Q1. Based on the above confusion matrix, calculate by using the correct equation: Accuracy, Precision, Recall, F1-score. Explain the meaning of the numbers you get.

```
Accuracy: 0.7705627705627706
Precision: 0.7285714285714285
Recall: 0.6
F1-Score: 0.6580645161290323
```

Accuracy: represents the overall correctness of the model's predictions. A higher accuracy indicates that the model is making more correct predictions.

Precision: represents the accuracy of positive predictions, showing how many of the instances predicted as positive are actually positive

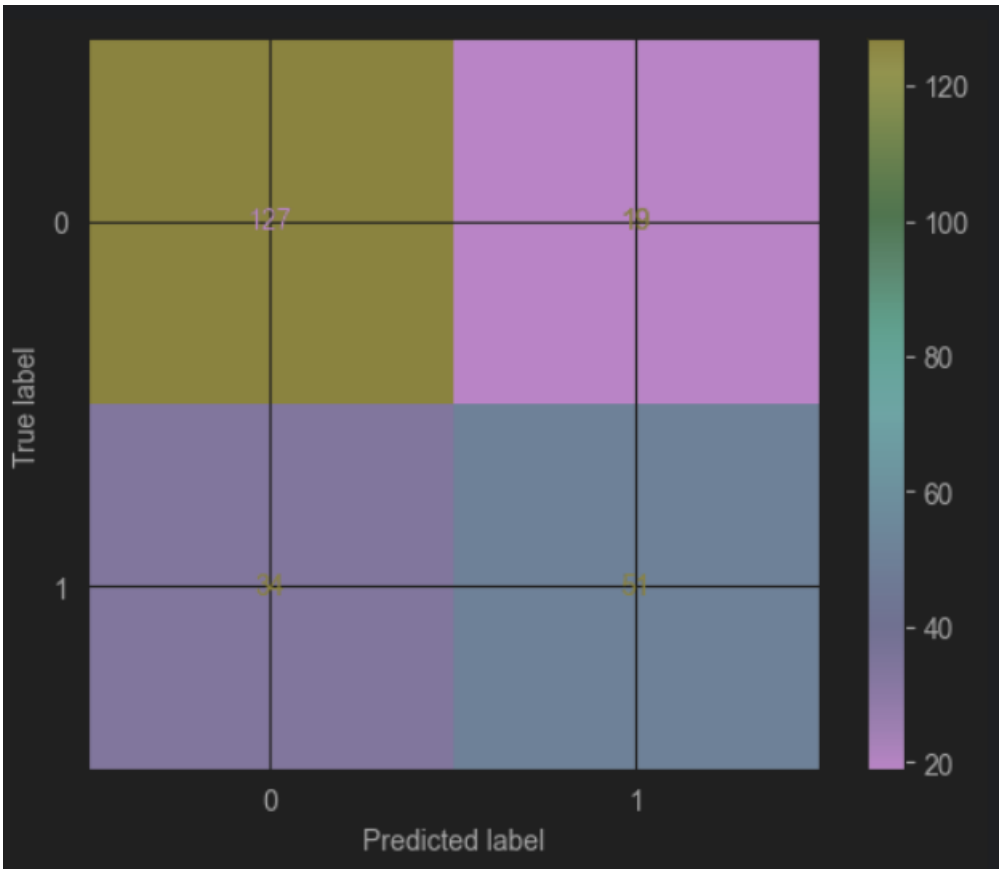
Recall (Sensitivity): It shows the ability of the model to correctly identify positive instances. It is important in scenarios where missing positive instances is costly.

