Worksheet
12/06/2019

Name: _____

1. Find the polynomial the fits the following points by Lagrange and Newton methods: $(-1, 1)$, $(0, -1)$, $(1, 1)$, $(2, 0)$.

2. Let $f(x) = \frac{1}{2+3x}$. For evenly spaced sample points $1 = x_1 < x_2 < \ldots < x_n = 2$, let P_n be the corresponding interpolation polynomial. Find n such that the integral $\int_1^2 P_n(x)dx$ approximates the integral $\int_1^2 f(x)dx$ with error not exceeding 10^{-4}.

3. We want to find an approximate value of the integral $I = \int_2^4 \frac{1}{x^3+1}dx$. Let n be the number of equal subintervals of the interval $[2, 4]$.

   (a) Use midpoint rule for $n = 5$.

   (b) Use Simpson rule for $n = 5$.

4. In Problem 3, how big should n be such that the approximate value of I by midpoint rule is under 10^{-4} ? The same question for Simpson rule.