15007861635220127, 0.78125, 'X[0] <= 12.803\nsquared_error = 1092.28\nsamples =
42\nvalue = 301.78'),
 Text(0.10644654088050315, 0.71875, 'X[0] <= 10.324\nsquared_error = 639.738\nsamples =
31\nvalue = 289.254'),
 Text(0.07547169811320754, 0.65625, 'X[0] <= 9.48\nsquared_error = 379.168\nsamples = 10
\nvalue = 267.164'),
 Text(0.06918238993710692, 0.59375, 'X[0] <= 9.356\nsquared_error = 46.651\nsamples = 2
\nvalue = 284.893'),
 Text(0.06666666666666667, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 291.72
3'),
 Text(0.07169811320754717, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 278.06
3'),
 Text(0.08176100628930817, 0.59375, 'X[0] <= 9.927\nsquared_error = 364.076\nsamples = 8
\nvalue = 262.732'),
 Text(0.07672955974842767, 0.53125, 'X[0] <= 9.604\nsquared_error = 327.423\nsamples = 4
\nvalue = 248.929'),
 Text(0.07421383647798742, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 235.36
5'),
 Text(0.07924528301886792, 0.46875, 'X[0] <= 9.717\nsquared_error = 354.786\nsamples = 3
\nvalue = 253.451'),
 Text(0.07672955974842767, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 274.67
9'),
 Text(0.08176100628930817, 0.40625, 'X[0] <= 9.841\nsquared_error = 194.206\nsamples = 2
\nvalue = 242.837'),
 Text(0.07924528301886792, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 228.90
1'),
 Text(0.08427672955974842, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 256.77
3'),
 Text(0.08679245283018867, 0.53125, 'X[0] <= 10.026\nsquared_error = 19.704\nsamples = 4
\nvalue = 276.535'),
 Text(0.08427672955974842, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 283.83
4'),
 Text(0.08930817610062892, 0.46875, 'X[0] <= 10.108\nsquared_error = 2.589\nsamples = 3
\nvalue = 274.101'),
 Text(0.08679245283018867, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 272.85
7'),
 Text(0.09182389937106918, 0.40625, 'X[0] <= 10.182\nsquared_error = 2.723\nsamples = 2
\nvalue = 274.723'),
 Text(0.08930817610062892, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 276.37
3'),
 Text(0.09433962264150944, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 273.07
3'),
 Text(0.13742138364779874, 0.65625, 'X[0] <= 12.397\nsquared_error = 420.796\nsamples =
21\nvalue = 299.773'),
```