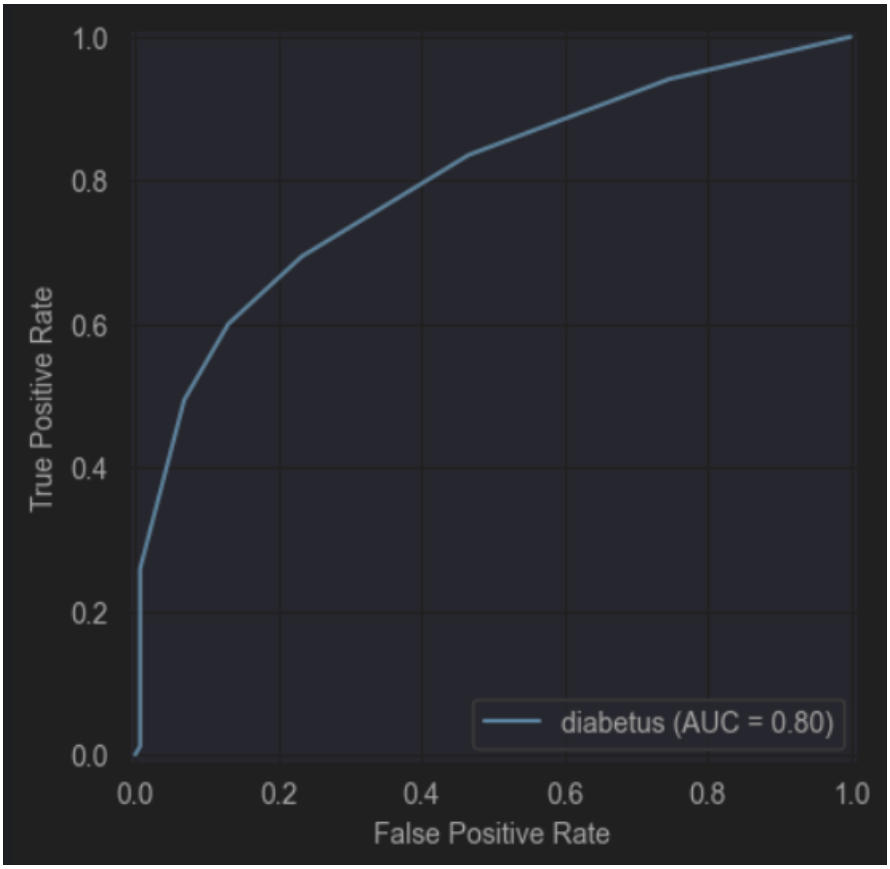
F1-score: It provides a balance between Precision and Recall. It is useful when we need to consider both false positives and false negatives. A higher F1-score indicates better performance.

Q2. Keep modifying the number of neighbours (K) to 7, 17, 15, 21, 25, 33, can you get a higher accuracy, F1-Score? Can you get a better AUC?

7:

```
Accuracy: 0.7705627705627706
Precision: 0.7285714285714285
Recall: 0.6
F1-Score: 0.6580645161290323
```

