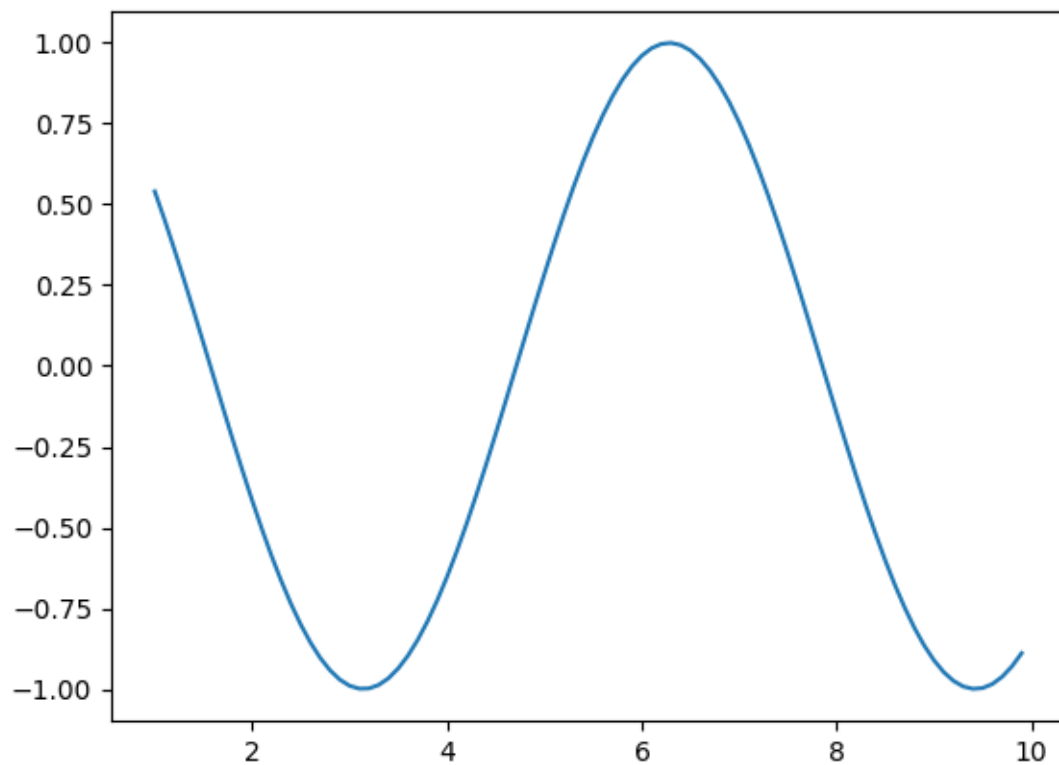# lab1

January 20, 2025

```
[2]: import numpy as np
     import matplotlib.pyplot as plt
     from sklearn.linear_model import LinearRegression
```

```
[3]: xs = np.arange(1, 10, 0.1)
```

```
[4]: ys = np.cos(xs)
```

```
[5]: plt.plot(xs,ys)
```

```
[5]: [<matplotlib.lines.Line2D at 0x7905563fd400>]
```

```python
[8]: [_ for _ in range(1,10) if _ % 2 == 0]
```

```
[8]: [2, 4, 6, 8]
```
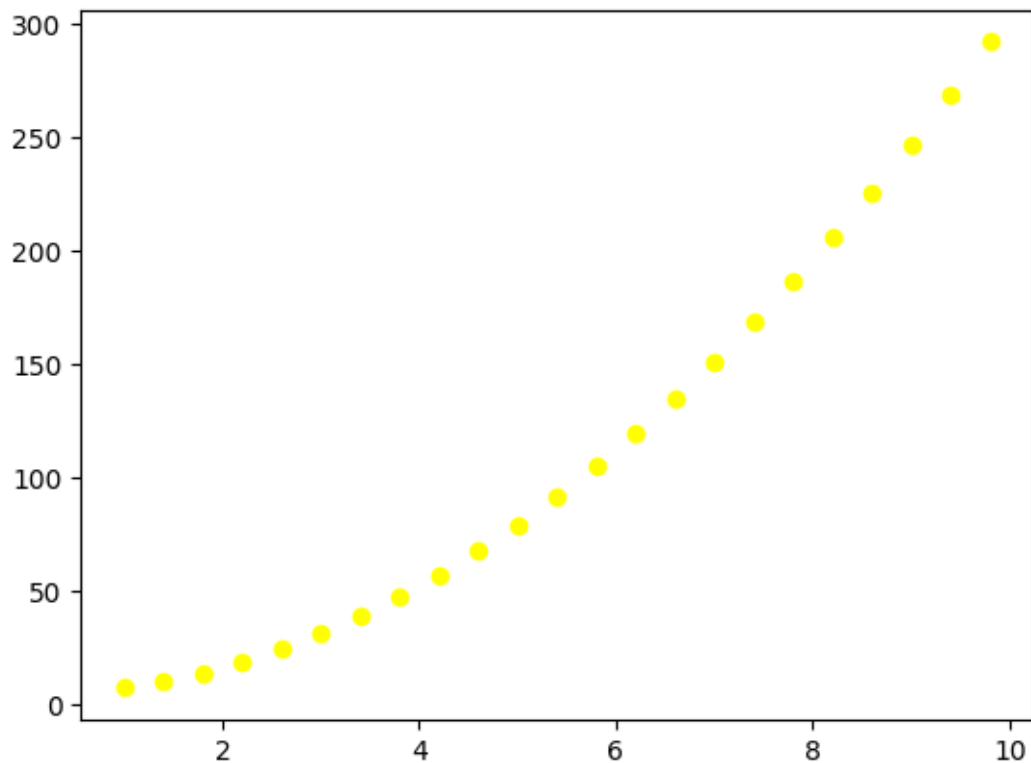
```python
[7]: ns = np.arange(1 , 10 , 0.4)
```

```python
[42]: ps = 3 * ns**2 + 4
      ps
```

```
[42]: array([  7.  ,   9.88,  13.72,  18.52,  24.28,  31.  ,  38.68,  47.32,
              56.92,  67.48,  79.  ,  91.48, 104.92, 119.32, 134.68, 151.  ,
             168.28, 186.52, 205.72, 225.88, 247.  , 269.08, 292.12])
```

```python
[46]: plt.scatter(ns,ps,color="yellow")
```

```
[46]: <matplotlib.collections.PathCollection at 0x727592daf500>
```



```python
[49]: x = 10           # int
      y = 3.5          # float
      name = "Alice"   # str
      is_student = True  # bool
```

```python
print(f"x: {x}, type: {type(x)}")
print(f"y: {y}, type: {type(y)}")
print(f"name: {name}, type: {type(name)}")
print(f"is_student: {is_student}, type: {type(is_student)}")
```

```
x: 10, type: <class 'int'>
y: 3.5, type: <class 'float'>
name: Alice, type: <class 'str'>
is_student: True, type: <class 'bool'>
```

[50]:
```python
a = "25"
b = 5.7

a_int = int(a)
b_int = int(b)

print(f"Converted a: {a_int}, type: {type(a_int)}")
print(f"Converted b: {b_int}, type: {type(b_int)}")
```

```
Converted a: 25, type: <class 'int'>
Converted b: 5, type: <class 'int'>
```

[51]:
```python
