HW3

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Math 104A Homework 3 Rad Mallari 8360828

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[1]: from IPython.display import Latex Latex(''' $$p_{n}(x)=\sum_{j=0}^{n}(x_{j})(1_{j}(x))$$ We can look for our $1_{j}(x)$ which are given by $$1_{i}(x)=\sum_{j=0,\text{}j \leq x_{j}}{x_{i}-x_{j}}$$ So for each $i=2$ we have $$1_{0}(x)=\sum_{x=0}(x_{x_{1}})(x_{0}-x_{1})(x_{0}-x_{2})=\sum_{x=0}(x_{x_{1}})(x_{x_{2}}){(x_{1}-x_{0})(x_{1}-x_{2})}=\sum_{x=0}(x_{x_{1}})(x_{x_{2}}){(x_{1}-x_{2})}=\sum_{x=0}(x_{x_{2}}){3}$$ And we get the polynomial $$p_{2}(x)=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}(x_{x_{2}}-x_{1})=\sum_{x=0}
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[1]:

$$p_n(x) = \sum_{j=0}^n f(x_j)(l_j(x))$$

We can look for our $l_i(x)$ which are given by

$$l_i(x) = \prod_{j=0, j \neq 1}^{n} \frac{x - x_j}{x_i - x_j}$$

So for each i = 2 we have

$$l_0(x) = \frac{(x - x_1)(x - x_2)}{(x_0 - x_1)(x_0 - x_2)} = \frac{x(x - 1)}{6}$$

$$l_1(x) = \frac{(x - x_0)(x - x_2)}{(x_1 - x_0)(x_1 - x_2)} = \frac{-x^2 + x - 2}{2}$$

$$l_2(x) = \frac{(x - x_0)(x - x_1)}{(x_2 - x_0)(x_2 - x_1)} = \frac{x(x + 2)}{3}$$

And we get the polynomial

$$p_2(x) = \frac{-5x^2 - 7x + 6}{6}$$

Approximating f(-1) gives us

$$p_2(-1) = \frac{-5(1)^2 - 7(-1) + 6}{6} = \frac{-5 + 7 + 6}{6} = \frac{2}{3}$$

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