

SHANTILAL SHAH ENGINEERING COLLEGE, BHAVNAGAR

B.E. Sem-IV (CIVIL ENGG.)-EVEN-2017

Tutorial :1

Sub : Num. & Stat. Methods for Civil Engineering(2140606)

Topic : Finite Deferences & Interpolation (Ex-1 to 14)

Ex-1 Compute $\cosh(0.56)$ from the following data.

x	0.5	0.6	0.7	0.8
$\cosh x$	1.127626	1.185465	1.255169	1.337435

Ex-2 Find the value of $\sin 52^\circ$ from the following table:

θ°	45	50	55	60
$\sin \theta^\circ$	0.7071	0.7660	0.8192	0.8660

Ex-3 The table below gives the values of function $y = \tan x$.

Obtain the value of $\tan(0.40)$

x	0.10	0.15	0.20	0.25	0.30
$y = \tan x$	0.1003	0.1511	0.2027	0.2553	0.3093

Ex-4 Find the third divided difference with arguments 2,4,9,10 of the

function $f(x) = x^3 - 2x$

Ex-5 Compute $f(9.2)$ from the following values using NDD formula: ☺

x	8.0	9.0	9.5	11.0
$f(x)$	2.079442	2.1974225	2.251292	2.397895

Ex-6 From the following table, find $f(x)$ using NDD formula☺

x	1	2	7	8
$f(x)$	1	5	5	4

Ex-7 Determine the interpolating polynomial of degree three using Langranges interpolation for the table .

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

Ex-8 Find the Langrange interpolation polynomials from the following data :

x	0	1	4	5
$f(x)$	1	3	24	39

Ex-9 Employ Stirling formula to compute $y(35)$ from the following table:

x	20	30	40	50
y	512	439	346	243

Ex-10 Obtain the value of $f(8)$ & $f(15)$ from the following table:

x	4	5	7	10	11	13
$f(x)$	48	100	294	900	1210	2028

Ex-11 Using Langrange formula to fit a polynomials to the data:

x	-1	0	2	3
$f(x)$	8	3	1	12

Ex-12 The shear stress in kips,per square foot(ksf) for 5 specimens in a clay stratum are:

Depth m	1.9	3.1	4.2	5.1	5.8
Stress- ksf	0.3	0.6	0.4	0.9	0.7

Use NDD interpolating polynomials to compute the stress at 4.5 m depth.

Ex-13 Let $f(40) = 836$, $f(50) = 682$, $f(60) = 436$, $f(70) = 272$. Use Stirling formula to find $f(55)$.

Ex-14 Using Langranges -interpolation formula to fit a polynomials to the data:

x	0	1	4	5
$f(x)$	1	3	24	39

Ex-1 Find the positive root of $x = \cos x$ correct upto three decimal places by **bisection method**.

Ex-2 Perform the five iteration of the **bisection method** to obtain a root of the equation $f(x) = \cos x - xe^x = 0$.

Ex-3 Find the positive root of $x^3 - 4x - 9 = 0$ using the bisection method In four stages.

Ex-4 Find the negative root of $x^3 - 7x + 3 = 0$ correct upto three decimal places by bisection method.

Ex-5 Using **Regula –Falsi method** ,find thr real root of the equation correct upto three decimal places .

Ex-6 Find the real root of the following equations correct upto three decimal places **By Iteration method** :

(1) $x^3 + x - 1 = 0$ (2) $\cos x + 1 = 3x$. (3) $x^3 - \cos x = 0$.

Ex-7 Obtain the **Newton-Raphson formula** from Taylor's theorem.

Ex-8 Develope a recurrence formula for finding \sqrt{N} ,using Newton Raphson method ,hence find $\sqrt{27}$ to three decimal places.

Ex-9 Find root of the following equations by Newton-Raphson method :

(1) $x - \cos x = 0, x > 0$ to three decimal places.

(2) $\sin x = e^{-x}$ with $x_0 = 0.6$ to four decimal places.

Ex-10 Find a root of $x^4 - x^3 + 10x + 7 = 0$ correct to three decimal places

between $a = -2$ & $b = -1$ by newton Raphson method.

Ex-11 Compute the real root of

(1) $f(x) = x - 2\sin x = 0$, starting from $x_0 = 2, x_1 = 1.9$.

(2) Cube root of 50

(3) $f(x) = x^3 - 2x - 1 = 0, x_0 = 1.5$ & $x_1 = 2$. by the **secant method**.

Ex-12 Derive **secant method** and solve $xe^x - 1 = 0$ correct to three decimal Places between 0 and 1.

