Lagrange interpolation. Classical and Newton forms

A

1. Construct the polynomial that interpolates the data below and approximate $f(-1)$.

x	-3	1	2
$f(x)$	1	0	2

2. Using Newton's form, obtain the polynomial that interpolates the following data:

x	-2	-1	0	1	2	3
$f(x)$	31	5	1	1	11	61

3. Find the maximum approximation error of $\sin\frac{\pi}{4}$ using the Lagrange polynomial corresponding to $f(x) = \sin \pi x$ and the nodes $x_0 = 0,\ x_1 = \frac{1}{6},\ x_2 = \frac{1}{2}$.

4. Approximate $\ln 46$ if $\ln 2 = 0.6931$, $\ln 3 = 1.0986$, $\ln 5 = 1.6094$.

B

1. Construct the polynomial that interpolates the data below and approximate $f(2)$.

x	-2	1	3
$f(x)$	1	0	2

2. Using Newton's form, obtain the polynomial that interpolates the following data:

x	-2	-1	0	1	2	3
$f(x)$	31	5	1	1	11	61

3. Find the maximum approximation error of $\cos\frac{\pi}{4}$ using the Lagrange polynomial corresponding to $f(x) = \cos \pi x$ and the nodes $x_0 = 0,\ x_1 = \frac{1}{3},\ x_2 = \frac{1}{2}$.

4. Approximate $\ln 43$ if $\ln 2 = 0.6931$, $\ln 3 = 1.0986$, $\ln 5 = 1.6094$.