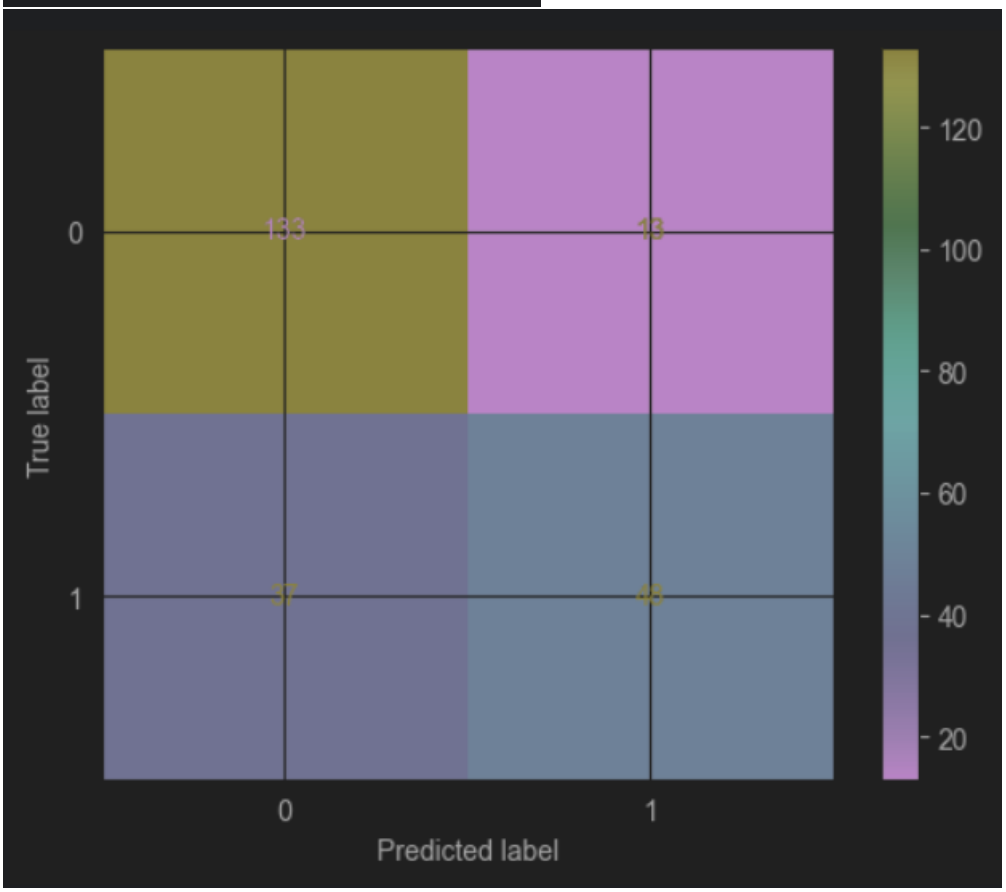

0
1
True label
127
13
34
51
0
1
Predicted label
120
100
80
60
40
20

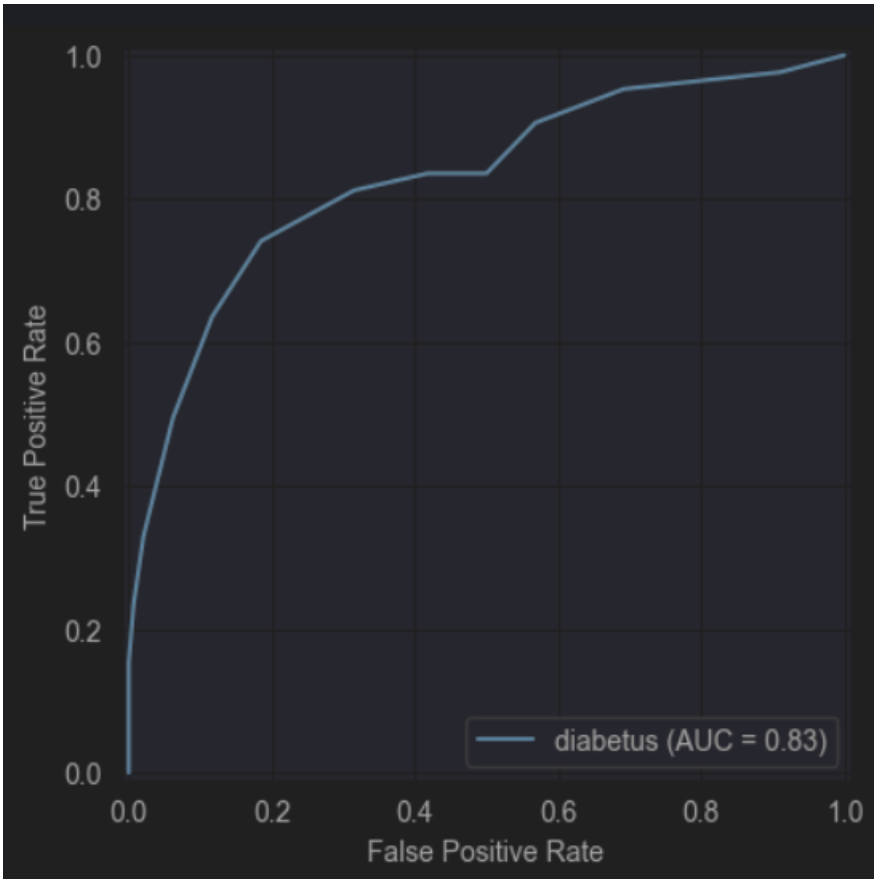



```
Area Under Curve: 0.7969379532634973
```

17:

```
Accuracy: 0.7835497835497836
Precision: 0.7868852459016393
Recall: 0.5647058823529412
F1-Score: 0.6575342465753424
```