```
 Text(0.12138364779874214, 0.59375, 'X[0] <= 12.156\nsquared_error = 460.888\nsamples =
15\nvalue = 303.957'),
 Text(0.10817610062893082, 0.53125, 'X[0] <= 10.425\nsquared_error = 259.036\nsamples =
10\nvalue = 293.623'),
 Text(0.10566037735849057, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 321.75'),
 Text(0.11069182389937107, 0.46875, 'X[0] <= 11.182\nsquared_error = 190.151\nsamples =
9\nvalue = 290.498'),
 Text(0.1018867924528302, 0.40625, 'X[0] <= 10.762\nsquared_error = 0.916\nsamples = 3\n
value = 279.187'),
 Text(0.09937106918238994, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 278.31'),
 Text(0.10440251572327044, 0.34375, 'X[0] <= 11.127\nsquared_error = 0.798\nsamples = 2
\nvalue = 279.625'),
 Text(0.1018867924528302, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 280.518'),
 Text(0.1069182389937107, 0.28125, 'squared_error = -0.0\nsamples = 1\nvalue = 278.73
2'),
 Text(0.11949685534591195, 0.40625, 'X[0] <= 11.632\nsquared_error = 188.806\nsamples =
6\nvalue = 296.154'),
 Text(0.11446540880503145, 0.34375, 'X[0] <= 11.379\nsquared_error = 194.908\nsamples =
2\nvalue = 307.887'),
 Text(0.1119496855345912, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 293.926'),
 Text(0.1169811320754717, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 321.848'),
 Text(0.12452830188679245, 0.34375, 'X[0] <= 12.104\nsquared_error = 82.5\nsamples = 4\n
value = 290.287'),
 Text(0.1220125786163522, 0.28125, 'X[0] <= 12.074\nsquared_error = 89.821\nsamples = 3
\nvalue = 288.041'),
 Text(0.11949685534591195, 0.21875, 'X[0] <= 11.879\nsquared_error = 65.282\nsamples = 2
\nvalue = 292.853'),
 Text(0.1169811320754717, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 284.773'),
 Text(0.1220125786163522, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 300.932'),
 Text(0.12452830188679245, 0.21875, 'squared_error = -0.0\nsamples = 1\nvalue = 278.41
8'),
 Text(0.1270440251572327, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 297.025'),
 Text(0.13459119496855346, 0.53125, 'X[0] <= 12.284\nsquared_error = 223.851\nsamples =
5\nvalue = 324.625'),
 Text(0.12955974842767295, 0.46875, 'X[0] <= 12.2\nsquared_error = 245.818\nsamples = 3
\nvalue = 317.557'),
 Text(0.1270440251572327, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 335.77'),
 Text(0.1320754716981132, 0.40625, 'X[0] <= 12.238\nsquared_error = 119.944\nsamples = 2
\nvalue = 308.451'),
 Text(0.12955974842767295, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 297.49
9'),
 Text(0.13459119496855346, 0.34375, 'squared_error = -0.0\nsamples = 1\nvalue = 319.40
3'),
 Text(0.13962264150943396, 0.46875, 'X[0] <= 12.327\nsquared_error = 3.581\nsamples = 2
\nvalue = 335.227'),
 Text(0.1371069182389937, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 333.334'),
 Text(0.1421383647798742, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 337.119'),
 Text(0.15345911949685534, 0.59375, 'X[0] <= 12.457\nsquared_error = 167.402\nsamples =
6\nvalue = 289.314'),
 Text(0.1471698113207547, 0.53125, 'X[0] <= 12.447\nsquared_error = 8.412\nsamples = 2\n
value = 276.966'),
 Text(0.14465408805031446, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 274.06
6'),
 Text(0.14968553459119496, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 279.86
6'),
 Text(0.15974842767295597, 0.53125, 'X[0] <= 12.638\nsquared_error = 132.542\nsamples =
4\nvalue = 295.488'),
 Text(0.15471698113207547, 0.46875, 'X[0] <= 12.526\nsquared_error = 1.388\nsamples = 2
\nvalue = 304.913'),
 Text(0.15220125786163521, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 303.73
4'),
 Text(0.15723270440251572, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 306.09
1'),
 Text(0.16477987421383647, 0.46875, 'X[0] <= 12.697\nsquared_error = 86.05\nsamples = 2
```

\nvalue = 286.063'),
 Text(0.16226415094339622, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 276.78
7'),
 Text(0.16729559748427672, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 295.34'),
 Text(0.19371069182389938, 0.71875, 'X[0] <= 14.803\nsquared_error = 679.544\nsamples =
11\nvalue = 337.078'),
 Text(0.19119496855345913, 0.65625, 'X[0] <= 14.373\nsquared_error = 569.988\nsamples =
10\nvalue = 341.095'),
 Text(0.18238993710691823, 0.59375, 'X[0] <= 13.478\nsquared_error = 438.516\nsamples =
7\nvalue = 332.095'),
 Text(0.17735849056603772, 0.53125, 'X[0] <= 13.316\nsquared_error = 10.8\nsamples = 4\n
value = 340.368'),
 Text(0.17484276729559747, 0.46875, 'X[0] <= 13.102\nsquared_error = 6.104\nsamples = 3
\nvalue = 338.928'),
 Text(0.17232704402515722, 0.40625, 'X[0] <= 12.901\nsquared_error = 1.89\nsamples = 2\n
value = 340.484'),
 Text(0.16981132075471697, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 339.11'),
 Text(0.17484276729559747, 0.34375, 'squared_error = -0.0\nsamples = 1\nvalue = 341.85
9'),
 Text(0.17735849056603772, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 335.81
6'),
 Text(0.17987421383647798, 0.46875, 'squared_error = -0.0\nsamples = 1\nvalue = 344.68
9'),
 Text(0.18742138364779873, 0.53125, 'X[0] <= 13.867\nsquared_error = 795.844\nsamples =
3\nvalue = 321.063'),
 Text(0.18490566037735848, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 289.54
1'),
 Text(0.189937106918239, 0.46875, 'X[0] <= 14.236\nsquared_error = 448.513\nsamples = 2
\nvalue = 336.825'),
 Text(0.18742138364779873, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 358.00
3'),
 Text(0.19245283018867926, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 315.64
7'),
 Text(0.2, 0.59375, 'X[0] <= 14.713\nsquared_error = 246.75\nsamples = 3\nvalue = 362.09
5'),
 Text(0.19748427672955976, 0.53125, 'X[0] <= 14.535\nsquared_error = 78.821\nsamples = 2
\nvalue = 352.241'),
 Text(0.1949685534591195, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 361.119'),
 Text(0.2, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 343.363'),
 Text(0.20251572327044026, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 381.80
3'),
 Text(0.19622641509433963, 0.65625, 'squared_error = -0.0\nsamples = 1\nvalue = 296.90
7'),
 Text(0.3072916666666667, 0.84375, 'X[0] <= 18.829\nsquared_error = 1965.907\nsamples =
86\nvalue = 438.464'),
 Text(0.24901729559748428, 0.78125, 'X[0] <= 16.68\nsquared_error = 1080.099\nsamples =
45\nvalue = 408.14'),
 Text(0.22578616352201258, 0.71875, 'X[0] <= 15.493\nsquared_error = 353.906\nsamples =
17\nvalue = 378.481'),
 Text(0.21509433962264152, 0.65625, 'X[0] <= 15.075\nsquared_error = 415.108\nsamples =
6\nvalue = 363.854'),
 Text(0.21006289308176102, 0.59375, 'X[0] <= 14.99\nsquared_error = 52.44\nsamples = 3\n
value = 376.394'),
 Text(0.20754716981132076, 0.53125, 'X[0] <= 14.914\nsquared_error = 13.208\nsamples = 2
\nvalue = 381.065'),
 Text(0.2050314465408805, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 384.699'),
 Text(0.21006289308176102, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 377.43
1'),
 Text(0.21257861635220127, 0.53125, 'squared_error = -0.0\nsamples = 1\nvalue = 367.05
2'),
 Text(0.22012578616352202, 0.59375, 'X[0] <= 15.111\nsquared_error = 463.27\nsamples = 3
\nvalue = 351.314'),
 Text(0.21761006289308177, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 322.88
9'),

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 Text(0.22264150943396227, 0.53125, 'X[0] <= 15.175\nsquared_error = 88.903\nsamples = 2
\nvalue = 365.527'),
 Text(0.22012578616352202, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 374.95
6'),
 Text(0.22515723270440252, 0.46875, 'squared_error = -0.0\nsamples = 1\nvalue = 356.09
8'),
 Text(0.23647798742138365, 0.65625, 'X[0] <= 15.798\nsquared_error = 140.164\nsamples =
11\nvalue = 386.46'),
 Text(0.2339622641509434, 0.59375, 'squared_error = 0.0\nsamples = 1\nvalue = 409.494'),
 Text(0.2389937106918239, 0.59375, 'X[0] <= 16.279\nsquared_error = 95.818\nsamples = 10
\nvalue = 384.157'),
 Text(0.23270440251572327, 0.53125, 'X[0] <= 16.225\nsquared_error = 16.226\nsamples = 6
\nvalue = 378.977'),
 Text(0.23018867924528302, 0.46875, 'X[0] <= 16.106\nsquared_error = 14.067\nsamples = 5
\nvalue = 379.926'),
 Text(0.22767295597484277, 0.40625, 'X[0] <= 16.007\nsquared_error = 12.507\nsamples = 4
\nvalue = 378.918'),
 Text(0.22515723270440252, 0.34375, 'X[0] <= 15.88\nsquared_error = 1.061\nsamples = 3\n
value = 380.894'),
 Text(0.22264150943396227, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 379.56
4'),
 Text(0.22767295597484277, 0.28125, 'X[0] <= 15.955\nsquared_error = 0.266\nsamples = 2
\nvalue = 381.559'),
 Text(0.22515723270440252, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 381.04
3'),
 Text(0.23018867924528302, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 382.07
4'),
 Text(0.23018867924528302, 0.34375, 'squared_error = -0.0\nsamples = 1\nvalue = 372.99
1'),
 Text(0.23270440251572327, 0.40625, 'squared_error = -0.0\nsamples = 1\nvalue = 383.95
6'),
 Text(0.23522012578616353, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 374.23
1'),
 Text(0.24528301886792453, 0.53125, 'X[0] <= 16.372\nsquared_error = 114.587\nsamples =
4\nvalue = 391.926'),
 Text(0.24025157232704403, 0.46875, 'X[0] <= 16.333\nsquared_error = 38.506\nsamples = 2
\nvalue = 400.374'),
 Text(0.23773584905660378, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 394.16
9'),
 Text(0.24276729559748428, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 406.57
9'),
 Text(0.25031446540880503, 0.46875, 'X[0] <= 16.393\nsquared_error = 47.948\nsamples = 2
\nvalue = 383.479'),
 Text(0.24779874213836478, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 376.55
4'),
 Text(0.2528301886792453, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 390.403'),
 Text(0.272248427672956, 0.71875, 'X[0] <= 17.14\nsquared_error = 662.667\nsamples = 28
\nvalue = 426.148'),
 Text(0.2578616352201258, 0.65625, 'X[0] <= 17.024\nsquared_error = 823.039\nsamples = 4
\nvalue = 454.208'),
 Text(0.2528301886792453, 0.59375, 'X[0] <= 16.976\nsquared_error = 132.945\nsamples = 2
\nvalue = 436.796'),
 Text(0.25031446540880503, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 425.26
6'),
 Text(0.25534591194968553, 0.53125, 'squared_error = -0.0\nsamples = 1\nvalue = 448.32
6'),
 Text(0.2628930817610063, 0.59375, 'X[0] <= 17.07\nsquared_error = 906.74\nsamples = 2\n
value = 471.621'),
 Text(0.26037735849056604, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 501.73
3'),
 Text(0.26540880503144654, 0.53125, 'squared_error = -0.0\nsamples = 1\nvalue = 441.50
9'),
 Text(0.2866352201257862, 0.65625, 'X[0] <= 17.781\nsquared_error = 482.832\nsamples = 2
4\nvalue = 421.471'),
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 Text(0.2729559748427673, 0.59375, 'X[0] <= 17.674\nsquared_error = 327.69\nsamples = 10
\nvalue = 408.037'),
 Text(0.27044025157232704, 0.53125, 'X[0] <= 17.194\nsquared_error = 302.352\nsamples =
9\nvalue = 410.522'),
 Text(0.2679245283018868, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 390.879'),
 Text(0.2729559748427673, 0.46875, 'X[0] <= 17.231\nsquared_error = 285.888\nsamples = 8
\nvalue = 412.977'),
 Text(0.27044025157232704, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 428.85
4'),
 Text(0.27547169811320754, 0.40625, 'X[0] <= 17.606\nsquared_error = 285.572\nsamples =
7\nvalue = 410.709'),
 Text(0.27044025157232704, 0.34375, 'X[0] <= 17.311\nsquared_error = 73.387\nsamples = 4
\nvalue = 403.894'),
 Text(0.2679245283018868, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 415.818'),
 Text(0.2729559748427673, 0.28125, 'X[0] <= 17.408\nsquared_error = 34.662\nsamples = 3
\nvalue = 399.92'),
 Text(0.27044025157232704, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 405.25'),
 Text(0.27547169811320754, 0.21875, 'X[0] <= 17.515\nsquared_error = 30.68\nsamples = 2
\nvalue = 397.254'),
 Text(0.2729559748427673, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 391.715'),
 Text(0.2779874213836478, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 402.793'),
 Text(0.28050314465408804, 0.34375, 'X[0] <= 17.647\nsquared_error = 424.003\nsamples =
3\nvalue = 419.795'),
 Text(0.2779874213836478, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 448.55'),
 Text(0.2830188679245283, 0.28125, 'X[0] <= 17.658\nsquared_error = 15.879\nsamples = 2
\nvalue = 405.418'),
 Text(0.28050314465408804, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 409.40
3'),
 Text(0.28553459119496855, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 401.43
3'),
 Text(0.27547169811320754, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 385.67
3'),
 Text(0.300314465408805, 0.59375, 'X[0] <= 18.776\nsquared_error = 372.661\nsamples = 14
\nvalue = 431.066'),
 Text(0.29779874213836477, 0.53125, 'X[0] <= 18.191\nsquared_error = 333.245\nsamples =
13\nvalue = 433.272'),
 Text(0.29056603773584905, 0.46875, 'X[0] <= 18.071\nsquared_error = 595.186\nsamples =
3\nvalue = 442.72'),
 Text(0.2880503144654088, 0.40625, 'X[0] <= 17.932\nsquared_error = 179.075\nsamples = 2
\nvalue = 427.296'),
 Text(0.28553459119496855, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 440.67
8'),
 Text(0.29056603773584905, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 413.91
4'),
 Text(0.2930817610062893, 0.40625, 'squared_error = -0.0\nsamples = 1\nvalue = 473.56
8'),
 Text(0.3050314465408805, 0.46875, 'X[0] <= 18.405\nsquared_error = 219.847\nsamples = 1
0\nvalue = 430.437'),
 Text(0.2981132075471698, 0.40625, 'X[0] <= 18.29\nsquared_error = 13.236\nsamples = 2\n
value = 414.499'),
 Text(0.29559748427672955, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 418.13
7'),
 Text(0.30062893081761005, 0.34375, 'squared_error = -0.0\nsamples = 1\nvalue = 410.86
1'),
 Text(0.3119496855345912, 0.40625, 'X[0] <= 18.741\nsquared_error = 192.118\nsamples = 8
\nvalue = 434.422'),
 Text(0.30566037735849055, 0.34375, 'X[0] <= 18.571\nsquared_error = 218.164\nsamples =
6\nvalue = 437.235'),
 Text(0.30062893081761005, 0.28125, 'X[0] <= 18.469\nsquared_error = 39.569\nsamples = 4
\nvalue = 429.707'),
 Text(0.2981132075471698, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 437.829'),
 Text(0.3031446540880503, 0.21875, 'X[0] <= 18.507\nsquared_error = 23.439\nsamples = 3
\nvalue = 426.999'),
 Text(0.30062893081761005, 0.15625, 'X[0] <= 18.491\nsquared_error = 9.75\nsamples = 2\n
```

