Name :	Advika Kharat
UID :	2021300060
Subject :	DAA
Experiment No.	1 a

Aim – To implement the various functions e.g. linear, non-linear, quadratic, exponential etc.

Details – A function is a relation between a set of inputs and a set of permissible outputs with the property that each

input is related to exactly one output. Let A & B be any two non-empty sets; mapping from A to B will be a function

only when every element in set A has one end, only one image in set B.

Program:

```
#include<stdio.h>
#include<math.h>

int main()
{

    printf("\tIndex\tn\tn^3\t2^n\t2^2^n\t3/2 ^n\te^n\tln n\troot log2 n\tn log2n\t2^log2n");
    for(int k=0;k<=100;k++)
    {
        printf("\n");

        printf("\t%d",k);

        //1.function: n
        printf("\t%d",k);

        //2. function: n^3
        printf("\t%.2lf",pow(k,3));

        //3. function: 2^n
        printf("\t%.2lf",pow(2,k));

        //4. function: 2^ 2^n
        printf("\t%.2lf",pow(2,pow(2,k)));

        //5. function: 3/2 ^n
        printf("\t%.2lf",pow((1.5),k));

        //6. function: e^n
        printf("\t%.2lf",pow((exp(1)),k));
```

```
        //7. function: ln n
        printf("\t%.2lf",log(k));

        //8. function: root log2 n
        printf("\t%.2lf",pow((log2(k)),(0.5)));

        //9. function: n log2 n
        printf("\t%.2lf",k*log2(k));

        //10. function: log(log(n))
        printf("\t%.2lf",log2(log2(k)));

    }
    printf("\n");
     fact(20);

    return 0;
}

int fact(int n)
{
    for(int k=0;k<=n;k++)
    {
        int f=1;
        for(int j=k;j>0;j--)
        {
            if(j==0)
                f=1;
                else if(j!=0)
            f=f*j;
        }
        printf("\nFactorial of %d = %d",k,f);
    }
}
```

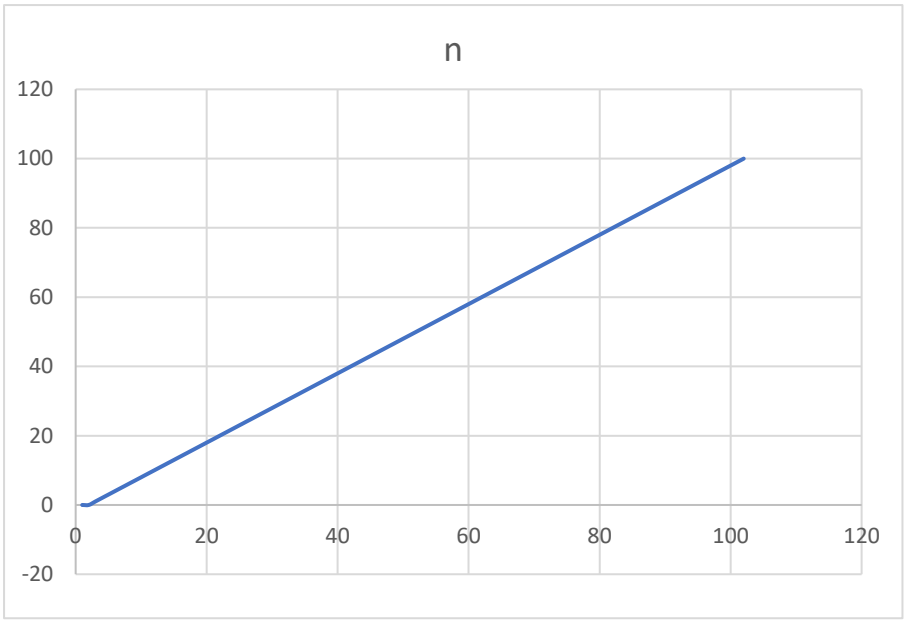
Output:

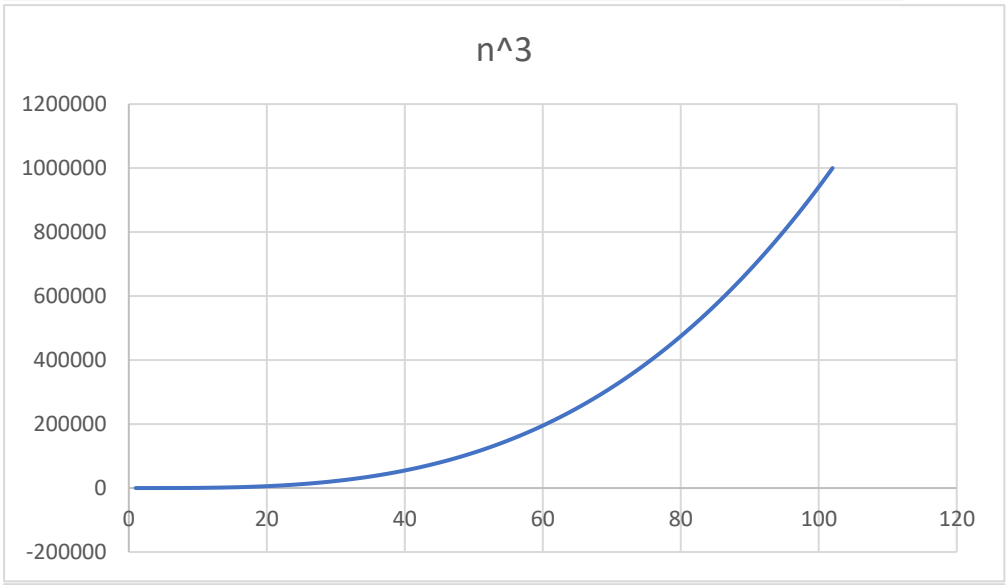
n	n^3	2^n	2^2^n	3/2 ^n	e^n	ln n	root log2 n	n log2 n	2^log2n
0	0	1	2	1	1	-inf	inf	#NAME?	-nan
1	1	2	4	1.5	2.72	0	0	0	-inf
2	8	4	16	2.25	7.39	0.69	1	2	0
3	27	8	256	3.38	20.09	1.1	1.26	4.75	0.66
4	64	16	65536	5.06	54.6	1.39	1.41	8	1
5	125	32	4.29E+09	7.59	148.41	1.61	1.52	11.61	1.22
6	216	64	1.84E+19	1.14E+01	403.43	1.79	1.61	15.51	1.37
7	343	128	3.4E+38	1.71E+01	1096.63	1.95	1.68	19.65	1.49
8	512	256	1.16E+77	2.56E+01	2980.96	2.08	1.73	24	1.58
9	729	512	1.3E+154	3.84E+01	8103.08	2.2	1.78	28.53	1.66
10	1000	1024	inf	57.67	22026.47	2.3	1.82	33.22	1.73
11	1331	2048	inf	86.5	59874.14	2.4	1.86	38.05	1.79
12	1728	4096	inf	129.75	162754.8	2.48	1.89	43.02	1.84
13	2197	8192	inf	194.62	442413.4	2.56	1.92	48.11	1.89
14	2744	16384	inf	291.93	1202604	2.64	1.95	53.3	1.93
15	3375	32768	inf	437.89	3269017	2.71	1.98	58.6	1.97
16	4096	65536	inf	656.84	8886111	2.77	2	64	2
17	4913	131072	inf	985.26	24154953	2.83	2.02	69.49	2.03
18	5832	262144	inf	1477.89	65659969	2.89	2.04	75.06	2.06
19	6859	524288	inf	2216.84	1.78E+08	2.94	2.06	80.71	2.09
20	8000	1048576	inf	3325.26	4.85E+08	3	2.08	86.44	2.11
21	9261	2097152	inf	4987.89	1.32E+09	3.04	2.1	92.24	2.13
22	10648	4194304	inf	7481.83	3.58E+09	3.09	2.11	98.11	2.16
23	12167	8388608	inf	11222.74	9.74E+09	3.14	2.13	104.04	2.18
24	13824	16777216	inf	16834.11	2.65E+10	3.18	2.14	110.04	2.2
25	15625	33554432	inf	25251.17	7.2E+10	3.22	2.15	116.1	2.22
26	17576	67108864	inf	37876.75	1.96E+11	3.26	2.17	122.21	2.23
27	19683	1.34E+08	inf	56815.13	5.32E+11	3.3	2.18	128.38	2.25
28	21952	2.68E+08	inf	85222.69	1.45E+12	3.33	2.19	134.61	2.27
29	24389	5.37E+08	inf	127834	3.93E+12	3.37	2.2	140.88	2.28
30	27000	1.07E+09	inf	191751.1	1.07E+13	3.4	2.22	147.21	2.29
31	29791	2.15E+09	inf	287626.6	2.9E+13	3.43	2.23	153.58	2.31
32	32768	4.29E+09	inf	431439.9	7.9E+13	3.47	2.24	160	2.32
33	35937	8.59E+09	inf	647159.8	2.15E+14	3.5	2.25	166.47	2.33
34	39304	1.72E+10	inf	970739.7	5.83E+14	3.53	2.26	172.97	2.35
35	42875	3.44E+10	inf	1456110	1.59E+15	3.56E+00	2.26	179.52	2.36
36	46656	6.87E+10	inf	2184164	4.31E+15	3.58E+00	2.27	186.12	2.37