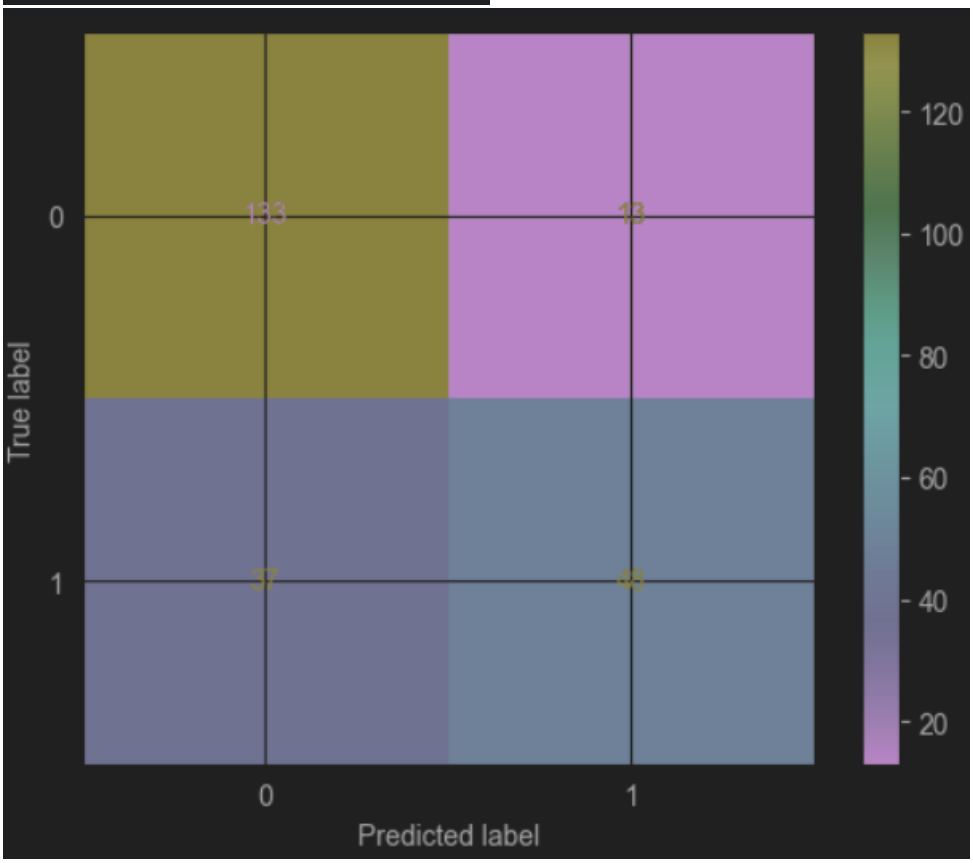


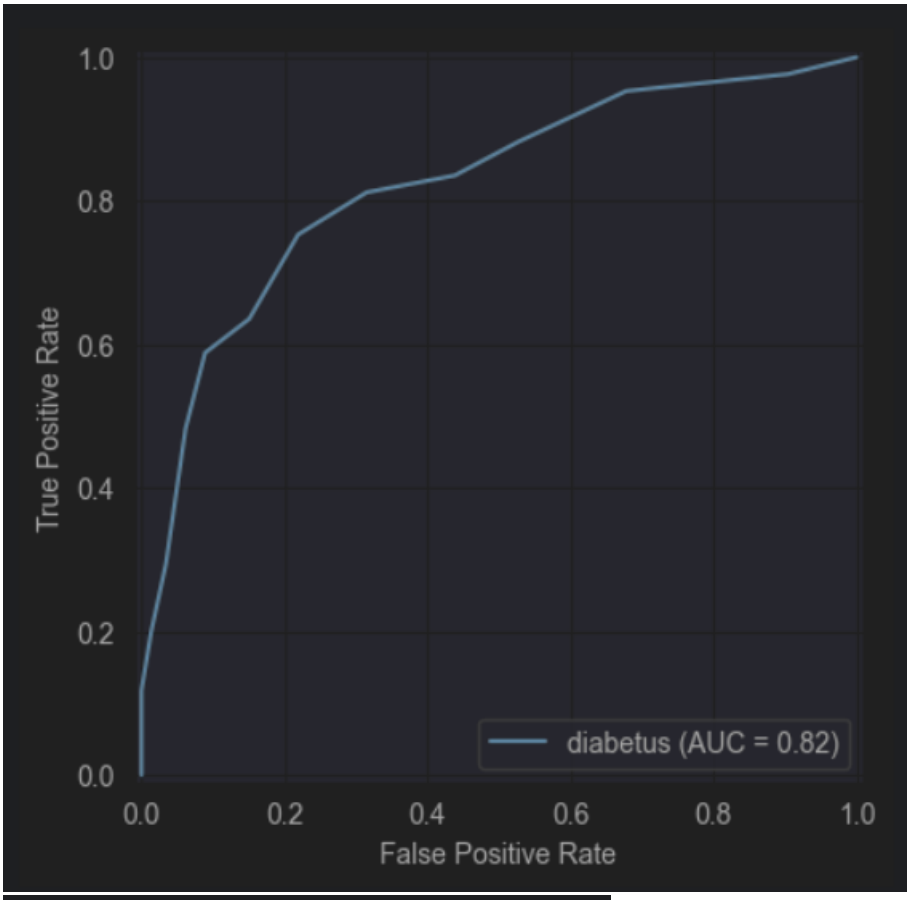



```
Area Under Curve: 0.8281627719580983
```

