

Score:

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**SM365 – Numerical Computing – Quiz 7– Section 5.1**  
**Lagrange Interpolating Polynomials**

1. Determine  $L_{2,0}(x)$ ,  $L_{2,1}(x)$  and  $L_{2,2}(x)$  and the Lagrange interpolating polynomial for the data points:

x	f(x)
-2	-3
1	0
2	5

$$L_{2,0}(x) = \frac{(x-1)(x-2)}{(-2-1)(-2-2)} = \frac{x^2 - x - 2x + 2}{(-3)(-4)} = \boxed{\frac{1}{12}(x^2 - 3x + 2)}$$

$$L_{2,1}(x) = \frac{(x+2)(x-2)}{(1+2)(1-2)} = \frac{x^2 - 4}{(3)(-1)} = \boxed{-\frac{1}{3}(x^2 - 4)}$$

$$L_{2,2} = \frac{(x+2)(x-1)}{(2+2)(2-1)} = \frac{x^2 + 2x - x - 2}{4} = \boxed{\frac{1}{4}(x^2 + x - 2)}$$

$$P_2(x) = \frac{-1}{12}(x^2 - 3x + 2) + \frac{5}{4}(x^2 + x - 2)$$

$$= -\frac{1}{12}x^2 + \frac{3}{12}x - \frac{2}{12} + \frac{5}{4}x^2 + \frac{5}{4}x - \frac{5}{2}$$

$$\Rightarrow \boxed{P_2(x) = x^2 + 2x - 3}$$