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value = 424.089'),
 Text(0.2981132075471698, 0.09375, 'squared_error = 0.0\nsamples = 1\nvalue = 427.211'),
 Text(0.3031446540880503, 0.09375, 'squared_error = 0.0\nsamples = 1\nvalue = 420.966'),
 Text(0.30566037735849055, 0.15625, 'squared_error = -0.0\nsamples = 1\nvalue = 432.8
2'),
 Text(0.31069182389937106, 0.28125, 'X[0] <= 18.671\nsquared_error = 235.312\nsamples =
2\nvalue = 452.291'),
 Text(0.3081761006289308, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 467.631'),
 Text(0.3132075471698113, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 436.951'),
 Text(0.3182389937106918, 0.34375, 'X[0] <= 18.774\nsquared_error = 19.02\nsamples = 2\n
value = 425.983'),
 Text(0.31572327044025156, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 430.34
4'),
 Text(0.32075471698113206, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 421.62
2'),
 Text(0.30283018867924527, 0.53125, 'squared_error = -0.0\nsamples = 1\nvalue = 402.39
8'),
 Text(0.36556603773584906, 0.78125, 'X[0] <= 19.777\nsquared_error = 821.263\nsamples =
41\nvalue = 471.745'),
 Text(0.33584905660377357, 0.71875, 'X[0] <= 19.042\nsquared_error = 532.102\nsamples =
20\nvalue = 461.454'),
 Text(0.3283018867924528, 0.65625, 'X[0] <= 19.005\nsquared_error = 459.313\nsamples = 7
\nvalue = 474.962'),
 Text(0.32578616352201256, 0.59375, 'X[0] <= 18.978\nsquared_error = 183.459\nsamples =
6\nvalue = 467.867'),
 Text(0.32075471698113206, 0.53125, 'X[0] <= 18.882\nsquared_error = 186.778\nsamples =
4\nvalue = 462.756'),
 Text(0.3182389937106918, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 476.795'),
 Text(0.3232704402515723, 0.46875, 'X[0] <= 18.885\nsquared_error = 161.446\nsamples = 3
\nvalue = 458.076'),
 Text(0.32075471698113206, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 444.82
7'),
 Text(0.32578616352201256, 0.40625, 'X[0] <= 18.933\nsquared_error = 110.503\nsamples =
2\nvalue = 464.701'),
 Text(0.3232704402515723, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 475.213'),
 Text(0.3283018867924528, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 454.189'),
 Text(0.33081761006289306, 0.53125, 'X[0] <= 18.982\nsquared_error = 20.105\nsamples = 2
\nvalue = 478.088'),
 Text(0.3283018867924528, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 473.604'),
 Text(0.3333333333333333, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 482.572'),
 Text(0.33081761006289306, 0.59375, 'squared_error = 0.0\nsamples = 1\nvalue = 517.53
4'),
 Text(0.3433962264150943, 0.65625, 'X[0] <= 19.09\nsquared_error = 420.133\nsamples = 13
\nvalue = 454.18'),
 Text(0.3383647798742138, 0.59375, 'X[0] <= 19.063\nsquared_error = 483.057\nsamples = 2
\nvalue = 428.495'),
 Text(0.33584905660377357, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 450.47
3'),
 Text(0.34088050314465407, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 406.51
6'),
 Text(0.3484276729559748, 0.59375, 'X[0] <= 19.143\nsquared_error = 266.93\nsamples = 11
\nvalue = 458.85'),
 Text(0.34591194968553457, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 445.77
2'),
 Text(0.35094339622641507, 0.53125, 'X[0] <= 19.273\nsquared_error = 274.811\nsamples =
10\nvalue = 460.158'),
 Text(0.3421383647798742, 0.46875, 'X[0] <= 19.26\nsquared_error = 223.883\nsamples = 4
\nvalue = 466.997'),
 Text(0.33962264150943394, 0.40625, 'X[0] <= 19.188\nsquared_error = 129.897\nsamples =
3\nvalue = 460.505'),
 Text(0.3371069182389937, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 474.832'),
 Text(0.3421383647798742, 0.34375, 'X[0] <= 19.227\nsquared_error = 40.888\nsamples = 2
\nvalue = 453.341'),
 Text(0.33962264150943394, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 459.73
```

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5'),
 Text(0.34465408805031444, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 446.94
7'),
 Text(0.34465408805031444, 0.40625, 'squared_error = -0.0\nsamples = 1\nvalue = 486.47
5'),
 Text(0.35974842767295595, 0.46875, 'X[0] <= 19.559\nsquared_error = 256.786\nsamples =
6\nvalue = 455.598'),
 Text(0.35471698113207545, 0.40625, 'X[0] <= 19.429\nsquared_error = 173.024\nsamples =
3\nvalue = 447.488'),
 Text(0.3522012578616352, 0.34375, 'X[0] <= 19.321\nsquared_error = 15.117\nsamples = 2
\nvalue = 456.514'),
 Text(0.34968553459119495, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 452.62
6'),
 Text(0.35471698113207545, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 460.40
3'),
 Text(0.3572327044025157, 0.34375, 'squared_error = -0.0\nsamples = 1\nvalue = 429.43
6'),
 Text(0.36477987421383645, 0.40625, 'X[0] <= 19.672\nsquared_error = 209.005\nsamples =
3\nvalue = 463.708'),
 Text(0.3622641509433962, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 483.333'),
 Text(0.3672955974842767, 0.34375, 'X[0] <= 19.748\nsquared_error = 24.654\nsamples = 2
\nvalue = 453.896'),
 Text(0.36477987421383645, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 448.93'),
 Text(0.36981132075471695, 0.28125, 'squared_error = -0.0\nsamples = 1\nvalue = 458.86
1'),
 Text(0.39528301886792455, 0.71875, 'X[0] <= 20.0\nsquared_error = 899.715\nsamples = 21
\nvalue = 481.547'),
 Text(0.3836477987421384, 0.65625, 'X[0] <= 19.9\nsquared_error = 370.103\nsamples = 3\n
value = 514.887'),
 Text(0.38113207547169814, 0.59375, 'X[0] <= 19.798\nsquared_error = 32.18\nsamples = 2
\nvalue = 501.684'),
 Text(0.3786163522012579, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 507.357'),
 Text(0.3836477987421384, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 496.011'),
 Text(0.38616352201257864, 0.59375, 'squared_error = 0.0\nsamples = 1\nvalue = 541.29
4'),
 Text(0.4069182389937107, 0.65625, 'X[0] <= 20.579\nsquared_error = 771.841\nsamples = 1
8\nvalue = 475.99'),
 Text(0.3949685534591195, 0.59375, 'X[0] <= 20.442\nsquared_error = 827.467\nsamples = 1
3\nvalue = 468.16'),
 Text(0.3886792452830189, 0.53125, 'X[0] <= 20.329\nsquared_error = 487.4\nsamples = 9\n
value = 477.056'),
 Text(0.38616352201257864, 0.46875, 'X[0] <= 20.246\nsquared_error = 358.414\nsamples =
8\nvalue = 472.462'),
 Text(0.3836477987421384, 0.40625, 'X[0] <= 20.235\nsquared_error = 207.21\nsamples = 7
\nvalue = 477.492'),
 Text(0.38113207547169814, 0.34375, 'X[0] <= 20.141\nsquared_error = 157.942\nsamples =
6\nvalue = 474.032'),
 Text(0.37484276729559746, 0.28125, 'X[0] <= 20.077\nsquared_error = 46.846\nsamples = 4
\nvalue = 479.885'),
 Text(0.36981132075471695, 0.21875, 'X[0] <= 20.033\nsquared_error = 3.64\nsamples = 2\n
value = 475.407'),
 Text(0.3672955974842767, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 477.315'),
 Text(0.3723270440251572, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 473.5'),
 Text(0.379874213836478, 0.21875, 'X[0] <= 20.117\nsquared_error = 49.953\nsamples = 2\n
value = 484.363'),
 Text(0.37735849056603776, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 491.43'),
 Text(0.38238993710691827, 0.15625, 'squared_error = -0.0\nsamples = 1\nvalue = 477.29
5'),
 Text(0.38742138364779877, 0.28125, 'X[0] <= 20.19\nsquared_error = 174.575\nsamples = 2
\nvalue = 462.326'),
 Text(0.3849056603773585, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 449.113'),
 Text(0.389937106918239, 0.21875, 'squared_error = -0.0\nsamples = 1\nvalue = 475.538'),
 Text(0.38616352201257864, 0.34375, 'squared_error = -0.0\nsamples = 1\nvalue = 498.25
2'),
```