15:

```
Accuracy: 0.7835497835497836
Precision: 0.7868852459016393
Recall: 0.5647058823529412
F1-Score: 0.6575342465753424
```

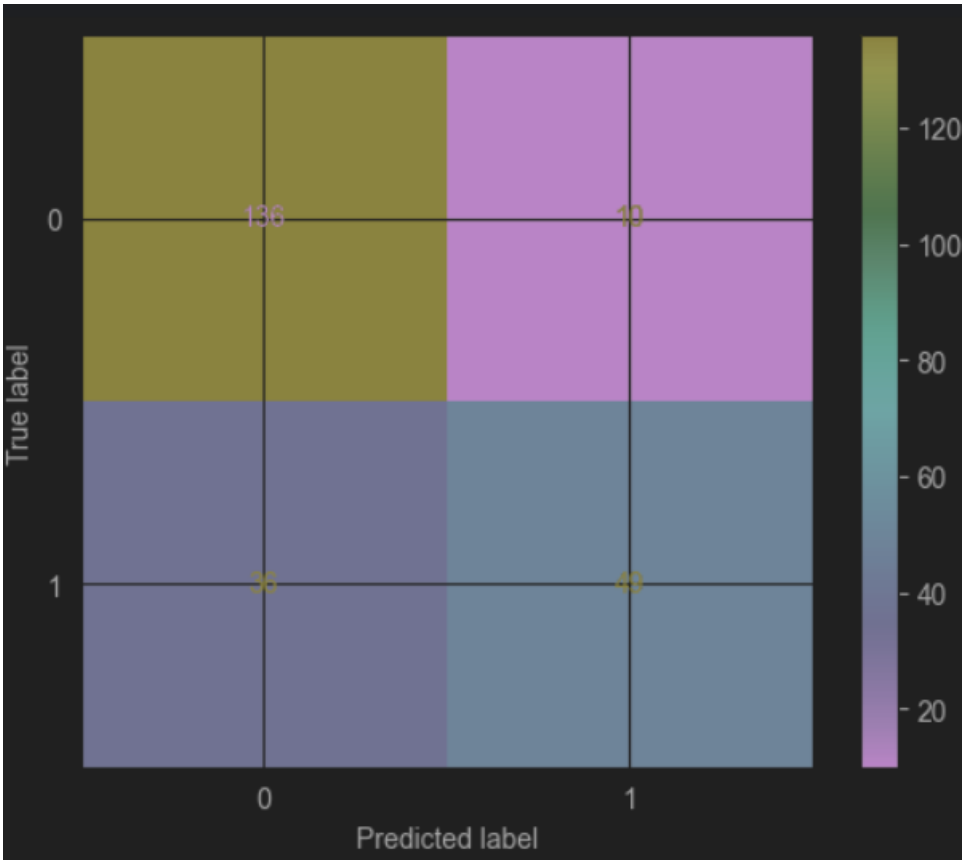


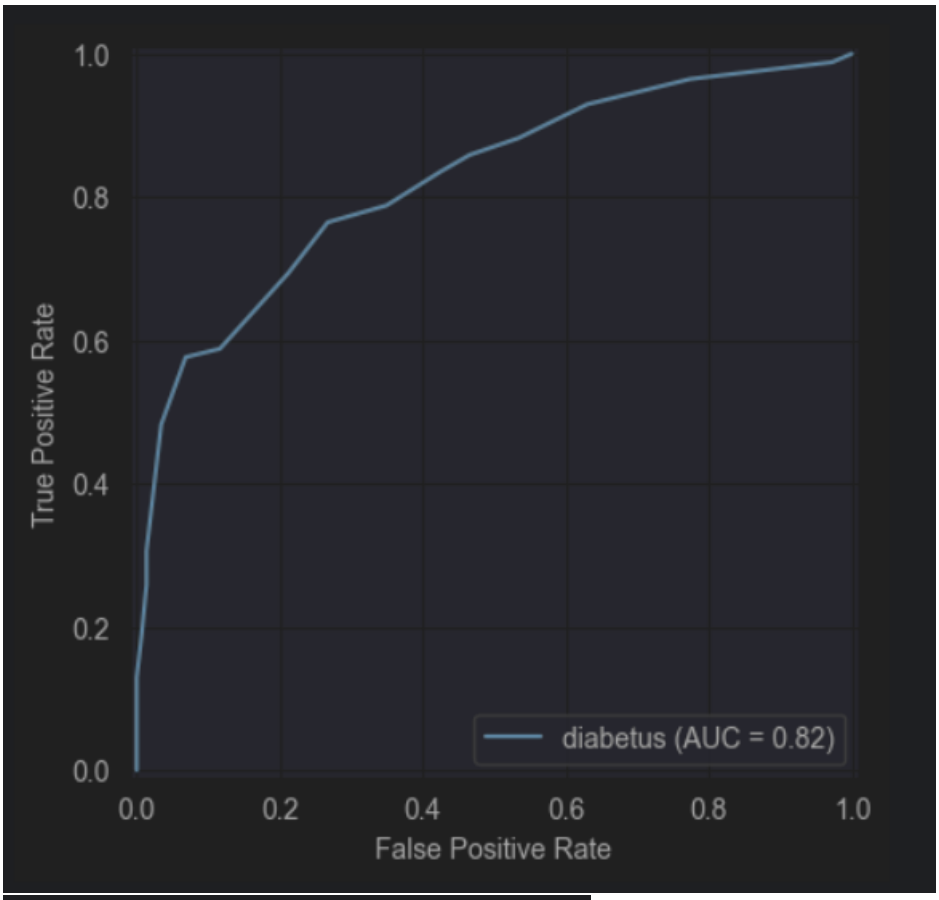



```
Area Under Curve: 0.821917808219178
```

21:

```
Accuracy: 0.8008658008658008
Precision: 0.8305084745762712
Recall: 0.5764705882352941
F1-Score: 0.6805555555555556
```