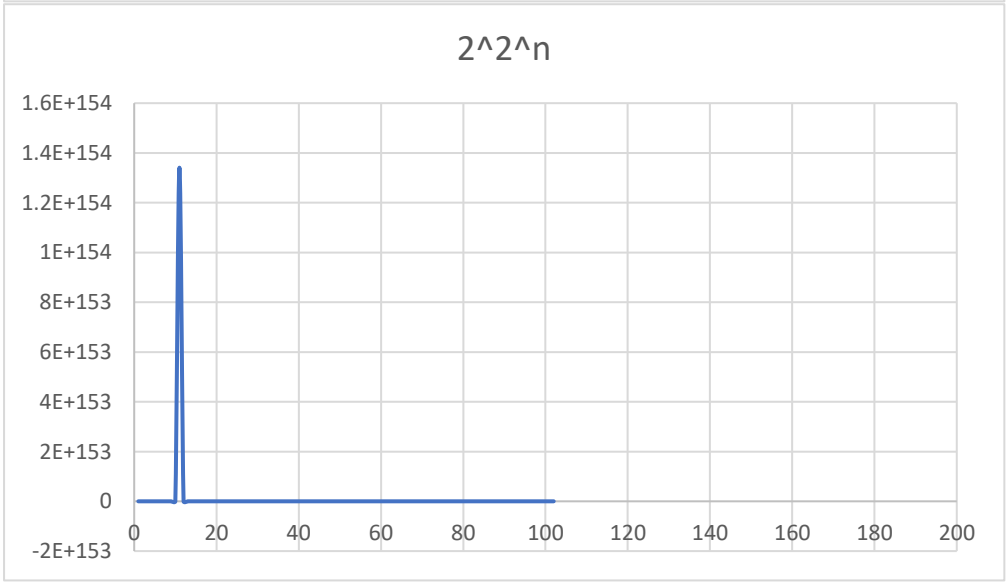
37	50653	1.37E+11	inf	3276247	1.17E+16	3.61E+00	2.28	192.75	2.38
38	54872	2.75E+11	inf	4914370	3.19E+16	3.64E+00	2.29	199.42	2.39
39	59319	5.5E+11	inf	7371555	8.66E+16	3.66E+00	2.3	206.13	2.4
40	64000	1.1E+12	inf	11057332	2.35E+17	3.69E+00	2.31	212.88	2.41
41	68921	2.2E+12	inf	16585998	6.4E+17	3.71E+00	2.31	219.66	2.42
42	74088	4.4E+12	inf	24878998	1.74E+18	3.74E+00	2.32	226.48	2.43
43	79507	8.8E+12	inf	37318497	4.73E+18	3.76E+00	2.33	233.33	2.44
44	85184	1.76E+13	inf	55977745	1.29E+19	3.78E+00	2.34	240.21	2.45
45	91125	3.52E+13	inf	83966617	3.49E+19	3.81E+00	2.34	247.13	2.46
46	97336	7.04E+13	inf	1.26E+08	9.5E+19	3.83E+00	2.35	254.08	2.47
47	103823	1.41E+14	inf	1.89E+08	2.58E+20	3.85E+00	2.36	261.07	2.47
48	110592	2.81E+14	inf	2.83E+08	7.02E+20	3.87E+00	2.36	268.08	2.48
49	117649	5.63E+14	inf	4.25E+08	1.91E+21	3.89E+00	2.37	275.12	2.49
50	125000	1.13E+15	inf	6.38E+08	5.18E+21	3.91E+00	2.38	282.19	2.5
51	132651	2.25E+15	inf	9.56E+08	1.41E+22	3.93E+00	2.38	289.29	2.5
52	140608	4.5E+15	inf	1.43E+09	3.83E+22	3.95E+00	2.39	296.42	2.51
53	148877	9.01E+15	inf	2.15E+09	1.04E+23	3.97E+00	2.39	303.58	2.52
54	157464	1.8E+16	inf	3.23E+09	2.83E+23	3.99E+00	2.4	310.76	2.52
55	166375	3.6E+16	inf	4.84E+09	7.69E+23	4.01E+00	2.4	317.97	2.53
56	175616	7.21E+16	inf	7.26E+09	2.09E+24	4.03E+00	2.41	325.21	2.54