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 Text(0.3886792452830189, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 437.252'),
 Text(0.39119496855345914, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 513.80
4'),
 Text(0.40125786163522015, 0.53125, 'X[0] <= 20.493\nsquared_error = 1013.919\nsamples =
4\nvalue = 448.144'),
 Text(0.39622641509433965, 0.46875, 'X[0] <= 20.474\nsquared_error = 290.633\nsamples =
2\nvalue = 434.403'),
 Text(0.3937106918238994, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 451.451'),
 Text(0.3987421383647799, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 417.355'),
 Text(0.40628930817610065, 0.46875, 'X[0] <= 20.537\nsquared_error = 1359.582\nsamples =
2\nvalue = 461.885'),
 Text(0.4037735849056604, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 498.757'),
 Text(0.4088050314465409, 0.40625, 'squared_error = -0.0\nsamples = 1\nvalue = 425.01
2'),
 Text(0.4188679245283019, 0.59375, 'X[0] <= 20.746\nsquared_error = 53.314\nsamples = 5
\nvalue = 496.349'),
 Text(0.41635220125786165, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 487.70
7'),
 Text(0.42138364779874216, 0.53125, 'X[0] <= 20.9\nsquared_error = 43.304\nsamples = 4\n
value = 498.509'),
 Text(0.41635220125786165, 0.46875, 'X[0] <= 20.898\nsquared_error = 49.653\nsamples = 2
\nvalue = 501.674'),
 Text(0.4138364779874214, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 494.627'),
 Text(0.4188679245283019, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 508.72'),
 Text(0.42641509433962266, 0.46875, 'X[0] <= 20.918\nsquared_error = 16.924\nsamples = 2
\nvalue = 495.344'),
 Text(0.4238993710691824, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 491.231'),
 Text(0.4289308176100629, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 499.458'),
 Text(0.7823997641509434, 0.90625, 'X[0] <= 29.799\nsquared_error = 11527.455\nsamples =
201\nvalue = 638.879'),
 Text(0.6434944968553459, 0.84375, 'X[0] <= 25.354\nsquared_error = 3091.271\nsamples =
144\nvalue = 584.305'),
 Text(0.5411556603773585, 0.78125, 'X[0] <= 23.962\nsquared_error = 969.617\nsamples = 7
5\nvalue = 541.782'),
 Text(0.48765723270440253, 0.71875, 'X[0] <= 21.9\nsquared_error = 513.644\nsamples = 49
\nvalue = 527.301'),
 Text(0.45345911949685536, 0.65625, 'X[0] <= 21.708\nsquared_error = 452.635\nsamples =
16\nvalue = 510.196'),
 Text(0.44528301886792454, 0.59375, 'X[0] <= 21.514\nsquared_error = 341.366\nsamples =
13\nvalue = 512.899'),
 Text(0.4389937106918239, 0.53125, 'X[0] <= 21.456\nsquared_error = 320.976\nsamples = 8
\nvalue = 508.78'),
 Text(0.43647798742138366, 0.46875, 'X[0] <= 21.391\nsquared_error = 262.404\nsamples =
7\nvalue = 512.393'),
 Text(0.4339622641509434, 0.40625, 'X[0] <= 21.34\nsquared_error = 220.949\nsamples = 6
\nvalue = 508.905'),
 Text(0.43144654088050316, 0.34375, 'X[0] <= 21.206\nsquared_error = 161.964\nsamples =
5\nvalue = 513.052'),
 Text(0.42641509433962266, 0.28125, 'X[0] <= 21.078\nsquared_error = 140.174\nsamples =
3\nvalue = 506.029'),
 Text(0.4238993710691824, 0.21875, 'X[0] <= 21.017\nsquared_error = 87.34\nsamples = 2\n
value = 512.43'),
 Text(0.42138364779874216, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 503.08
4'),
 Text(0.42641509433962266, 0.15625, 'squared_error = -0.0\nsamples = 1\nvalue = 521.77
5'),
 Text(0.4289308176100629, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 493.227'),
 Text(0.43647798742138366, 0.28125, 'X[0] <= 21.302\nsquared_error = 9.705\nsamples = 2
\nvalue = 523.586'),
 Text(0.4339622641509434, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 526.701'),
 Text(0.4389937106918239, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 520.47'),
 Text(0.43647798742138366, 0.34375, 'squared_error = -0.0\nsamples = 1\nvalue = 488.17
1'),
 Text(0.4389937106918239, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 533.324'),
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 Text(0.44150943396226416, 0.46875, 'squared_error = -0.0\nsamples = 1\nvalue = 483.4
9'),
 Text(0.45157232704402517, 0.53125, 'X[0] <= 21.641\nsquared_error = 303.41\nsamples = 5
\nvalue = 519.49'),
 Text(0.44654088050314467, 0.46875, 'X[0] <= 21.571\nsquared_error = 79.1\nsamples = 2\n
value = 537.01'),
 Text(0.4440251572327044, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 528.116'),
 Text(0.4490566037735849, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 545.904'),
 Text(0.45660377358490567, 0.46875, 'X[0] <= 21.7\nsquared_error = 111.88\nsamples = 3\n
value = 507.81'),
 Text(0.4540880503144654, 0.40625, 'X[0] <= 21.688\nsquared_error = 23.678\nsamples = 2
\nvalue = 500.878'),
 Text(0.45157232704402517, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 505.74
4'),
 Text(0.45660377358490567, 0.34375, 'squared_error = -0.0\nsamples = 1\nvalue = 496.01
2'),
 Text(0.4591194968553459, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 521.673'),
 Text(0.46163522012578617, 0.59375, 'X[0] <= 21.744\nsquared_error = 765.909\nsamples =
3\nvalue = 498.482'),
 Text(0.4591194968553459, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 467.402'),
 Text(0.4641509433962264, 0.53125, 'X[0] <= 21.837\nsquared_error = 424.415\nsamples = 2
\nvalue = 514.022'),
 Text(0.46163522012578617, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 534.62
3'),
 Text(0.4666666666666667, 0.46875, 'squared_error = -0.0\nsamples = 1\nvalue = 493.42'),
 Text(0.5218553459119497, 0.65625, 'X[0] <= 22.856\nsquared_error = 332.588\nsamples = 3
3\nvalue = 535.594'),
 Text(0.48867924528301887, 0.59375, 'X[0] <= 22.162\nsquared_error = 390.587\nsamples =
20\nvalue = 530.061'),
 Text(0.4767295597484277, 0.53125, 'X[0] <= 22.064\nsquared_error = 345.287\nsamples = 4
\nvalue = 545.206'),
 Text(0.4716981132075472, 0.46875, 'X[0] <= 21.956\nsquared_error = 218.86\nsamples = 2
\nvalue = 535.647'),
 Text(0.4691823899371069, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 550.441'),
 Text(0.4742138364779874, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 520.853'),
 Text(0.4817610062893082, 0.46875, 'X[0] <= 22.136\nsquared_error = 288.969\nsamples = 2
\nvalue = 554.765'),
 Text(0.47924528301886793, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 571.76
4'),
 Text(0.48427672955974843, 0.40625, 'squared_error = -0.0\nsamples = 1\nvalue = 537.76
6'),
 Text(0.5006289308176101, 0.53125, 'X[0] <= 22.237\nsquared_error = 330.228\nsamples = 1
6\nvalue = 526.274'),
 Text(0.4918238993710692, 0.46875, 'X[0] <= 22.18\nsquared_error = 67.873\nsamples = 3\n
value = 503.995'),
 Text(0.48930817610062893, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 515.45
9'),
 Text(0.49433962264150944, 0.40625, 'X[0] <= 22.207\nsquared_error = 3.248\nsamples = 2
\nvalue = 498.264'),
 Text(0.4918238993710692, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 496.461'),
 Text(0.4968553459119497, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 500.066'),
 Text(0.5094339622641509, 0.46875, 'X[0] <= 22.423\nsquared_error = 249.796\nsamples = 1
3\nvalue = 531.416'),
 Text(0.5044025157232704, 0.40625, 'X[0] <= 22.337\nsquared_error = 285.192\nsamples = 5
\nvalue = 539.5'),
 Text(0.5018867924528302, 0.34375, 'X[0] <= 22.298\nsquared_error = 133.428\nsamples = 4
\nvalue = 532.821'),
 Text(0.49937106918238994, 0.28125, 'X[0] <= 22.28\nsquared_error = 109.25\nsamples = 3
\nvalue = 536.964'),
 Text(0.4968553459119497, 0.21875, 'X[0] <= 22.262\nsquared_error = 30.916\nsamples = 2
\nvalue = 530.307'),
 Text(0.49433962264150944, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 535.86
7'),
 Text(0.49937106918238994, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 524.74
```

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6'),
 Text(0.5018867924528302, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 550.279'),
 Text(0.5044025157232704, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 520.392'),
 Text(0.5069182389937107, 0.34375, 'squared_error = -0.0\nsamples = 1\nvalue = 566.21
7'),
 Text(0.5144654088050314, 0.40625, 'X[0] <= 22.505\nsquared_error = 161.29\nsamples = 8
\nvalue = 526.363'),
 Text(0.5119496855345912, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 507.9'),
 Text(0.5169811320754717, 0.34375, 'X[0] <= 22.76\nsquared_error = 128.681\nsamples = 7
\nvalue = 529.0'),
 Text(0.5144654088050314, 0.28125, 'X[0] <= 22.626\nsquared_error = 119.981\nsamples = 6
\nvalue = 531.075'),
 Text(0.5094339622641509, 0.21875, 'X[0] <= 22.573\nsquared_error = 2.203\nsamples = 2\n
value = 522.752'),
 Text(0.5069182389937107, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 521.267'),
 Text(0.5119496855345912, 0.15625, 'squared_error = -0.0\nsamples = 1\nvalue = 524.23
6'),
 Text(0.519496855345912, 0.21875, 'X[0] <= 22.634\nsquared_error = 126.908\nsamples = 4
\nvalue = 535.237'),
 Text(0.5169811320754717, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 546.694'),
 Text(0.5220125786163522, 0.15625, 'X[0] <= 22.644\nsquared_error = 110.875\nsamples = 3
\nvalue = 531.418'),
 Text(0.519496855345912, 0.09375, 'squared_error = 0.0\nsamples = 1\nvalue = 518.216'),
 Text(0.5245283018867924, 0.09375, 'X[0] <= 22.666\nsquared_error = 35.587\nsamples = 2
\nvalue = 538.02'),
 Text(0.5220125786163522, 0.03125, 'squared_error = 0.0\nsamples = 1\nvalue = 532.054'),
 Text(0.5270440251572327, 0.03125, 'squared_error = -0.0\nsamples = 1\nvalue = 543.98
5'),
 Text(0.519496855345912, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 516.549'),
 Text(0.5550314465408805, 0.59375, 'X[0] <= 23.822\nsquared_error = 123.772\nsamples = 1
3\nvalue = 544.108'),
 Text(0.5477987421383648, 0.53125, 'X[0] <= 23.537\nsquared_error = 95.333\nsamples = 11
\nvalue = 546.651'),
 Text(0.5408805031446541, 0.46875, 'X[0] <= 23.419\nsquared_error = 37.749\nsamples = 8
\nvalue = 543.265'),
 Text(0.5345911949685535, 0.40625, 'X[0] <= 23.159\nsquared_error = 30.366\nsamples = 6
\nvalue = 545.371'),
 Text(0.529559748427673, 0.34375, 'X[0] <= 22.905\nsquared_error = 16.202\nsamples = 4\n
value = 543.535'),
 Text(0.5270440251572327, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 550.055'),
 Text(0.5320754716981132, 0.28125, 'X[0] <= 23.037\nsquared_error = 2.709\nsamples = 3\n
value = 541.362'),
 Text(0.529559748427673, 0.21875, 'X[0] <= 22.972\nsquared_error = 0.308\nsamples = 2\nv
alue = 540.243'),
 Text(0.5270440251572327, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 540.798'),
 Text(0.5320754716981132, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 539.688'),
 Text(0.5345911949685535, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 543.6'),
 Text(0.539622641509434, 0.34375, 'X[0] <= 23.33\nsquared_error = 38.478\nsamples = 2\nv
alue = 549.042'),
 Text(0.5371069182389937, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 555.245'),
 Text(0.5421383647798742, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 542.839'),
 Text(0.5471698113207547, 0.40625, 'X[0] <= 23.461\nsquared_error = 6.665\nsamples = 2\n
value = 536.946'),
 Text(0.5446540880503145, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 539.528'),
 Text(0.549685534591195, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 534.365'),
 Text(0.5547169811320755, 0.46875, 'X[0] <= 23.584\nsquared_error = 136.765\nsamples = 3
\nvalue = 555.681'),
 Text(0.5522012578616352, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 570.991'),
 Text(0.5572327044025157, 0.40625, 'X[0] <= 23.676\nsquared_error = 29.361\nsamples = 2
\nvalue = 548.027'),
 Text(0.5547169811320755, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 542.608'),
 Text(0.559748427672956, 0.34375, 'squared_error = -0.0\nsamples = 1\nvalue = 553.445'),
 Text(0.5622641509433962, 0.53125, 'X[0] <= 23.921\nsquared_error = 48.925\nsamples = 2
\nvalue = 530.119'),
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 Text(0.559748427672956, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 523.125'),
 Text(0.5647798742138365, 0.46875, 'squared_error = -0.0\nsamples = 1\nvalue = 537.11
4'),
 Text(0.5946540880503145, 0.71875, 'X[0] <= 24.576\nsquared_error = 688.886\nsamples = 2
6\nvalue = 569.074'),
 Text(0.5823899371069182, 0.65625, 'X[0] <= 24.479\nsquared_error = 590.88\nsamples = 11
\nvalue = 556.152'),
 Text(0.5773584905660377, 0.59375, 'X[0] <= 24.358\nsquared_error = 479.192\nsamples = 6
\nvalue = 571.273'),
 Text(0.5748427672955975, 0.53125, 'X[0] <= 24.149\nsquared_error = 417.7\nsamples = 5\n
value = 566.152'),
 Text(0.569811320754717, 0.46875, 'X[0] <= 24.039\nsquared_error = 25.843\nsamples = 2\n
value = 583.444'),
 Text(0.5672955974842767, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 578.36'),
 Text(0.5723270440251572, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 588.528'),
 Text(0.579874213836478, 0.46875, 'X[0] <= 24.212\nsquared_error = 346.718\nsamples = 3
\nvalue = 554.625'),
 Text(0.5773584905660377, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 528.38'),
 Text(0.5823899371069182, 0.40625, 'X[0] <= 24.242\nsquared_error = 3.504\nsamples = 2\n
value = 567.747'),
 Text(0.579874213836478, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 569.619'),
 Text(0.5849056603773585, 0.34375, 'squared_error = -0.0\nsamples = 1\nvalue = 565.87
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 Text(0.579874213836478, 0.53125, 'squared_error = -0.0\nsamples = 1\nvalue = 596.877'),
 Text(0.5874213836477987, 0.59375, 'X[0] <= 24.489\nsquared_error = 121.311\nsamples = 5
\nvalue = 538.008'),
 Text(0.5849056603773585, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 526.547'),
 Text(0.589937106918239, 0.53125, 'X[0] <= 24.508\nsquared_error = 110.593\nsamples = 4
\nvalue = 540.873'),
 Text(0.5874213836477987, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 558.637'),
 Text(0.5924528301886792, 0.46875, 'X[0] <= 24.535\nsquared_error = 7.207\nsamples = 3\n
value = 534.951'),
 Text(0.589937106918239, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 538.313'),
 Text(0.5949685534591195, 0.40625, 'X[0] <= 24.558\nsquared_error = 2.336\nsamples = 2\n
value = 533.271'),
 Text(0.5924528301886792, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 531.742'),
 Text(0.5974842767295597, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 534.799'),
 Text(0.6069182389937107, 0.65625, 'X[0] <= 24.678\nsquared_error = 548.519\nsamples = 1
5\nvalue = 578.55'),
 Text(0.5974842767295597, 0.59375, 'X[0] <= 24.601\nsquared_error = 3.273\nsamples = 3\n
value = 601.921'),
 Text(0.5949685534591195, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 599.365'),
 Text(0.6, 0.53125, 'X[0] <= 24.622\nsquared_error = 0.011\nsamples = 2\nvalue = 603.19
8'),
 Text(0.5974842767295597, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 603.091'),
 Text(0.6025157232704402, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 603.305'),
 Text(0.6163522012578616, 0.59375, 'X[0] <= 24.77\nsquared_error = 514.15\nsamples = 12
\nvalue = 572.707'),
 Text(0.610062893081761, 0.53125, 'X[0] <= 24.745\nsquared_error = 13.807\nsamples = 2\n
value = 534.464'),
 Text(0.6075471698113207, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 538.18'),
 Text(0.6125786163522012, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 530.748'),
 Text(0.6226415094339622, 0.53125, 'X[0] <= 24.995\nsquared_error = 263.203\nsamples = 1
0\nvalue = 580.356'),
 Text(0.6176100628930817, 0.46875, 'X[0] <= 24.974\nsquared_error = 273.77\nsamples = 4
\nvalue = 591.605'),
 Text(0.6150943396226415, 0.40625, 'X[0] <= 24.89\nsquared_error = 236.21\nsamples = 3\n
value = 585.931'),
 Text(0.6125786163522012, 0.34375, 'X[0] <= 24.798\nsquared_error = 3.747\nsamples = 2\n
value = 596.741'),
 Text(0.610062893081761, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 594.805'),
 Text(0.6150943396226415, 0.28125, 'squared_error = -0.0\nsamples = 1\nvalue = 598.67
6'),
 Text(0.6176100628930817, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 564.311'),
```

