

Assignment#5

Numerical Differentiation

1. Determine $y'(1)$ & $y''(1)$ from following data:

x	0.5	1.0	1.5	2.0	2.5
y	6	3	2	1.2	0.8

2. Find the **velocity** and **acceleration** when $t = 0.1$ second.

t (sec)	0	0.1	0.2	0.3	0.4	0.5	0.6
x (cm)	30.13	31.62	32.87	33.64	33.95	33.81	33.24

3. The table gives the angle in radians (θ) through which a rotating rod has turned for various values of time in seconds (t), Find the **angular velocity** & **angular acceleration** at $t = 0.2$.

t	0	0.2	0.4	0.6	0.8
θ	0	0.122	0.493	0.123	2.022

4. Given $\sin 0^\circ = 0.000$, $\sin 10^\circ = 0.1736$, $\sin 20^\circ = 0.3420$, $\sin 30^\circ = 0.500$, $\sin 40^\circ = 0.6428$,
- Find the value of **$\sin 23^\circ$** ,
 - Find the numerical value of **$\cos x$** at $x = 10$,
 - Find the numerical value of **d^2y/dx^2** at $x = 20^\circ$ for $y = \sin x$
5. Find the value of $f'(8)$ from the table given below:

x	6	7	9	12
f(x)	1.556	1.690	1.908	2.158

Maxima & Minima

1. Find the **maximum** & **minimum** value of y from the following table:

x	0	1	2	3	4	5
y	0	0.25	0	0.25	16	56.25

2. Find the value of **x** for which **f(x)** is **maximum**, using the table:

x	9	10	11	12	13	14
f(x)	1330	1340	1320	1250	1120	930

Also find the maximum value of **f(x)**?