57	185193	1.44E+17	inf	1.09E+10	5.69E+24	4.04E+00	2.42	332.47	2.54
58	195112	2.88E+17	inf	1.63E+10	1.55E+25	4.06E+00	2.42	339.76	2.55
59	205379	5.76E+17	inf	2.45E+10	4.2E+25	4.08E+00	2.43	347.08	2.56
60	216000	1.15E+18	inf	3.68E+10	1.14E+26	4.09E+00	2.43	354.41	2.56
61	226981	2.31E+18	inf	5.52E+10	3.1E+26	4.11E+00	2.44	361.77	2.57
62	238328	4.61E+18	inf	8.27E+10	8.44E+26	4.13E+00	2.44	369.16	2.57
63	250047	9.22E+18	inf	1.24E+11	2.29E+27	4.14E+00	2.44	376.57	2.58
64	262144	1.84E+19	inf	1.86E+11	6.24E+27	4.16E+00	2.45	384	2.58
65	274625	3.69E+19	inf	2.79E+11	1.69E+28	4.17E+00	2.45	391.45	2.59
66	287496	7.38E+19	inf	4.19E+11	4.61E+28	4.19E+00	2.46	398.93	2.6
67	300763	1.48E+20	inf	6.28E+11	1.25E+29	4.20E+00	2.46	406.43	2.6
68	314432	2.95E+20	inf	9.42E+11	3.4E+29	4.22E+00	2.47	413.95	2.61
69	328509	5.9E+20	inf	1.41E+12	9.25E+29	4.23E+00	2.47	421.49	2.61
70	343000	1.18E+21	inf	2.12E+12	2.52E+30	4.25E+00	2.48	429.05	2.62
71	357911	2.36E+21	inf	3.18E+12	6.84E+30	4.26E+00	2.48	436.63	2.62
72	373248	4.72E+21	inf	4.77E+12	1.86E+31	4.28E+00	2.48	444.23	2.63
73	389017	9.44E+21	inf	7.16E+12	5.05E+31	4.29E+00	2.49	451.86	2.63
74	405224	1.89E+22	inf	1.07E+13	1.37E+32	4.30E+00	2.49	459.5	2.63
75	421875	3.78E+22	inf	1.61E+13	3.73E+32	4.32E+00	2.5	467.16	2.64
76	438976	7.56E+22	inf	2.42E+13	1.01E+33	4.33E+00	2.5	474.84	2.64
77	456533	1.51E+23	inf	3.62E+13	2.76E+33	4.34E+00	2.5	482.54	2.65