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 Text(0.620125786163522, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 608.63'),
 Text(0.6276729559748427, 0.46875, 'X[0] <= 25.029\nsquared_error = 115.553\nsamples = 6
\nvalue = 572.857'),
 Text(0.6251572327044025, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 550.701'),
 Text(0.630188679245283, 0.40625, 'X[0] <= 25.084\nsquared_error = 20.857\nsamples = 5\n
value = 577.288'),
 Text(0.6276729559748427, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 583.855'),
 Text(0.6327044025157232, 0.34375, 'X[0] <= 25.287\nsquared_error = 12.593\nsamples = 4
\nvalue = 575.646'),
 Text(0.630188679245283, 0.28125, 'X[0] <= 25.152\nsquared_error = 2.773\nsamples = 3\nv
alue = 573.774'),
 Text(0.6276729559748427, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 571.434'),
 Text(0.6327044025157232, 0.21875, 'X[0] <= 25.216\nsquared_error = 0.054\nsamples = 2\n
value = 574.944'),
 Text(0.630188679245283, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 575.177'),
 Text(0.6352201257861635, 0.15625, 'squared_error = -0.0\nsamples = 1\nvalue = 574.71
1'),
 Text(0.6352201257861635, 0.28125, 'squared_error = -0.0\nsamples = 1\nvalue = 581.26
2'),
 Text(0.7458333333333333, 0.78125, 'X[0] <= 27.716\nsquared_error = 1295.669\nsamples =
69\nvalue = 630.526'),
 Text(0.7124213836477987, 0.71875, 'X[0] <= 26.563\nsquared_error = 833.616\nsamples = 4
2\nvalue = 612.882'),
 Text(0.6858490566037736, 0.65625, 'X[0] <= 26.19\nsquared_error = 804.629\nsamples = 24
\nvalue = 602.682'),
 Text(0.6761006289308176, 0.59375, 'X[0] <= 26.148\nsquared_error = 730.945\nsamples = 1
9\nvalue = 608.562'),
 Text(0.6691823899371069, 0.53125, 'X[0] <= 25.966\nsquared_error = 370.342\nsamples = 1
7\nvalue = 601.761'),
 Text(0.6628930817610063, 0.46875, 'X[0] <= 25.93\nsquared_error = 383.51\nsamples = 13
\nvalue = 603.7'),
 Text(0.660377358490566, 0.40625, 'X[0] <= 25.896\nsquared_error = 236.616\nsamples = 12
\nvalue = 599.991'),
 Text(0.6578616352201258, 0.34375, 'X[0] <= 25.477\nsquared_error = 180.876\nsamples = 1
1\nvalue = 602.528'),
 Text(0.6477987421383647, 0.28125, 'X[0] <= 25.436\nsquared_error = 157.456\nsamples = 6
\nvalue = 606.393'),
 Text(0.6427672955974842, 0.21875, 'X[0] <= 25.423\nsquared_error = 93.55\nsamples = 4\n
value = 600.09'),
 Text(0.640251572327044, 0.15625, 'X[0] <= 25.421\nsquared_error = 6.211\nsamples = 3\nv
alue = 605.533'),
 Text(0.6377358490566037, 0.09375, 'X[0] <= 25.397\nsquared_error = 0.632\nsamples = 2\n
value = 603.832'),
 Text(0.6352201257861635, 0.03125, 'squared_error = 0.0\nsamples = 1\nvalue = 604.627'),
 Text(0.640251572327044, 0.03125, 'squared_error = -0.0\nsamples = 1\nvalue = 603.037'),
 Text(0.6427672955974842, 0.09375, 'squared_error = 0.0\nsamples = 1\nvalue = 608.936'),
 Text(0.6452830188679245, 0.15625, 'squared_error = -0.0\nsamples = 1\nvalue = 583.76'),
 Text(0.6528301886792452, 0.21875, 'X[0] <= 25.453\nsquared_error = 46.871\nsamples = 2
\nvalue = 619.0'),
 Text(0.650314465408805, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 625.846'),
 Text(0.6553459119496855, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 612.154'),
 Text(0.6679245283018868, 0.28125, 'X[0] <= 25.636\nsquared_error = 169.536\nsamples = 5
\nvalue = 597.89'),
 Text(0.6628930817610063, 0.21875, 'X[0] <= 25.498\nsquared_error = 29.339\nsamples = 3
\nvalue = 590.165'),
 Text(0.660377358490566, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 596.237'),
 Text(0.6654088050314465, 0.15625, 'X[0] <= 25.523\nsquared_error = 16.358\nsamples = 2
\nvalue = 587.129'),
 Text(0.6628930817610063, 0.09375, 'squared_error = 0.0\nsamples = 1\nvalue = 583.084'),
 Text(0.6679245283018868, 0.09375, 'squared_error = 0.0\nsamples = 1\nvalue = 591.173'),
 Text(0.6729559748427673, 0.21875, 'X[0] <= 25.796\nsquared_error = 156.062\nsamples = 2
\nvalue = 609.477'),
 Text(0.670440251572327, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 621.969'),
 Text(0.6754716981132075, 0.15625, 'squared_error = 0.0\nsamples = 1\nvalue = 596.984'),
```

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 Text(0.6628930817610063, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 572.081'),
 Text(0.6654088050314465, 0.40625, 'squared_error = -0.0\nsamples = 1\nvalue = 648.21'),
 Text(0.6754716981132075, 0.46875, 'X[0] <= 26.037\nsquared_error = 275.591\nsamples = 4
\nvalue = 595.457'),
 Text(0.6729559748427673, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 570.578'),
 Text(0.6779874213836478, 0.40625, 'X[0] <= 26.124\nsquared_error = 92.35\nsamples = 3\n
value = 603.75'),
 Text(0.6754716981132075, 0.34375, 'X[0] <= 26.1\nsquared_error = 79.41\nsamples = 2\nva
lue = 608.19'),
 Text(0.6729559748427673, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 599.278'),
 Text(0.6779874213836478, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 617.101'),
 Text(0.680503144654088, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 594.872'),
 Text(0.6830188679245283, 0.53125, 'X[0] <= 26.178\nsquared_error = 60.452\nsamples = 2
\nvalue = 666.376'),
 Text(0.680503144654088, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 658.6'),
 Text(0.6855345911949685, 0.46875, 'squared_error = -0.0\nsamples = 1\nvalue = 674.15
1'),
 Text(0.6955974842767295, 0.59375, 'X[0] <= 26.493\nsquared_error = 453.904\nsamples = 5
\nvalue = 580.336'),
 Text(0.6930817610062893, 0.53125, 'X[0] <= 26.397\nsquared_error = 249.226\nsamples = 4
\nvalue = 572.359'),
 Text(0.690566037735849, 0.46875, 'X[0] <= 26.221\nsquared_error = 194.376\nsamples = 3
\nvalue = 578.231'),
 Text(0.6880503144654088, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 563.382'),
 Text(0.6930817610062893, 0.40625, 'X[0] <= 26.294\nsquared_error = 126.178\nsamples = 2
\nvalue = 585.656'),
 Text(0.690566037735849, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 596.889'),
 Text(0.6955974842767295, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 574.423'),
 Text(0.6955974842767295, 0.46875, 'squared_error = -0.0\nsamples = 1\nvalue = 554.74
3'),
 Text(0.6981132075471698, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 612.244'),
 Text(0.7389937106918238, 0.65625, 'X[0] <= 27.557\nsquared_error = 548.567\nsamples = 1
8\nvalue = 626.482'),
 Text(0.7295597484276729, 0.59375, 'X[0] <= 27.446\nsquared_error = 339.497\nsamples = 1
6\nvalue = 630.965'),
 Text(0.7182389937106918, 0.53125, 'X[0] <= 27.129\nsquared_error = 292.421\nsamples = 1
3\nvalue = 626.466'),
 Text(0.7081761006289308, 0.46875, 'X[0] <= 27.093\nsquared_error = 370.343\nsamples = 8
\nvalue = 632.425'),
 Text(0.7031446540880503, 0.40625, 'X[0] <= 27.013\nsquared_error = 363.144\nsamples = 6
\nvalue = 628.859'),
 Text(0.70062893081761, 0.34375, 'X[0] <= 26.95\nsquared_error = 154.923\nsamples = 5\nv
alue = 635.701'),
 Text(0.6981132075471698, 0.28125, 'X[0] <= 26.944\nsquared_error = 173.915\nsamples = 4
\nvalue = 633.714'),
 Text(0.6955974842767295, 0.21875, 'X[0] <= 26.909\nsquared_error = 124.53\nsamples = 3
\nvalue = 638.895'),
 Text(0.6930817610062893, 0.15625, 'X[0] <= 26.735\nsquared_error = 11.165\nsamples = 2
\nvalue = 631.243'),
 Text(0.690566037735849, 0.09375, 'squared_error = 0.0\nsamples = 1\nvalue = 627.902'),
 Text(0.6955974842767295, 0.09375, 'squared_error = 0.0\nsamples = 1\nvalue = 634.585'),
 Text(0.6981132075471698, 0.15625, 'squared_error = -0.0\nsamples = 1\nvalue = 654.19
7'),
 Text(0.70062893081761, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 618.172'),
 Text(0.7031446540880503, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 643.649'),
 Text(0.7056603773584905, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 594.651'),
 Text(0.7132075471698113, 0.40625, 'X[0] <= 27.123\nsquared_error = 239.366\nsamples = 2
\nvalue = 643.122'),
 Text(0.710691823899371, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 658.594'),
 Text(0.7157232704402515, 0.34375, 'squared_error = -0.0\nsamples = 1\nvalue = 627.65
1'),
 Text(0.7283018867924528, 0.46875, 'X[0] <= 27.349\nsquared_error = 20.031\nsamples = 5
\nvalue = 616.932'),
 Text(0.7257861635220125, 0.40625, 'X[0] <= 27.233\nsquared_error = 12.569\nsamples = 4
```

