

1) We know, ~~$f(u)$~~

$$\text{degree of } g(u) = \text{degree of } p(u)$$

Since, we had degree 7 in $p(u)$ and then we added 3 points more, the new degree of $p(u)$ will be $7+3=10$.

Therefore, degree of $g(u)$ also 10.

$$\therefore \text{Ans} = (10, 10).$$

2) We know,

$$f[u_0, u_1, \dots, u_k] = \frac{f[u_1, u_2, \dots, u_k] - f[u_0, \dots, u_{k-1}]}{u_k - u_0}$$

$$\therefore f[u_1, u_2, u_3, u_4] = \frac{\frac{f[u_2, u_3, u_4] - f[u_1, u_2, u_3]}{u_4 - u_1}}{u_4 - u_1}$$

$= -2$ (Ans)

3) We know,

$$f[x_1, x_2] = \frac{f[x_2] - f[x_1]}{x_2 - x_1}$$

$$= \frac{-4 - 11}{2 - 7}$$

$$= \frac{-15}{-5} = 3$$

(Ans.)

$$4) f[x_0, x_1, x_2] = \frac{f[x_1, x_2] - f[x_0, x_1]}{x_2 - x_0}$$

$$= \frac{3 - \frac{f[x_1] - f[x_0]}{x_1 - x_0}}{2 - 3}$$

$$= \frac{3 - \frac{11 - 7}{7 - 3}}{-1} = \frac{3 - \frac{4}{4}}{-1}$$

$$= \frac{3 - 1}{-1} = \frac{2}{-1}$$

$= -2$ (Ans.)