x = 10
y = 3.5

print(f"Sum: {x + y}")
print(f"Difference: {x - y}")
print(f"Product: {x * y}")

print(f"Is x greater than y? {x > y}")

is_valid = (x > 5) and (y < 5)
print(f"Is the condition valid? {is_valid}")
```

```
Sum: 13.5
Difference: 6.5
Product: 35.0
Is x greater than y? True
Is the condition valid? True
```

[52]:
```python
age = 20

if age < 18:
    print("You are a minor.")
elif age == 18:
    print("You are just an adult.")
else:
```

```
    print("You are an adult.")
```

You are an adult.

[53]:
```
X = np.array([[1], [2], [3], [4], [5]])
y = np.array([2, 4, 6, 8, 10])
print("Input Features (X):")
print(X)
print("\nOutput Values (y):")
print(y)
```

Input Features (X):
[[1]
 [2]
 [3]
 [4]
 [5]]

Output Values (y):
[2 4 6 8 10]

[60]:
```
model = LinearRegression()
model.fit(X, y)
print("Model training complete.")
```

Model training complete.

[62]:
```
X = np.array([[1], [2], [3], [4], [5]])
y = np.array([2, 4, 6, 8, 10])
print("Input Features (X):")
print(X)
print("\nOutput Values (y):")
print(y)
```

Input Features (X):
[[1]
 [2]
 [3]
 [4]
 [5]]

Output Values (y):
[2 4 6 8 10]

[63]:
```
model = LinearRegression()
model.fit(X, y)
print("Model training complete.")
```

Model training complete.

```
[64]: new_input = np.array([[6]])
      prediction = model.predict(new_input)
      print(f"Prediction for input {new_input[0][0]}: {prediction[0]}")
```

Prediction for input 6: 12.0

```
[ ]: import matplotlib.pyplot as plt
     x = [1, 2, 3, 4, 5]
     y = [2, 4, 6, 8, 10]
     plt.plot(x, y, marker='o')
     plt.title("Simple Line Plot")
     plt.xlabel("X-axis")
     plt.ylabel("Y-axis")
     plt.grid(True)
     plt.show()
```