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\nvalue = 615.353'),
 Text(0.720754716981132, 0.34375, 'X[0] <= 27.158\nsquared_error = 9.043\nsamples = 2\nv
alue = 618.183'),
 Text(0.7182389937106918, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 615.175'),
 Text(0.7232704402515723, 0.28125, 'squared_error = -0.0\nsamples = 1\nvalue = 621.19'),
 Text(0.730817610062893, 0.34375, 'X[0] <= 27.302\nsquared_error = 0.079\nsamples = 2\nv
alue = 612.523'),
 Text(0.7283018867924528, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 612.242'),
 Text(0.7333333333333333, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 612.804'),
 Text(0.730817610062893, 0.40625, 'squared_error = -0.0\nsamples = 1\nvalue = 623.249'),
 Text(0.740880503144654, 0.53125, 'X[0] <= 27.536\nsquared_error = 75.813\nsamples = 3\n
value = 650.458'),
 Text(0.7383647798742138, 0.46875, 'X[0] <= 27.523\nsquared_error = 34.448\nsamples = 2
\nvalue = 655.598'),
 Text(0.7358490566037735, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 649.729'),
 Text(0.740880503144654, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 661.468'),
 Text(0.7433962264150943, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 640.177'),
 Text(0.7484276729559748, 0.59375, 'X[0] <= 27.639\nsquared_error = 774.643\nsamples = 2
\nvalue = 590.625'),
 Text(0.7459119496855345, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 562.792'),
 Text(0.7509433962264151, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 618.457'),
 Text(0.779245283018868, 0.71875, 'X[0] <= 28.811\nsquared_error = 776.916\nsamples = 27
\nvalue = 657.971'),
 Text(0.7647798742138365, 0.65625, 'X[0] <= 28.462\nsquared_error = 759.704\nsamples = 1
2\nvalue = 650.602'),
 Text(0.7584905660377359, 0.59375, 'X[0] <= 28.361\nsquared_error = 737.059\nsamples = 8
\nvalue = 660.054'),
 Text(0.7559748427672957, 0.53125, 'X[0] <= 28.023\nsquared_error = 127.283\nsamples = 7
\nvalue = 650.599'),
 Text(0.7509433962264151, 0.46875, 'X[0] <= 27.965\nsquared_error = 112.227\nsamples = 5
\nvalue = 646.618'),
 Text(0.7484276729559748, 0.40625, 'X[0] <= 27.786\nsquared_error = 37.174\nsamples = 4
\nvalue = 651.159'),
 Text(0.7433962264150943, 0.34375, 'X[0] <= 27.754\nsquared_error = 14.288\nsamples = 2
\nvalue = 647.724'),
 Text(0.740880503144654, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 651.504'),
 Text(0.7459119496855345, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 643.944'),
 Text(0.7534591194968554, 0.34375, 'X[0] <= 27.861\nsquared_error = 36.467\nsamples = 2
\nvalue = 654.593'),
 Text(0.7509433962264151, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 660.632'),
 Text(0.7559748427672957, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 648.555'),
 Text(0.7534591194968554, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 628.453'),
 Text(0.7610062893081762, 0.46875, 'X[0] <= 28.155\nsquared_error = 26.208\nsamples = 2
\nvalue = 660.553'),
 Text(0.7584905660377359, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 665.673'),
 Text(0.7635220125786164, 0.40625, 'squared_error = -0.0\nsamples = 1\nvalue = 655.43
4'),
 Text(0.7610062893081762, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 726.234'),
 Text(0.7710691823899372, 0.59375, 'X[0] <= 28.597\nsquared_error = 268.954\nsamples = 4
\nvalue = 631.698'),
 Text(0.7685534591194969, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 607.839'),
 Text(0.7735849056603774, 0.53125, 'X[0] <= 28.79\nsquared_error = 105.615\nsamples = 3
\nvalue = 639.651'),
 Text(0.7710691823899372, 0.46875, 'X[0] <= 28.759\nsquared_error = 1.194\nsamples = 2\n
value = 632.411'),
 Text(0.7685534591194969, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 631.318'),
 Text(0.7735849056603774, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 633.504'),
 Text(0.7761006289308177, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 654.129'),
 Text(0.7937106918238994, 0.65625, 'X[0] <= 29.371\nsquared_error = 712.478\nsamples = 1
5\nvalue = 663.867'),
 Text(0.7886792452830189, 0.59375, 'X[0] <= 29.309\nsquared_error = 556.363\nsamples = 8
\nvalue = 671.45'),
 Text(0.7861635220125787, 0.53125, 'X[0] <= 29.197\nsquared_error = 259.342\nsamples = 7
\nvalue = 664.59'),
```

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 Text(0.7811320754716982, 0.46875, 'X[0] <= 28.894\nsquared_error = 202.2\nsamples = 5\n
value = 671.031'),
 Text(0.7786163522012579, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 682.809'),
 Text(0.7836477987421384, 0.40625, 'X[0] <= 28.997\nsquared_error = 209.402\nsamples = 4
\nvalue = 668.086'),
 Text(0.7811320754716982, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 655.66'),
 Text(0.7861635220125787, 0.34375, 'X[0] <= 29.082\nsquared_error = 210.577\nsamples = 3
\nvalue = 672.229'),
 Text(0.7836477987421384, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 685.362'),
 Text(0.7886792452830189, 0.28125, 'X[0] <= 29.157\nsquared_error = 186.492\nsamples = 2
\nvalue = 665.662'),
 Text(0.7861635220125787, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 652.005'),
 Text(0.7911949685534592, 0.21875, 'squared_error = 0.0\nsamples = 1\nvalue = 679.318'),
 Text(0.7911949685534592, 0.46875, 'X[0] <= 29.257\nsquared_error = 39.189\nsamples = 2
\nvalue = 648.487'),
 Text(0.7886792452830189, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 654.747'),
 Text(0.7937106918238994, 0.40625, 'squared_error = -0.0\nsamples = 1\nvalue = 642.22
7'),
 Text(0.7911949685534592, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 719.472'),
 Text(0.7987421383647799, 0.59375, 'X[0] <= 29.447\nsquared_error = 750.065\nsamples = 7
\nvalue = 655.2'),
 Text(0.7962264150943397, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 618.236'),
 Text(0.8012578616352202, 0.53125, 'X[0] <= 29.486\nsquared_error = 609.391\nsamples = 6
\nvalue = 661.361'),
 Text(0.7987421383647799, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 682.753'),
 Text(0.8037735849056604, 0.46875, 'X[0] <= 29.647\nsquared_error = 621.443\nsamples = 5
\nvalue = 657.083'),
 Text(0.7987421383647799, 0.40625, 'X[0] <= 29.549\nsquared_error = 96.701\nsamples = 2
\nvalue = 639.727'),
 Text(0.7962264150943397, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 629.894'),
 Text(0.8012578616352202, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 649.561'),
 Text(0.8088050314465409, 0.40625, 'X[0] <= 29.713\nsquared_error = 636.602\nsamples = 3
\nvalue = 668.653'),
 Text(0.8062893081761007, 0.34375, 'X[0] <= 29.706\nsquared_error = 464.849\nsamples = 2
\nvalue = 681.434'),
 Text(0.8037735849056604, 0.28125, 'squared_error = 0.0\nsamples = 1\nvalue = 659.873'),
 Text(0.8088050314465409, 0.28125, 'squared_error = -0.0\nsamples = 1\nvalue = 702.99
4'),
 Text(0.8113207547169812, 0.34375, 'squared_error = -0.0\nsamples = 1\nvalue = 643.09
1'),
 Text(0.9213050314465409, 0.84375, 'X[0] <= 35.064\nsquared_error = 6307.736\nsamples =
57\nvalue = 776.749'),
 Text(0.8718553459119497, 0.78125, 'X[0] <= 32.056\nsquared_error = 1668.617\nsamples =
38\nvalue = 730.773'),
 Text(0.8430817610062893, 0.71875, 'X[0] <= 30.715\nsquared_error = 416.639\nsamples = 2
0\nvalue = 700.749'),
 Text(0.8264150943396227, 0.65625, 'X[0] <= 30.599\nsquared_error = 229.493\nsamples = 1
1\nvalue = 689.81'),
 Text(0.8213836477987422, 0.59375, 'X[0] <= 29.9\nsquared_error = 81.717\nsamples = 9\nv
alue = 695.114'),
 Text(0.8188679245283019, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 683.545'),
 Text(0.8238993710691824, 0.53125, 'X[0] <= 30.083\nsquared_error = 73.11\nsamples = 8\n
value = 696.56'),
 Text(0.8163522012578617, 0.46875, 'X[0] <= 29.974\nsquared_error = 63.284\nsamples = 3
\nvalue = 703.391'),
 Text(0.8138364779874214, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 696.64'),
 Text(0.8188679245283019, 0.40625, 'X[0] <= 30.055\nsquared_error = 60.748\nsamples = 2
\nvalue = 706.766'),
 Text(0.8163522012578617, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 714.56'),
 Text(0.8213836477987422, 0.34375, 'squared_error = 0.0\nsamples = 1\nvalue = 698.972'),
 Text(0.8314465408805032, 0.46875, 'X[0] <= 30.51\nsquared_error = 34.213\nsamples = 5\n
value = 692.462'),
 Text(0.8289308176100629, 0.40625, 'X[0] <= 30.432\nsquared_error = 8.705\nsamples = 4\n
value = 689.851'),
```

