- Jawaban no 1

```python
import numpy as np
import pandas as pd
from sklearn import svm
import matplotlib.pyplot as plt

# Fungsi Trapezoid untuk menghitung integral
def Trapezoid(a, b, f):
    '''
        Fungsi untuk mencari Integral Trapezoid dengan mengganti nilai
        a = batas atas
        dan
        b = batas bawah,
        serta
        f = yang akan diintegralkan
    '''
    n = 100
    def trapezoid(f, a, b, n=100):
        h = (b - a) / n
        sum = 0.0
        for i in range(1, n):
            x = a + i * h
            sum = sum + f(x)
        integral = (h / 2) * (f(a) + 2 * sum + f(b))  # Rumus Trapezoid
        return integral
    integral = trapezoid(f, a, b, n)
    return round(integral, 2)
```

```python
# Membaca data dari Google Drive
drive.mount('/content/drive')
file_path = '/content/drive/My Drive/Trapezoid.txt'  # Ganti path sesuai lokasi file Anda
Database = pd.read_csv(file_path, sep=",", header=0)

# Fungsi-fungsi yang akan dihitung integralnya
functions = [
    lambda x: 2*x,
    lambda x: 2*x + 2,
    lambda x: 2*x + 4,
    lambda x: 4*x + 6,
    lambda x: 6*x + 8,
    lambda x: 8*x + 10,
    lambda x: 10*x + 12,
    lambda x: 12*x + 14,
    lambda x: 14*x + 12,
    lambda x: 20*x + 40,
]
```

```python
data = []
for i in range(len(functions)):
    a, b = 1 + i, 2 + i  # Nilai a dan b
    integral = Trapezoid(a, b, functions[i])
    data.append([a, b, integral])

# Membuat DataFrame untuk menyimpan database
Database = pd.DataFrame(data, columns=['a', 'b', 'Target'])

# X = Data, y = Target
X = Database[['a', 'b']]
y = Database['Target']

# Membuat dan melatih model SVM
clf = svm.SVC(kernel='linear')  # Menggunakan kernel linear
clf.fit(X, y)
```

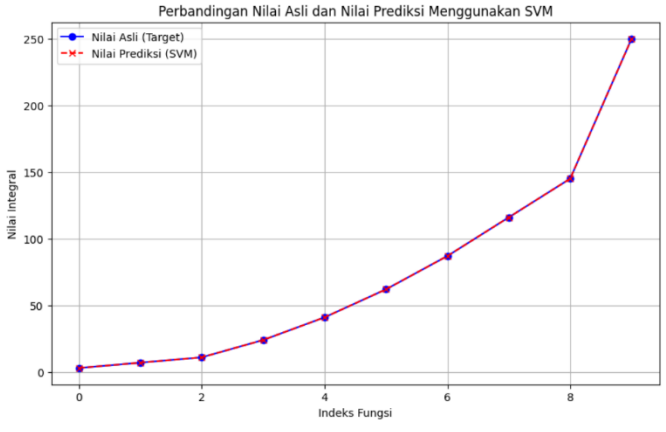
```python
# Melakukan prediksi
y_pred = clf.predict(X.values)

# Menampilkan hasil prediksi
print("Hasil prediksi:")
for i, pred in enumerate(y_pred):
    print(f"Fungsi ke-{i+1}: a = {X.iloc[i, 0]}, b = {X.iloc[i, 1]}, Integral Asli = {y.iloc[i]}, Prediksi = {pred}")

# Membuat plot perbandingan nilai asli dengan nilai prediksi
plt.figure(figsize=(10, 6))
plt.plot(range(len(y)), y, 'o-', label='Nilai Asli (Target)', color='blue')
plt.plot(range(len(y_pred)), y_pred, 'x--', label='Nilai Prediksi (SVM)', color='red')

# Menambahkan label dan judul
plt.xlabel('Indeks Fungsi')
plt.ylabel('Nilai Integral')
plt.title('Perbandingan Nilai Asli dan Nilai Prediksi Menggunakan SVM')
plt.legend()
plt.grid()
plt.show()
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/base.py:493: UserWarning: X does not have valid feature names, but SVC was fitted with feature nam
  warnings.warn(
Hasil prediksi:
Fungsi ke-1: a = 1, b = 2, Integral Asli = 3.0, Prediksi = 3.0
Fungsi ke-2: a = 2, b = 3, Integral Asli = 7.0, Prediksi = 7.0
Fungsi ke-3: a = 3, b = 4, Integral Asli = 11.0, Prediksi = 11.0
Fungsi ke-4: a = 4, b = 5, Integral Asli = 24.0, Prediksi = 24.0
Fungsi ke-5: a = 5, b = 6, Integral Asli = 41.0, Prediksi = 41.0
Fungsi ke-6: a = 6, b = 7, Integral Asli = 62.0, Prediksi = 62.0
Fungsi ke-7: a = 7, b = 8, Integral Asli = 87.0, Prediksi = 87.0
Fungsi ke-8: a = 8, b = 9, Integral Asli = 116.0, Prediksi = 116.0
Fungsi ke-9: a = 9, b = 10, Integral Asli = 145.0, Prediksi = 145.0
Fungsi ke-10: a = 10, b = 11, Integral Asli = 250.0, Prediksi = 250.0
```



