In [1]:
```
import pandas as pd
```

In [2]:
```
df = pd.read_csv("diabetes.csv")
df
```

Out[2]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age	Outcome
0	6	148	72	35	0	33.6	0.627	50	1
1	1	85	66	29	0	26.6	0.351	31	0
2	8	183	64	0	0	23.3	0.672	32	1
3	1	89	66	23	94	28.1	0.167	21	0
4	0	137	40	35	168	43.1	2.288	33	1
...	...	...	...	...	...	...	...	...	...
763	10	101	76	48	180	32.9	0.171	63	0
764	2	122	70	27	0	36.8	0.340	27	0
765	5	121	72	23	112	26.2	0.245	30	0
766	1	126	60	0	0	30.1	0.349	47	1
767	1	93	70	31	0	30.4	0.315	23	0

768 rows × 9 columns

In [4]:
```
df.describe()
```

Out[4]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age	Outcome
count	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000
mean	3.845052	120.894531	69.105469	20.536458	79.799479	31.992578	0.471876	33.240885	0.348958
std	3.369578	31.972618	19.355807	15.952218	115.244002	7.884160	0.331329	11.760232	0.476951
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.078000	21.000000	0.000000
25%	1.000000	99.000000	62.000000	0.000000	0.000000	27.300000	0.243750	24.000000	0.000000
50%	3.000000	117.000000	72.000000	23.000000	30.500000	32.000000	0.372500	29.000000	0.000000
75%	6.000000	140.250000	80.000000	32.000000	127.250000	36.600000	0.626250	41.000000	1.000000
max	17.000000	199.000000	122.000000	99.000000	846.000000	67.100000	2.420000	81.000000	1.000000

In [32]:
```
x = df.drop(columns=["Outcome"])
y = df["Outcome"]
```

In [33]:
```
x
```

Out[33]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age
0	6	148	72	35	0	33.6	0.627	50
1	1	85	66	29	0	26.6	0.351	31
2	8	183	64	0	0	23.3	0.672	32
3	1	89	66	23	94	28.1	0.167	21
4	0	137	40	35	168	43.1	2.288	33
...	...	...	...	...	...	...	...	...
763	10	101	76	48	180	32.9	0.171	63
764	2	122	70	27	0	36.8	0.340	27
765	5	121	72	23	112	26.2	0.245	30
766	1	126	60	0	0	30.1	0.349	47
767	1	93	70	31	0	30.4	0.315	23

768 rows × 8 columns

In [34]:
```
y
```

Out[34]:
```
0      1
1      0
2      1
3      0
4      1
      ..
763    0
764    0
765    0
766    1
767    0
Name: Outcome, Length: 768, dtype: int64
```

In [24]:
```
from sklearn.model_selection import train_test_split
```

In [35]:
```
x_train,x_test,y_train,y_test = train_test_split(x,y)
```

In [36]:
```
from sklearn.neighbors import KNeighborsClassifier
```

In [54]:
```
knn = KNeighborsClassifier(n_neighbors=4)
```

In [55]:
```
knn.fit(x_train,y_train)
```

Out[55]:
```
KNeighborsClassifier(n_neighbors=4)
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

In [56]:
```
y_pred = knn.predict(x_test)
```

In [57]:
```
from sklearn.metrics import accuracy_score,precision_score,recall_score,confusion_matrix
```

In [59]:
```
acc = accuracy_score(y_test,y_pred)
acc
```

Out[59]:
```
0.7604166666666666
```

In [60]:
```
recall = recall_score(y_test,y_pred)
recall
```

Out[60]:
```
0.3898305084745763
```

In [62]:
```
precision = precision_score(y_test,y_pred)
precision
```

Out[62]:
```
0.696969696969697
```

In [63]:
```
cm = confusion_matrix(y_test,y_pred)
cm
```

Out[63]:
```
array([[123,  10],
       [ 36,  23]])
```

In [64]:
```
err = (1 - acc)
err
```

Out[64]:
```
0.23958333333333337
```

In [65]:
```
err_1 = (cm[0,1] + cm[1,0])/(cm[0,0] + cm[0,1] + cm[1,0] + cm[1,1]) # Error Rate = FP+FN/TP+TN+FP+FN
err_1
```

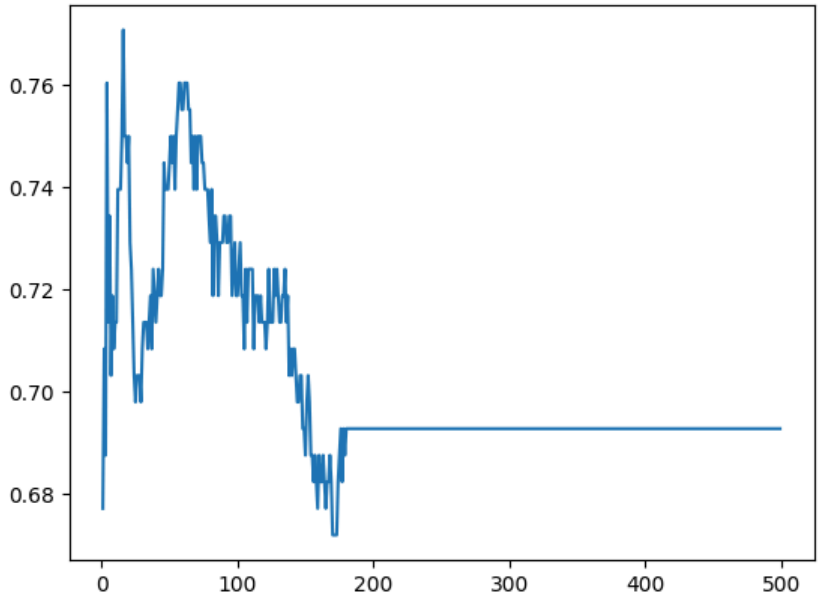
Out[65]:
```
0.23958333333333334
```

In [69]:
```
def knn(x_train, y_train, x_test, y_test, n):
    n_range = range(1,n)
    results=[]
    for n in n_range:
        knn = KNeighborsClassifier(n_neighbors=n)
        knn.fit(x_train,y_train)
        predict_y = knn.predict(x_test)
        accuracy = accuracy_score(y_test,predict_y)
        results.append(accuracy)
    return results
```

In [70]:
```
import matplotlib.pyplot as plt
```

In [71]:
```
n = 500
output = knn(x_train,y_train,x_test,y_test,n)
n_range = range(1,n)
plt.plot(n_range, output)
```

Out[71]:
```
[<matplotlib.lines.Line2D at 0x7a244edadc00>]
```



In [ ]:
```

```