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 Text(0.8264150943396227, 0.34375, 'X[0] <= 30.369\nsquared_error = 0.279\nsamples = 3\n
value = 691.534'),
 Text(0.8238993710691824, 0.28125, 'X[0] <= 30.208\nsquared_error = 0.003\nsamples = 2\n
value = 691.907'),
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9'),
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3'),
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\nvalue = 665.944'),
 Text(0.8289308176100629, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 651.862'),
 Text(0.8339622641509434, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 680.027'),
 Text(0.859748427672956, 0.65625, 'X[0] <= 31.815\nsquared_error = 320.376\nsamples = 9
\nvalue = 714.119'),
 Text(0.8528301886792453, 0.59375, 'X[0] <= 31.625\nsquared_error = 312.068\nsamples = 7
\nvalue = 717.995'),
 Text(0.8465408805031447, 0.53125, 'X[0] <= 31.442\nsquared_error = 180.094\nsamples = 5
\nvalue = 709.446'),
 Text(0.8415094339622642, 0.46875, 'X[0] <= 31.189\nsquared_error = 165.583\nsamples = 3
\nvalue = 713.529'),
 Text(0.8389937106918239, 0.40625, 'X[0] <= 30.864\nsquared_error = 3.499\nsamples = 2\n
value = 704.494'),
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 Text(0.8415094339622642, 0.34375, 'squared_error = -0.0\nsamples = 1\nvalue = 702.62
4'),
 Text(0.8440251572327044, 0.40625, 'squared_error = -0.0\nsamples = 1\nvalue = 731.59
8'),
 Text(0.8515723270440252, 0.46875, 'X[0] <= 31.526\nsquared_error = 139.336\nsamples = 2
\nvalue = 703.321'),
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value = 739.368'),
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 Text(0.8616352201257862, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 740.936'),
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\nvalue = 700.552'),
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8\nvalue = 764.134'),
 Text(0.8855345911949686, 0.65625, 'X[0] <= 32.761\nsquared_error = 1121.126\nsamples =
12\nvalue = 756.161'),
 Text(0.879245283018868, 0.59375, 'X[0] <= 32.556\nsquared_error = 964.29\nsamples = 8\n
value = 765.748'),
 Text(0.8742138364779874, 0.53125, 'X[0] <= 32.472\nsquared_error = 502.869\nsamples = 5
\nvalue = 747.809'),
 Text(0.8716981132075472, 0.46875, 'X[0] <= 32.202\nsquared_error = 101.111\nsamples = 4
\nvalue = 758.08'),
 Text(0.869182389937107, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 773.925'),
 Text(0.8742138364779874, 0.40625, 'X[0] <= 32.4\nsquared_error = 23.234\nsamples = 3\nv
alue = 752.798'),
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value = 749.509'),
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7'),
 Text(0.8767295597484277, 0.46875, 'squared_error = -0.0\nsamples = 1\nvalue = 706.72
5'),
 Text(0.8842767295597485, 0.53125, 'X[0] <= 32.683\nsquared_error = 303.098\nsamples = 3
```

\nvalue = 795.646'),
 Text(0.8817610062893082, 0.46875, 'X[0] <= 32.641\nsquared_error = 156.956\nsamples = 2
\nvalue = 805.607'),
 Text(0.879245283018868, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 793.079'),
 Text(0.8842767295597485, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 818.135'),
 Text(0.8867924528301887, 0.46875, 'squared_error = -0.0\nsamples = 1\nvalue = 775.72
3'),
 Text(0.8918238993710692, 0.59375, 'X[0] <= 32.849\nsquared_error = 883.418\nsamples = 4
\nvalue = 736.989'),
 Text(0.889308176100629, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 685.655'),
 Text(0.8943396226415095, 0.53125, 'X[0] <= 33.415\nsquared_error = 6.69\nsamples = 3\nv
alue = 754.1'),
 Text(0.8918238993710692, 0.46875, 'X[0] <= 33.104\nsquared_error = 0.012\nsamples = 2\n
value = 755.928'),
 Text(0.889308176100629, 0.40625, 'squared_error = 0.0\nsamples = 1\nvalue = 755.818'),
 Text(0.8943396226415095, 0.40625, 'squared_error = -0.0\nsamples = 1\nvalue = 756.03
8'),
 Text(0.8968553459119497, 0.46875, 'squared_error = -0.0\nsamples = 1\nvalue = 750.44
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\nvalue = 780.078'),
 Text(0.909433962264151, 0.59375, 'X[0] <= 33.903\nsquared_error = 211.414\nsamples = 4
\nvalue = 775.107'),
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\nvalue = 785.837'),
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 Text(0.9069182389937107, 0.46875, 'squared_error = -0.0\nsamples = 1\nvalue = 797.56
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 Text(0.9169811320754717, 0.46875, 'squared_error = -0.0\nsamples = 1\nvalue = 756.96
3'),
 Text(0.9220125786163522, 0.59375, 'X[0] <= 34.947\nsquared_error = 64.609\nsamples = 2
\nvalue = 790.022'),
 Text(0.919496855345912, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 798.06'),
 Text(0.9245283018867925, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 781.984'),
 Text(0.970754716981132, 0.78125, 'X[0] <= 38.388\nsquared_error = 2903.621\nsamples = 1
9\nvalue = 868.699'),
 Text(0.9515723270440252, 0.71875, 'X[0] <= 36.636\nsquared_error = 731.071\nsamples = 1
2\nvalue = 834.038'),
 Text(0.9371069182389937, 0.65625, 'X[0] <= 35.451\nsquared_error = 110.472\nsamples = 6
\nvalue = 813.81'),
 Text(0.9320754716981132, 0.59375, 'X[0] <= 35.282\nsquared_error = 16.452\nsamples = 3
\nvalue = 805.805'),
 Text(0.929559748427673, 0.53125, 'X[0] <= 35.107\nsquared_error = 1.135\nsamples = 2\nv
alue = 808.607'),
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2'),
 Text(0.9421383647798742, 0.59375, 'X[0] <= 35.544\nsquared_error = 76.34\nsamples = 3\n
value = 821.815'),
 Text(0.939622641509434, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 828.296'),
 Text(0.9446540880503145, 0.53125, 'X[0] <= 36.099\nsquared_error = 83.005\nsamples = 2
\nvalue = 818.574'),
 Text(0.9421383647798742, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 809.463'),
 Text(0.9471698113207547, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 827.685'),
 Text(0.9660377358490566, 0.65625, 'X[0] <= 37.612\nsquared_error = 533.35\nsamples = 6
\nvalue = 854.265'),
 Text(0.959748427672956, 0.59375, 'X[0] <= 37.027\nsquared_error = 391.269\nsamples = 4
\nvalue = 864.057'),
 Text(0.9547169811320755, 0.53125, 'X[0] <= 36.85\nsquared_error = 25.866\nsamples = 2\n
value = 846.257'),