- Jawaban no 3

```python
import numpy as np
import pandas as pd
from sklearn import svm
from google.colab import drive
import matplotlib.pyplot as plt

# Fungsi Trapezoid untuk menghitung integral
def Trapezoid(a, b, f):
    '''
        Fungsi untuk mencari Integral Trapezoid dengan mengganti nilai
        a = batas atas
        dan
        b = batas bawah,
        serta
        f = yang akan diintegralkan
    '''
    n = 100
    def trapezoid(f, a, b, n=100):
        h = (b - a) / n
        sum = 0.0
        for i in range(1, n):
            x = a + i * h
            sum = sum + f(x)
        integral = (h / 2) * (f(a) + 2 * sum + f(b))  # Rumus Trapezoid
        return integral
    integral = trapezoid(f, a, b, n)
    return round(integral, 2)
```

```python
# Membaca data dari Google Drive
drive.mount('/content/drive')
file_path = '/content/drive/My Drive/Trapezoid.txt'  # Ganti path sesuai lokasi file Anda
Database = pd.read_csv(file_path, sep=",", header=0)

# Fungsi-fungsi yang akan dihitung integralnya
functions = [
    lambda x: 2*x,
    lambda x: 2*x + 2,
    lambda x: 2*x + 4,
    lambda x: 4*x + 6,
    lambda x: 6*x + 8,
    lambda x: 8*x + 10,
    lambda x: 10*x + 12,
    lambda x: 12*x + 14,
    lambda x: 14*x + 12,
    lambda x: 20*x + 40,
]
```

```python
data = []
for i in range(len(functions)):
    a, b = i + 2, i + 4  # Perubahan batas sesuai soal
    integral = Trapezoid(a, b, functions[i])
    data.append([a, b, integral])


# Membuat DataFrame untuk menyimpan database
Database = pd.DataFrame(data, columns=['a', 'b', 'Target'])

# X = Data, y = Target
X = Database[['a', 'b']]
y = Database['Target']

# Membuat dan melatih model SVM
clf = svm.SVC(kernel='linear')  # Menggunakan kernel linear
clf.fit(X, y)
```

```python
# Melakukan prediksi
y_pred = clf.predict(X.values)

# Menampilkan hasil prediksi
print("Hasil prediksi:")
for i, pred in enumerate(y_pred):
    print(f"Fungsi ke-{i+1}: a = {X.iloc[i, 0]}, b = {X.iloc[i, 1]}, Integral Asli = {y.iloc[i]}, Prediksi = {pred}")

# Membuat plot perbandingan nilai asli dengan nilai prediksi
plt.figure(figsize=(10, 6))
plt.plot(range(len(y)), y, 'o-', label='Nilai Asli (Target)', color='blue')
plt.plot(range(len(y_pred)), y_pred, 'x--', label='Nilai Prediksi (SVM)', color='red')

# Menambahkan label dan judul
plt.xlabel('Indeks Fungsi')
plt.ylabel('Nilai Integral')
plt.title('Perbandingan Nilai Asli dan Nilai Prediksi Menggunakan SVM')
plt.legend()
plt.grid()
plt.show()
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/base.py:493: UserWarning: X does not have valid feature names, but SVC was fitted with feature names
  warnings.warn(
Hasil prediksi:
Fungsi ke-1: a = 2, b = 4, Integral Asli = 12.0, Prediksi = 12.0
Fungsi ke-2: a = 3, b = 5, Integral Asli = 20.0, Prediksi = 20.0
Fungsi ke-3: a = 4, b = 6, Integral Asli = 28.0, Prediksi = 28.0
Fungsi ke-4: a = 5, b = 7, Integral Asli = 60.0, Prediksi = 60.0
Fungsi ke-5: a = 6, b = 8, Integral Asli = 100.0, Prediksi = 100.0
Fungsi ke-6: a = 7, b = 9, Integral Asli = 148.0, Prediksi = 148.0
Fungsi ke-7: a = 8, b = 10, Integral Asli = 204.0, Prediksi = 204.0
Fungsi ke-8: a = 9, b = 11, Integral Asli = 268.0, Prediksi = 268.0
Fungsi ke-9: a = 10, b = 12, Integral Asli = 332.0, Prediksi = 332.0
Fungsi ke-10: a = 11, b = 13, Integral Asli = 560.0, Prediksi = 560.0
```