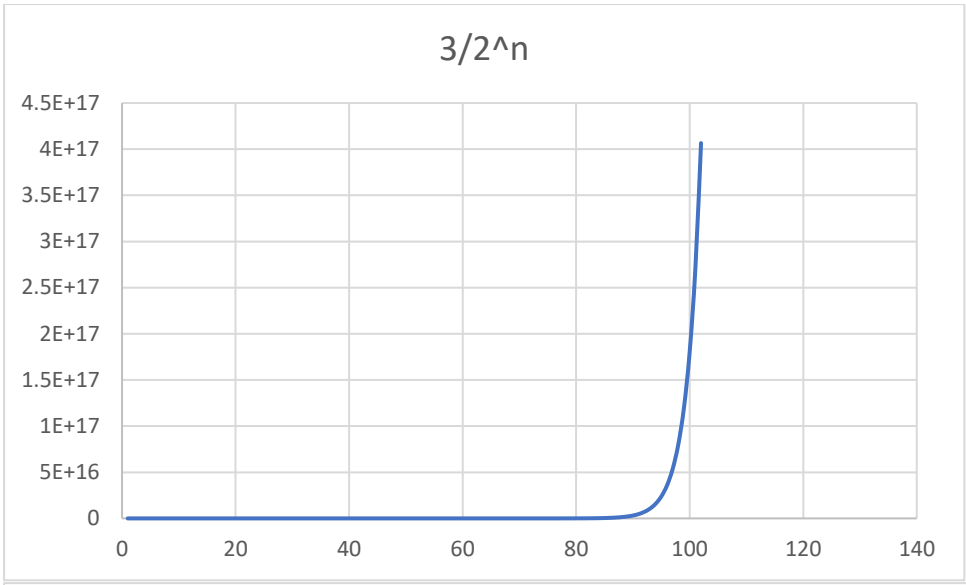
78	474552	3.02E+23	inf	5.43E+13	7.5E+33	4.36E+00	2.51	490.26	2.65
79	493039	6.04E+23	inf	8.15E+13	2.04E+34	4.37E+00	2.51	498	2.66
80	512000	1.21E+24	inf	1.22E+14	5.54E+34	4.38E+00	2.51	505.75	2.66
81	531441	2.42E+24	inf	1.83E+14	1.51E+35	4.39E+00	2.52	513.53	2.66
82	551368	4.84E+24	inf	2.75E+14	4.09E+35	4.41E+00	2.52	521.32	2.67
83	571787	9.67E+24	inf	4.13E+14	1.11E+36	4.42E+00	2.52	529.13	2.67
84	592704	1.93E+25	inf	6.19E+14	3.03E+36	4.43E+00	2.53	536.95	2.68
85	614125	3.87E+25	inf	9.28E+14	8.22E+36	4.44E+00	2.53	544.8	2.68
86	636056	7.74E+25	inf	1.39E+15	2.24E+37	4.45E+00	2.54	552.66	2.68
87	658503	1.55E+26	inf	2.09E+15	6.08E+37	4.47E+00	2.54	560.54	2.69
88	681472	3.09E+26	inf	3.13E+15	1.65E+38	4.48E+00	2.54	568.43	2.69
89	704969	6.19E+26	inf	4.7E+15	4.49E+38	4.49E+00	2.54	576.34	2.7
90	729000	1.24E+27	inf	7.05E+15	1.22E+39	4.50E+00	2.55	584.27	2.7
91	753571	2.48E+27	inf	1.06E+16	3.32E+39	4.51E+00	2.55	592.21	2.7
92	778688	4.95E+27	inf	1.59E+16	9.02E+39	4.52E+00	2.55	600.17	2.71
93	804357	9.9E+27	inf	2.38E+16	2.45E+40	4.53E+00	2.56	608.14	2.71
94	830584	1.98E+28	inf	3.57E+16	6.66E+40	4.54E+00	2.56	616.13	2.71
95	857375	3.96E+28	inf	5.35E+16	1.81E+41	4.55E+00	2.56	624.14	2.72
96	884736	7.92E+28	inf	8.03E+16	4.92E+41	4.56E+00	2.57	632.16	2.72
97	912673	1.58E+29	inf	1.2E+17	1.34E+42	4.57E+00	2.57	640.19	2.72
98	941192	3.17E+29	inf	1.81E+17	3.64E+42	4.58E+00	2.57	648.24	2.73
99	970299	6.34E+29	inf	2.71E+17	9.89E+42	4.60E+00	2.57	656.31	2.73
100	1000000	1.27E+30	inf	4.07E+17	2.69E+43	4.61E+00	2.58	664.39	2.73