```
 Text(0.9522012578616352, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 841.171'),
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3'),
 Text(0.9647798742138365, 0.53125, 'X[0] <= 37.092\nsquared_error = 123.008\nsamples = 2
\nvalue = 881.857'),
 Text(0.9622641509433962, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 870.766'),
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 Text(0.9723270440251572, 0.59375, 'X[0] <= 38.121\nsquared_error = 242.26\nsamples = 2
\nvalue = 834.682'),
 Text(0.969811320754717, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 819.118'),
 Text(0.9748427672955975, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 850.247'),
 Text(0.989937106918239, 0.71875, 'X[0] <= 43.758\nsquared_error = 1037.716\nsamples = 7
\nvalue = 928.119'),
 Text(0.9874213836477987, 0.65625, 'X[0] <= 39.652\nsquared_error = 205.996\nsamples = 6
\nvalue = 916.139'),
 Text(0.9823899371069182, 0.59375, 'X[0] <= 38.649\nsquared_error = 106.599\nsamples = 3
\nvalue = 904.513'),
 Text(0.979874213836478, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 916.649'),
 Text(0.9849056603773585, 0.53125, 'X[0] <= 39.104\nsquared_error = 49.449\nsamples = 2
\nvalue = 898.446'),
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 Text(0.9924528301886792, 0.59375, 'X[0] <= 40.034\nsquared_error = 35.089\nsamples = 3
\nvalue = 927.764'),
 Text(0.989937106918239, 0.53125, 'squared_error = 0.0\nsamples = 1\nvalue = 935.717'),
 Text(0.9949685534591195, 0.53125, 'X[0] <= 41.41\nsquared_error = 5.196\nsamples = 2\nv
alue = 923.788'),
 Text(0.9924528301886792, 0.46875, 'squared_error = 0.0\nsamples = 1\nvalue = 926.067'),
 Text(0.9974842767295597, 0.46875, 'squared_error = -0.0\nsamples = 1\nvalue = 921.50
8'),
 Text(0.9924528301886792, 0.65625, 'squared_error = 0.0\nsamples = 1\nvalue = 1000.0')]
```

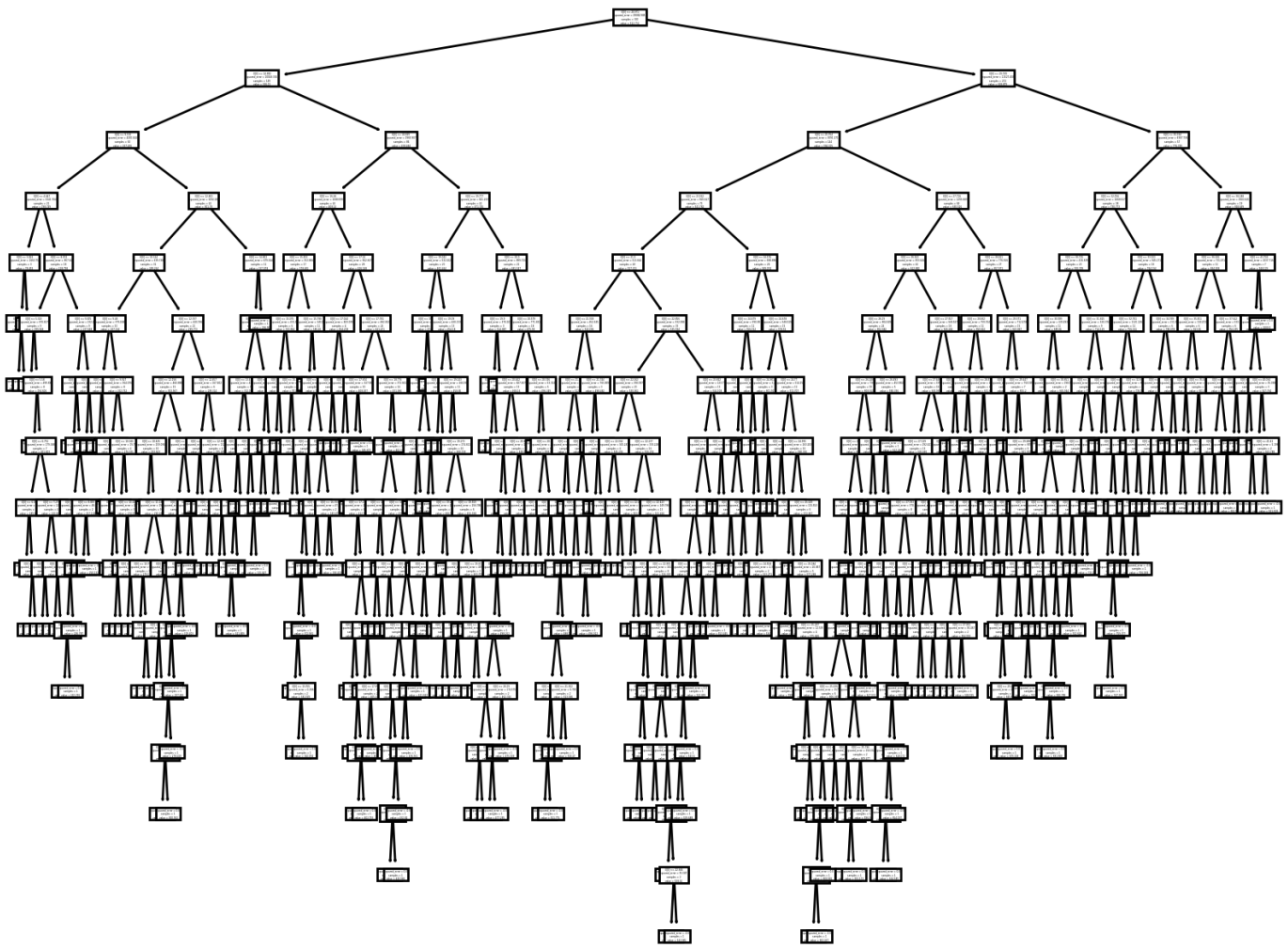

Random Forest

In [63]:
```
from sklearn.ensemble import RandomForestRegressor

rf = RandomForestRegressor(n_estimators = 1000, random_state = 0)

rf.fit(TempTrain,RevTrain)
```

Out[63]:
```
RandomForestRegressor(n_estimators=1000, random_state=0)
```

In [68]:
```
# make predictions

rf_pred = rf.predict(TempTest)

forest_mae = metrics.mean_absolute_error(RevTest, rf_pred)
forest_mse = metrics.mean_squared_error(RevTest, rf_pred)
forest_rmse = np.sqrt(metrics.mean_squared_error(RevTest, rf_pred))
forest_r2 = metrics.r2_score(RevTest, rf_pred)

forest_results = pd.DataFrame([['Random Forest', forest_mae, forest_mse, forest_rmse, fo
               columns = ['Model', 'MAE', 'MSE', 'RMSE', 'R2 Score'])

forest_results

# random forest algorithm is relatively better than decision tree
```

Out[68]:

	Model	MAE	MSE	RMSE	R2 Score
0	Random Forest	23.054486	857.562576	29.284169	0.975128

Boosting Algorithms

AdaBoost

In [70]:
```
from sklearn.ensemble import AdaBoostRegressor
ada = AdaBoostRegressor()
ada.fit(TempTrain, RevTrain)
```

Out[70]:
```
AdaBoostRegressor()
```

In [73]:
```
# Testing Set predictions
AdaRevPred = ada.predict(TempTest)

ada_mae = metrics.mean_absolute_error(RevTest, AdaRevPred)
ada_mse = metrics.mean_squared_error(RevTest, AdaRevPred)
ada_rmse = np.sqrt(metrics.mean_squared_error(RevTest, AdaRevPred))
ada_r2 = metrics.r2_score(RevTest, AdaRevPred)

ada_results = pd.DataFrame([['AdaBoost Regressor', ada_mae, ada_mse, ada_rmse, ada_r2]],
               columns = ['Model', 'MAE', 'MSE', 'RMSE', 'R2 Score'])

ada_results
```

Out[73]:

	Model	MAE	MSE	RMSE	R2 Score
0	AdaBoost Regressor	20.246776	630.86786	25.117083	0.981703

Gradient Boost

In [74]:
```
from sklearn.ensemble import GradientBoostingRegressor
gb = GradientBoostingRegressor()
gb.fit(TempTrain, RevTrain)
```

Out[74]:
```
GradientBoostingRegressor()
```

In [75]:
```
#  Testing Set predictions

GBRevPred = gb.predict(TempTest)

gb_mae = metrics.mean_absolute_error(RevTest, GBRevPred)
gb_mse = metrics.mean_squared_error(RevTest, GBRevPred)
gb_rmse = np.sqrt(metrics.mean_squared_error(RevTest, GBRevPred))
gb_r2 = metrics.r2_score(RevTest, GBRevPred)

gb_results = pd.DataFrame([['GradientBoosting Regressor', gb_mae, gb_mse, gb_rmse, gb_r2
               columns = ['Model', 'MAE', 'MSE', 'RMSE', 'R2 Score'])

gb_results
```

Out[75]:

	Model	MAE	MSE	RMSE	R2 Score
0	GradientBoosting Regressor	21.264507	685.110431	26.174614	0.98013

Evaluation Summary of Algorithms

In [81]:
```
ols_results, tree_results, forest_results ,ada_results,gb_results
```

Out[81]:
```
(                   Model        MAE         MSE       RMSE  R2 Score
 0  OLS Linear Regression  17.976808  503.354709  22.435568  0.985401,
                       Model        MAE          MSE       RMSE  R2 Score
 0  Decision Tree Regression  27.476058  1214.953466  34.856183  0.964763,
            Model        MAE         MSE       RMSE  R2 Score
 0  Random Forest  23.054486  857.562576  29.284169  0.975128,
                  Model        MAE        MSE       RMSE  R2 Score
 0  AdaBoost Regressor  20.246776  630.86786  25.117083  0.981703,
                         Model        MAE         MSE       RMSE  R2 Score
 0  GradientBoosting Regressor  21.264507  685.110431  26.174614   0.98013)
```

In [ ]:
```
# In general, the OLS Simple linear regression has the best predictive probability for t

# It has the lowest evaluation metrics for MAE, MSE, RMSE, and highest R-squared value
```