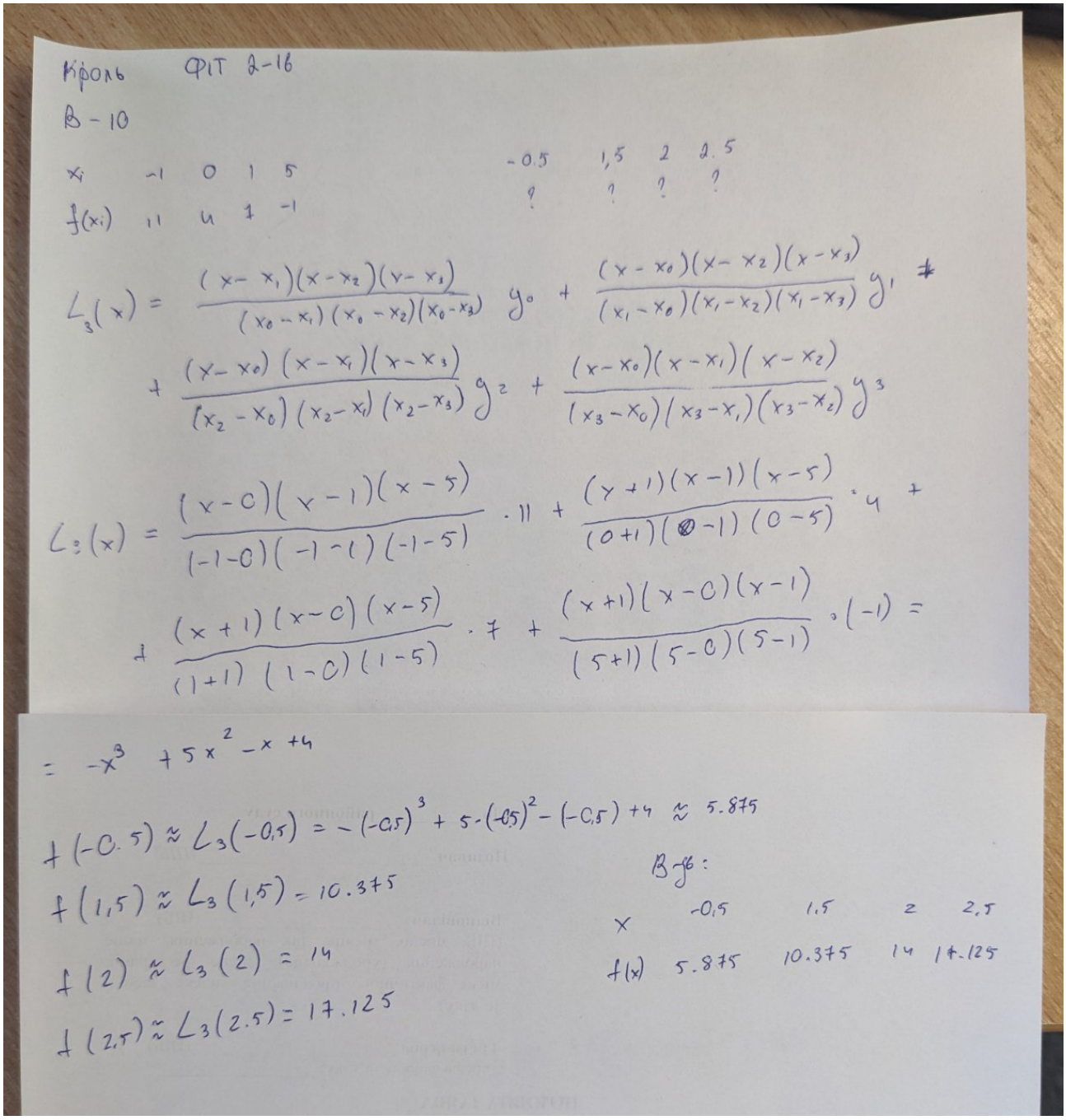
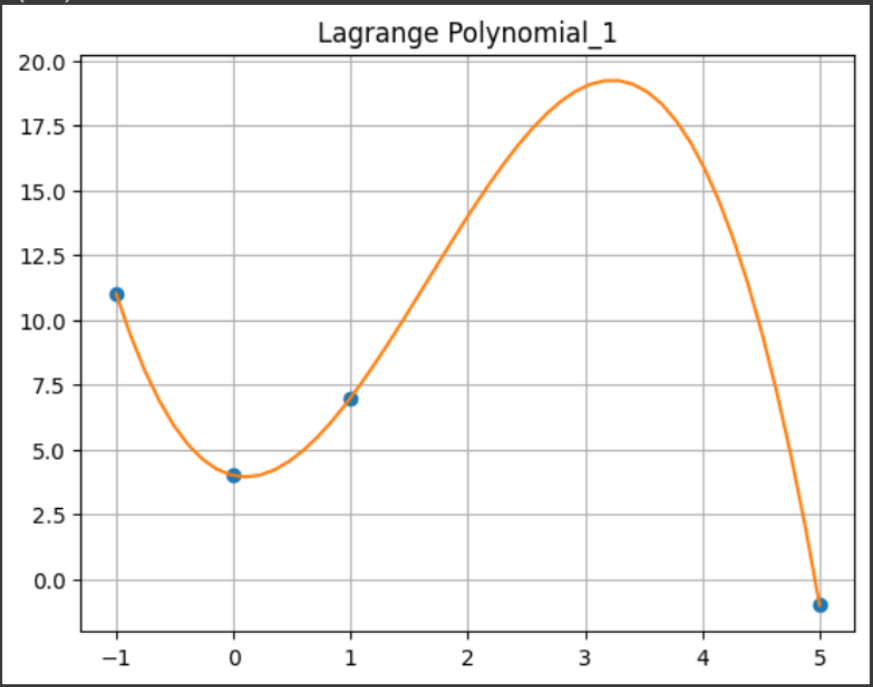
Кроль Данило
ФІТ 2-16
Варіант 10

Код:
https://colab.research.google.com/drive/1h7E5cf1IJCuQ5MAztzBh8cKqmH0nHPWf?usp=sharing



```python
import matplotlib.pyplot as plt
import numpy as np
x=[-1.,0.,1.,5.]
y=[11.,4.,7.,-1.]
x_test = [-0.5,1.5,2.,2.5]

def lagrange_i(x, y, xt):
  n = len(x)
  ret = 0
  for i in range(n):
    tmp = []
    for j in range(n):
      if i == j:
        continue
      tmp.append(x[j])
    p_u = 1
    p_d = 1
    for px in tmp:
      p_u *= (xt - px)
      p_d *= (x[i] - px)
    ret += (p_u/p_d)*y[i]
  return ret

for xt in x_test:
  print(f"L({xt}) = {lagrange_i(x, y, xt)}")

x_range = np.linspace(min(x), max(x))
y_arr = [lagrange_i(x, y, i) for i in x_range]

plt.plot(x,y,'o',x_range,y_arr) #будуємо графік функції Лагранжа
plt.title('Lagrange Polynomial_1')
plt.grid(True)
plt.show()
```

```
L(-0.5) = 5.875
L(1.5) = 10.375
L(2.0) = 14.0
L(2.5) = 17.125
```



Перевірка:

```
from scipy.interpolate import lagrange

f = lagrange(x, y)
fig = plt.figure(figsize = (7,5))
plt.plot(x_range, f(x_range), 'b', x, y, 'ro')
plt.title('Lagrange Polynomial_2')
plt.grid()
plt.xlabel('x')
plt.ylabel('y')
plt.show()
```