```
from sklearn.metrics import accuracy_score, classification_report, roc_auc_score, roc_curve, confusion_matrix
import matplotlib.pyplot as plt
import seaborn as sns
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score
```

```
df = pd.read_csv('/content/Credit Risk Benchmark Dataset.csv')
df.head()
```

	rev_util	age	late_30_59	debt_ratio	monthly_inc	open_credit	late_90	real_estate	late_60_89	dependents	dlq_2yrs
0	0.006999	38	0	0.302150	5440	4	0	1	0	3	0
1	0.704592	63	0	0.471441	8000	9	0	1	0	0	0
2	0.063113	57	0	0.068586	5000	17	0	0	0	0	0
3	0.368397	68	0	0.296273	6250	16	0	2	0	0	0
4	1.000000	34	1	0.000000	3500	0	0	0	0	1	0

Next steps: Generate code with df View recommended plots New interactive sheet

+ Code + Text

```
# Assuming 'predict' is the target variable
X = df[['rev_util', 'age', 'late_30_59', 'debt_ratio', 'monthly_inc', 'open_credit', 'late_90', 'real_estate', 'late_60_89', 'dependents
y = df['dlq_2yrs']
```

```
# Handle missing values (replace with mean for numerical features)
for col in X.columns:
    if X[col].dtype in ['int64', 'float64']:
        X[col].fillna(X[col].mean(), inplace=True)
```

```
<ipython-input-15-413c7dcc32be>:4: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained assignm
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting valu

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = df[col].me


  X[col].fillna(X[col].mean(), inplace=True)
<ipython-input-15-413c7dcc32be>:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-cc
  X[col].fillna(X[col].mean(), inplace=True)
```

```
# Convert to numerical features (if necessary)
X = pd.get_dummies(X, columns=['dependents'], dummy_na=True) # Example: One-hot encode 'dependents'
# ... handle other categorical features as needed
```

```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
```

```
model = LogisticRegression()  # Or any suitable model
model.fit(X_train, y_train)
```

```
/usr/local/lib/python3.11/dist-packages/sklearn/linear_model/_logistic.py:465: ConvergenceWarning: lbfgs failed to converge (status=1):
STOP: TOTAL NO. OF ITERATIONS REACHED LIMIT.

Increase the number of iterations (max_iter) or scale the data as shown in:
    https://scikit-learn.org/stable/modules/preprocessing.html
Please also refer to the documentation for alternative solver options:
    https://scikit-learn.org/stable/modules/linear_model.html#logistic-regression
  n_iter_i = _check_optimize_result(
```

```
▾ LogisticRegression
LogisticRegression()
```

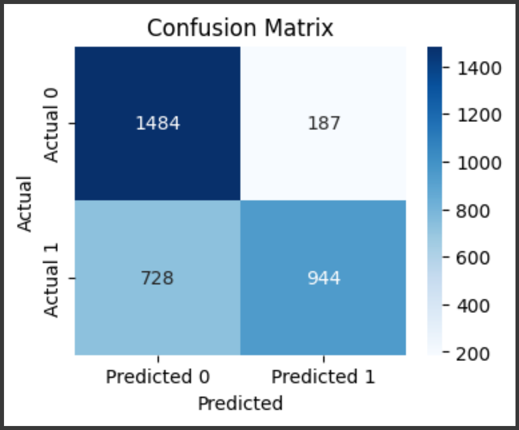
```
y_pred = model.predict(X_test)
accuracy = accuracy_score(y_test, y_pred)
print(f"Accuracy: {accuracy}")
```

```
Accuracy: 0.7262937481304218
```

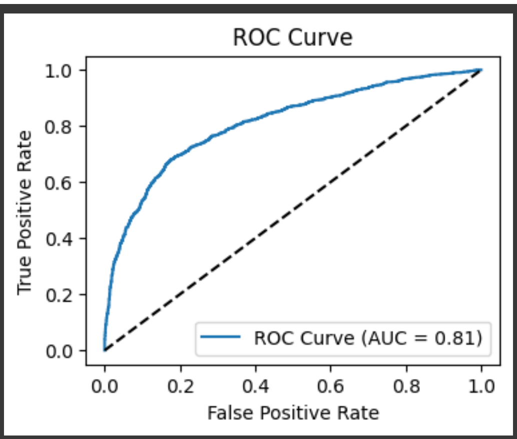
```
# Model Evaluation
print(classification_report(y_test, y_pred))
print(f"ROC AUC Score: {roc_auc_score(y_test, model.predict_proba(X_test)[:, 1])}")
```

```
              precision    recall  f1-score   support

           0       0.67      0.89      0.76      1671
           1       0.83      0.56      0.67      1672

    accuracy                           0.73      3343
   macro avg       0.75      0.73      0.72      3343
weighted avg       0.75      0.73      0.72      3343

ROC AUC Score: 0.8114886939889303
```

```
# Confusion Matrix
cm = confusion_matrix(y_test, y_pred)
plt.figure(figsize=(4, 3))
sns.heatmap(cm, annot=True, fmt='d', cmap='Blues',
            xticklabels=['Predicted 0', 'Predicted 1'],
            yticklabels=['Actual 0', 'Actual 1'])
plt.title('Confusion Matrix')
plt.xlabel('Predicted')
plt.ylabel('Actual')
plt.show()
```



```
# ROC Curve
fpr, tpr, thresholds = roc_curve(y_test, model.predict_proba(X_test)[:, 1])
plt.figure(figsize=(4, 3))
plt.plot(fpr, tpr, label=f'ROC Curve (AUC = {roc_auc_score(y_test, model.predict_proba(X_test)[:, 1]):.2f})')
plt.plot([0, 1], [0, 1], 'k--')  # Random classifier line
plt.xlabel('False Positive Rate')
plt.ylabel('True Positive Rate')
plt.title('ROC Curve')
plt.legend(loc='lower right')
plt.show()
```


ROC Curve
True Positive Rate
False Positive Rate
0.0
0.2
0.4
0.6
0.8
1.0
ROC Curve (AUC = 0.81)