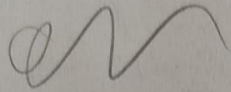


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Q1)

opt 2:

a)

$$L_0(x) = \frac{x-x_1}{x_0-x_1} \cdot \frac{x-x_2}{x_0-x_2} \cdot \frac{x-x_3}{x_0-x_3} = \frac{x-0}{-2-0} \cdot \frac{x-1}{-2-1} \cdot \frac{x-3}{-2-3}$$

$$= \frac{x}{-2} \cdot \frac{x-1}{-3} \cdot \frac{x-3}{-5}$$

$$= \frac{x \cdot (x-1) \cdot (x-3)}{-30}$$

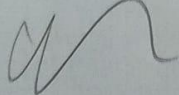
$$L_1(x) = \frac{x+2}{2} \cdot \frac{x-1}{-1} \cdot \frac{x-3}{-3} = \frac{(x+2)(x-1)(x-3)}{6}$$

$$L_2(x) = \frac{x+2}{\frac{1+2}{3}} \cdot \frac{x}{1} \cdot \frac{x-3}{\frac{1-3}{-2}} = \frac{(x+2)(x)(x-3)}{-6}$$

$$L_3(x) = \frac{x+2}{5} \cdot \frac{x}{3} \cdot \frac{(x-1)}{2} = \frac{(x+2)x(x-1)}{30}$$

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b)

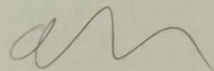
$$\frac{-27 \cdot x \cdot (x-1) \cdot (x-3)}{-30} + \frac{-1 \cdot (x+2) \cdot (x-1) \cdot (x-3)}{6} +$$

$$\frac{1 \cdot (x+2) \cdot x \cdot (x-1)}{30}$$

$$f(3) = 0 + 0 + \frac{5 \cdot 3 \cdot 2}{30} = 1$$

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Q2)

opt 2:

→ coefficients of polynomial

a)	$f[x_0]$	$f[x_0, x_1]$	$f[x_0, x_1, x_2]$
1	1	$\frac{3-1}{3-1} = 1$	
3	3		$\frac{2-1}{5-1} = \frac{1}{4}$
5	7	$\frac{7-3}{7-5} = 2$	

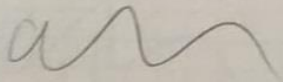
$$P(x) = 1 + 1 \cdot (x-1) + \frac{1}{4} (x-1)(x-3)$$

$$1 + (x-1) + \frac{x^2 - 4x + 3}{4}$$

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

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Q2)

Opt2

b)

		$f(x_0, x_1)$		
1	1	$\frac{3-1}{2-1} = 1$	$\frac{2-1}{5-1} = \frac{1}{4}$	
3	3	$\frac{7-3}{5-3} = 2$		$\frac{-\frac{1}{3} - \frac{1}{4}}{6-1} = -\frac{7}{60}$
5	7	$\frac{8-7}{6-5} = 1$	$\frac{1-2}{6-3} = -\frac{1}{3}$	
6	8			

$$f(x) = 1 + (x-1) + \frac{1}{4} (x-1)(x-3) - \frac{7}{60} (x-1)(x-3)(x-5)$$

