

3.2 Problems

Problem 1. Use Neville's method to approximate $\sqrt{3}$ with the following functions and values:

1. $f(x) = 3^x$ and the values $x_0 = -2, x_1 = -1, x_2 = 0, x_3 = 1, x_4 = 2$
2. $f(x) = \sqrt{x}$ and the values $x_0 = 0, x_1 = 1, x_2 = 2, x_3 = 4, x_4 = 5$
3. compare the accuracy of the approximations in parts (a) and (b)

Problem 2. Let $P_3(x)$ be the interpolating polynomial for the data $(0, 0), (.5, y), (1, 3), (2, 2)$, find y if the coefficient of x^3 in $P_3(x)$ is 6.

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Problem 3. Use Newton forward-difference formula to construct interpolating polynomials of degree one, two, and three for the following data. Approximate the specified value using each of the polynomials

1. $f(.43)$ if

x_i	$f(x_i)$
0	1
.25	1.64872
.5	2.71828
.75	4.48169

Problem 4. Show that the polynomial interpolating the following data has degree three.

x	-2	-1	0	1	2	3
$f(x)$	1	4	11	16	13	-4