Quiz (1)

1) Let $f(x) = 2^x$. Please answer the following:

a) Give the unsimplified form of the Lagrange polymomial for f that passes throught the nodes *with* $x-$ *coordinates* $x_0 = 0, x_1 = 1,$ *and* $x_2 = 2.$

b) Use the Lagrange polynomial computed in part (a) to approximate $\sqrt{2}$. What are the absolute and relative errors in your approximation (use your calculator approximation of $\sqrt{2}$ as the exact value of $\sqrt{2}$).

2) **Calculate Fitting straight line - Curve fitting using Least square method**

x	5	4	3	2	1
y	1	2	3	4	5

Quiz (2)

1. **Use the nodes $x_0 = \frac{\pi}{4}. x_1 = \frac{\pi}{2}.$ and $x_2 = \frac{3\pi}{4}$ to find a Lagrange polynomial that** approximates $\sin(x)$. And find $\sin\left(\frac{3\pi}{8}\right)$. (Do not simplify your answer)

2. **Calculate Fitting exponential equation $y = ae^{bx}$ - Curve fitting using Least square method**

x	0	0.5	1	1.5	2	2.5
y	0.10	0.45	2.15	9.15	40.35	180.75

Quiz (3)

1) The following $x - y$ data is given

x	15	18	22
y	24	37	25

The Newton's divided difference second order polynomial for the above data is given by

$$f_2(x) = b_0 + b_1(x - 15) + b_2(x - 15)(x - 22)$$

The value of b_1 is

a) -1.048 b) 0.1433 c) 4.333 *d*) 24.00

2) **Calculate Fitting exponential equation $y = ab^x$ - Curve fitting using Least square method**

x	0	1	2	3	4	5	6	7
y	10	21	35	59	92	200	400	610

Quiz (4)

1) **Find Solution using Newton's Divided Difference Interpolation formula**

x	300	304	305	307
y	2.4771	2.4829	2.4843	2.4871

find $y(301)$.

2) **Calculate Fitting second degree parabola - Curve fitting using Least square method**

$\boldsymbol{x}$	1	2	3	4	5	6	7
$\boldsymbol{y}$	-5	-2	5	16	31	50	73

Quiz (5)

1) Find Solution of an equation $\boldsymbol{2x^3 - 4x + 1}$ using Divided Difference Interpolation formula at $x = 3.8$ Step value (h) = 0.5 ($x_0 = 2$ and $x_n = 4$).

2) **Calculate Fitting exponential equation $\boldsymbol{y = ax^b}$ - Curve fitting using Least square method**

$\boldsymbol{x}$	2	3	4	5
$\boldsymbol{y}$	27.8	62.1	110	161

Quiz (6)

1) **Find Missing terms in interpolation table**

$\boldsymbol{x}$	2	3	4	5	6
$\boldsymbol{y}$	45	49.2	54.1	?	67.4

1) Fit the curve $y = a\,x^3 + b$ to the data:

(7.9, 0.2) , (11.9, 0.4) , (16.4, 0.8) and (22.6,1.6).

Quiz (7)

1) **Find x at $y = 6$ using Lagrange's Inverse Interpolation formula**

x	168	120	72	63
y	3	7	9	10

1) Fit the curve $y = \frac{1}{(a\,x^2 + b)}$ to the data:

(1. 0.5). (2. 0.4). (4. 0.3). (6. 0.2). (8. 0.1). Hence find y(5.1).

Quiz (8)

1) Find Solution of an equation $x^3 - x + 1$ using Newton's forward Difference Interpolation formula at $x = 3.8$ Step value (h) = 0.5 ($x_0 = 2$ and $x_n = 4$).

2) **Calculate Fitting exponential equation $y = ae^{-bx^2}$ - Curve fitting using Least square method**

(1, 9.01). (2, 6.01). (3, 6.07). (4, 2.02). (5, 0.22). (8, 0.02).

Quiz (9)

1) **Find Solution using Newton's Forward Difference formula**

x	1891	1901	1911	1921	1931
y	46	66	81	93	101

Finding $y(1895)$.

2) Fit the curve $y = \frac{1}{(a\,x^2 + b)}$ to the data:

(1. 0.5). (2. 0.4). (4. 0.3). (6. 0.2). (8. 0.1). Hence find y(5.1).