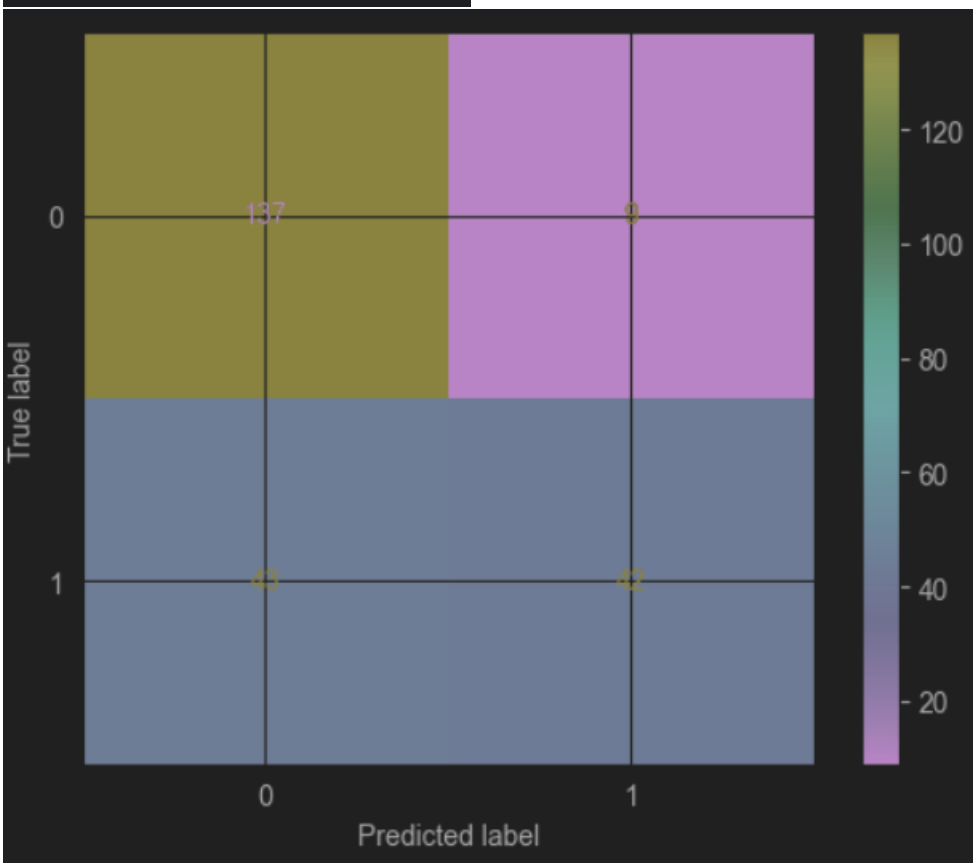

0
1
True label
136
19
36
49
0
1
Predicted label
120
100
80
60
40
20

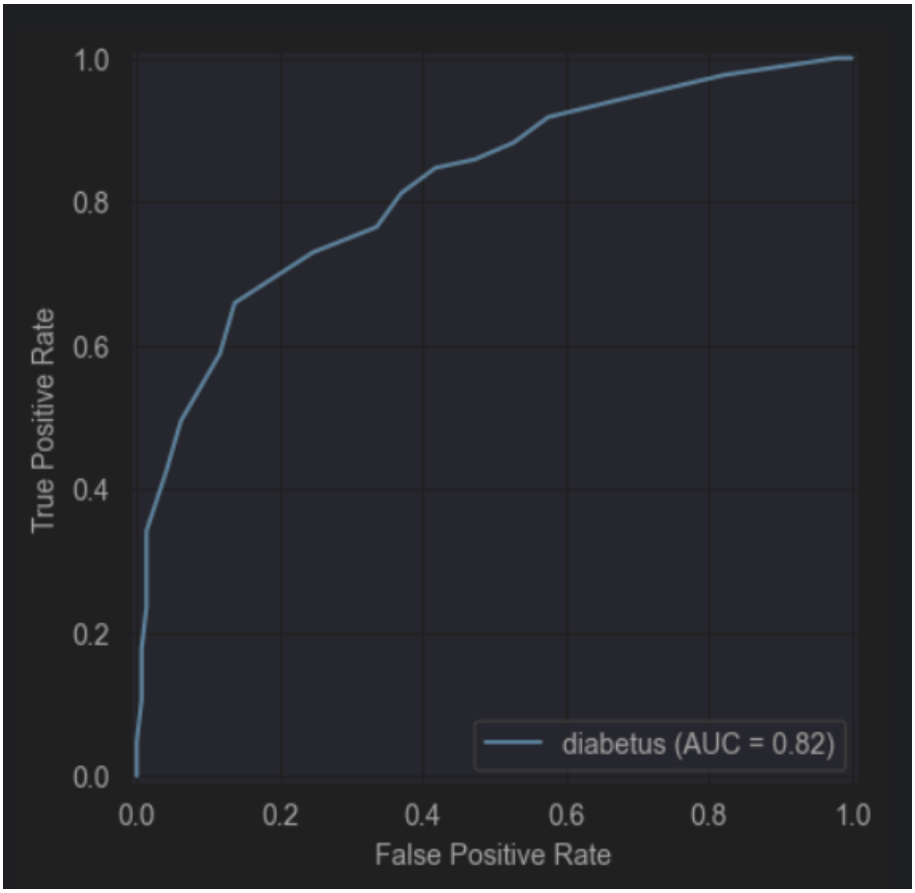



```
Area Under Curve: 0.821917808219178
```

25:

```
Accuracy: 0.7748917748917749
Precision: 0.8235294117647058
Recall: 0.49411764705882355
F1-Score: 0.6176470588235294
```

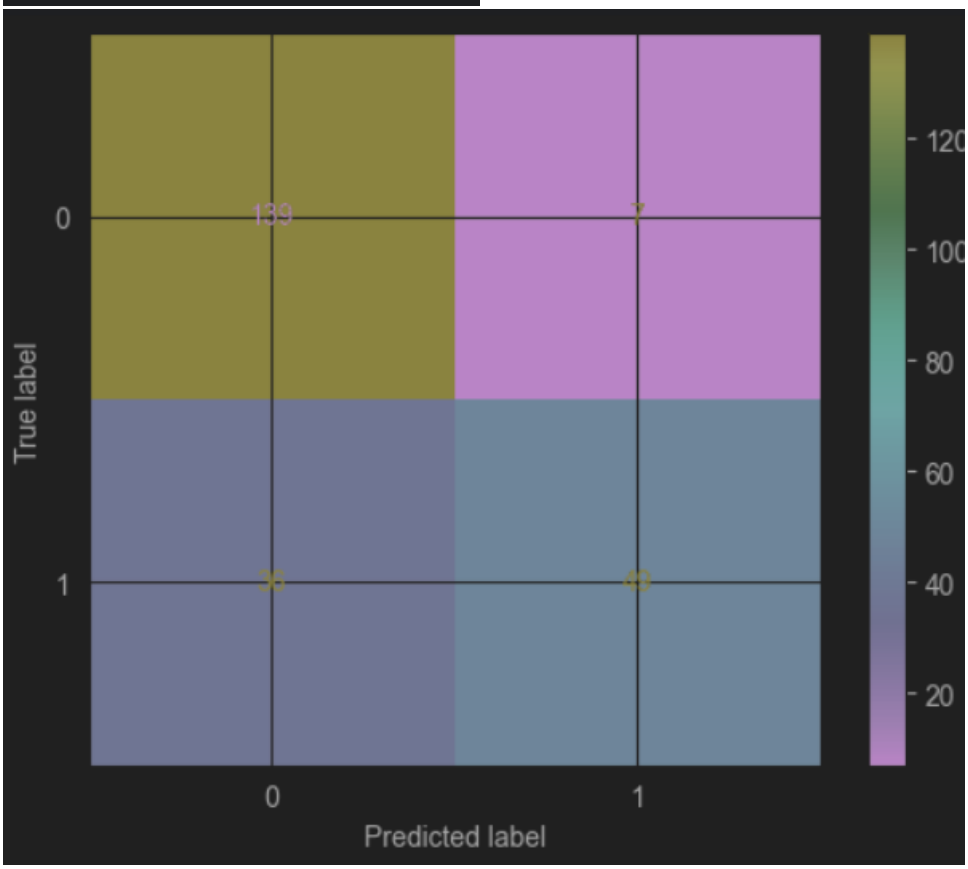


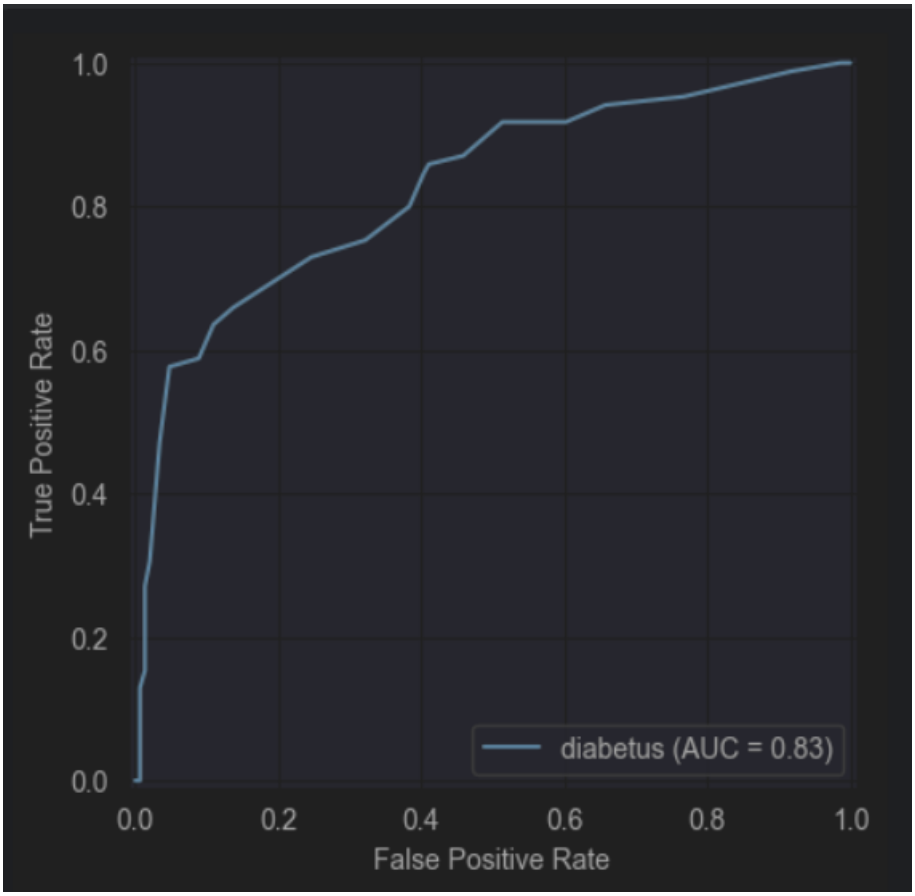



```
Area Under Curve: 0.8210717163577759
```
r

33:

```
Accuracy: 0.8138528138528138
Precision: 0.875
Recall: 0.5764705882352941
F1-Score: 0.6950354609929078
```






```
Area Under Curve: 0.8271152296535053
```

Q3. Compare your results to the accuracy and AUC of Logistic Regression Model.

```
Logistic Regression Model Accuracy: 0.7835497835497836
Logistic Regression Model AUC: 0.8628525382755842
```

Logistic Regression Model is a bit higher.