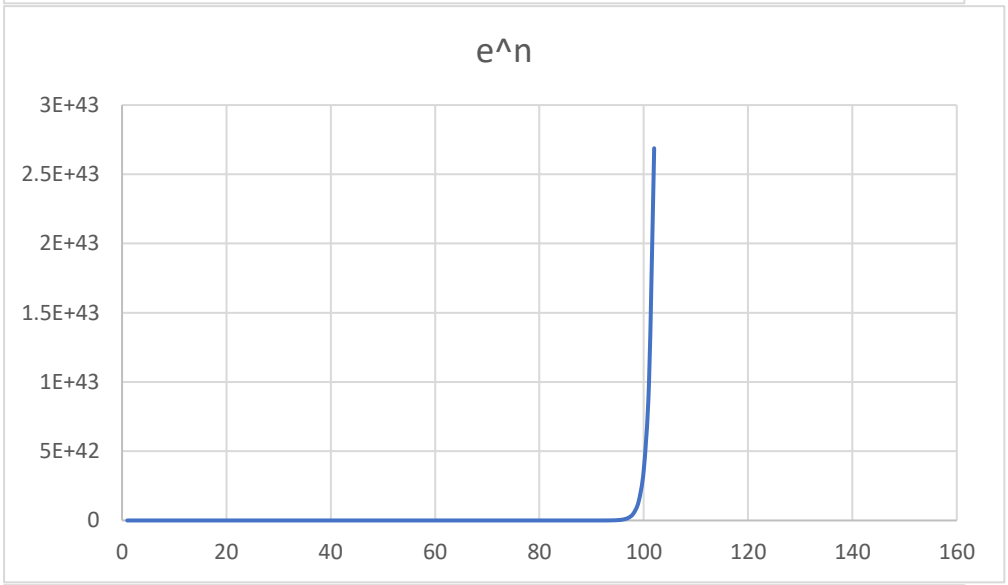
Graphs:

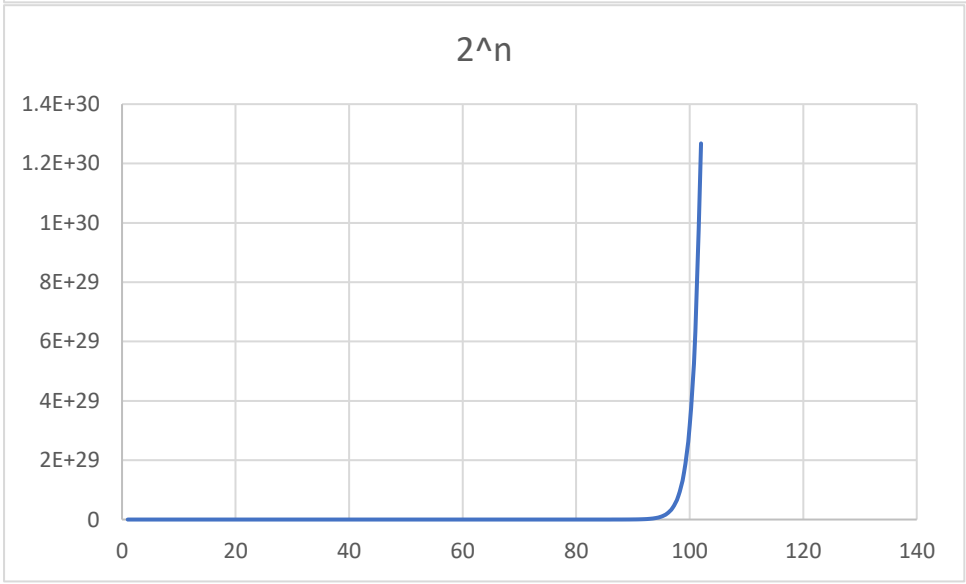

n
120
100
80
60
40
20
0
-20
0
20
40
60
80
100
120

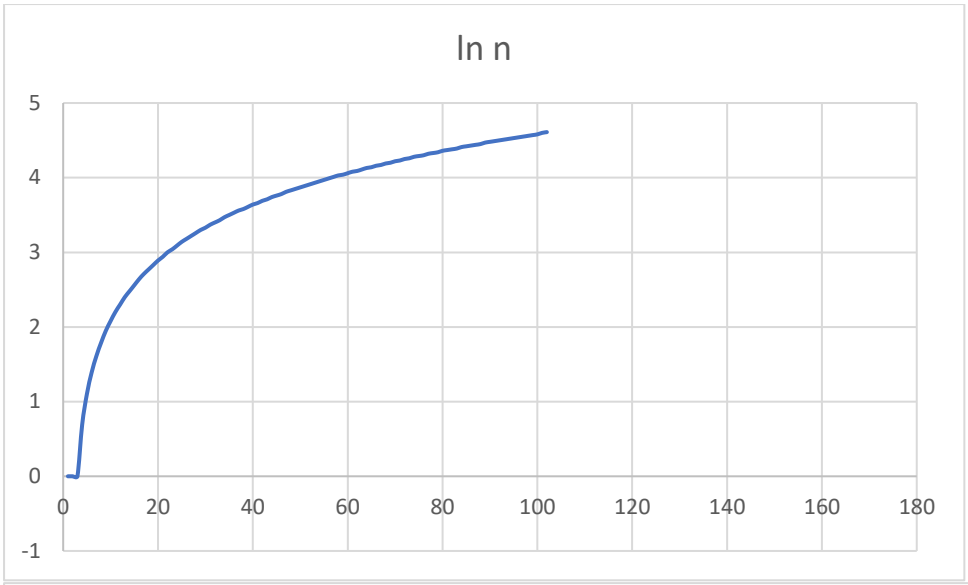

n^3
1200000
1000000
800000
600000
400000
200000
0
-200000
0
20
40
60
80
100
120

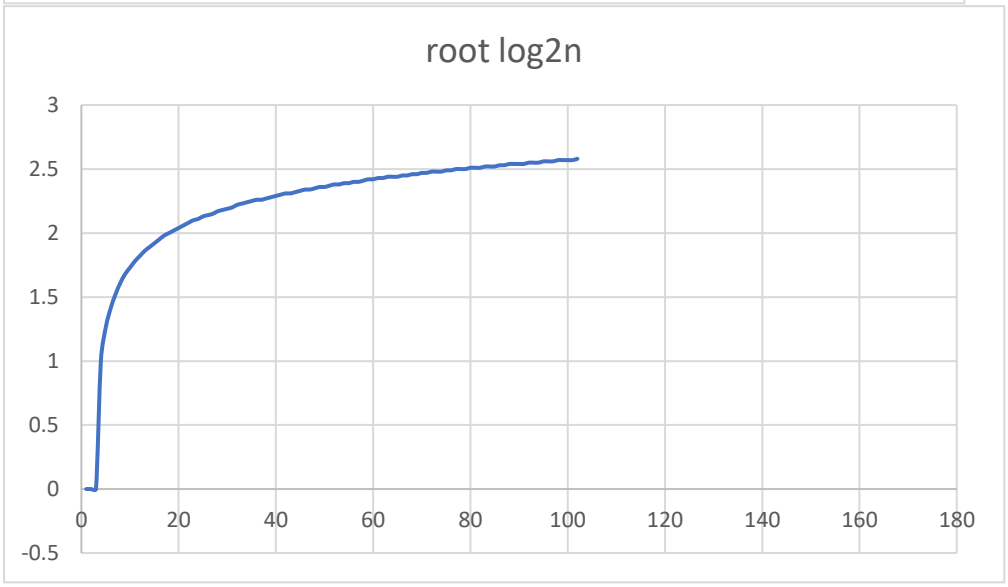

2^2^n
1.6E+154
1.4E+154
1.2E+154
1E+154
8E+153
6E+153
4E+153
2E+153
0
-2E+153
0
20
40
60
80
100
120
140
160
180
200

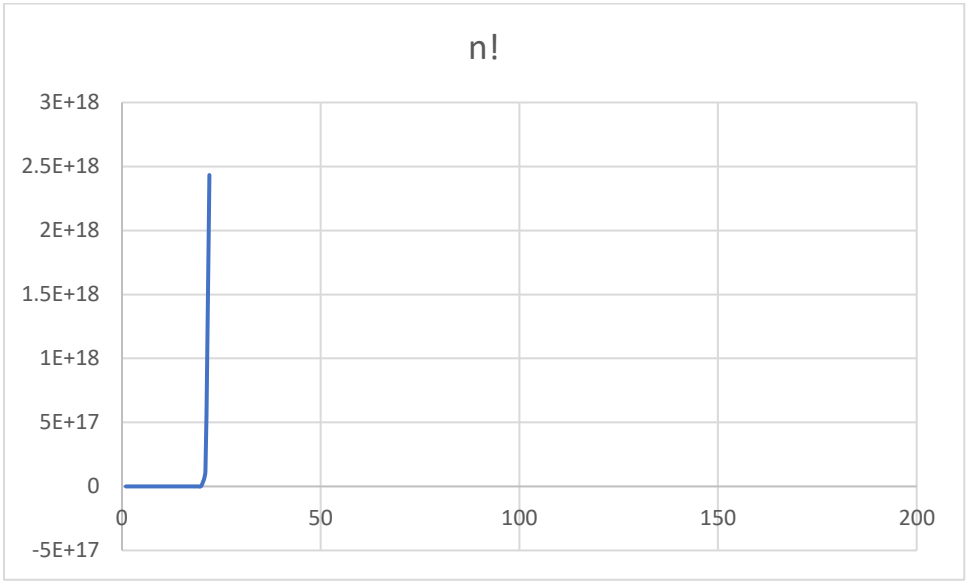

3/2^n
4.5E+17
4E+17
3.5E+17
3E+17
2.5E+17
2E+17
1.5E+17
1E+17
5E+16
0
0
20
40
60
80
100
120
140


e^n
3E+43
2.5E+43
2E+43
1.5E+43
1E+43
5E+42
0
0
20
40
60
80
100
120
140
160


2^n
1.4E+30
1.2E+30
1E+30
8E+29
6E+29
4E+29
2E+29
0
0
20
40
60
80
100
120
140


ln n
5
4
3
2
1
0
-1
0
20
40
60
80
100
120
140
160
180


root log2n
3
2.5
2
1.5
1
0.5
0
-0.5
0
20
40
60
80
100
120
140
160
180


n!
3E+18
2.5E+18
2E+18
1.5E+18
1E+18
5E+17
0
-5E+17
0
50
100
150
200

n!

Conclusion:

Hence, by completing this experiment, I have understood various different mathematical functions look like and I'm able to program them. I have also grown acquainted to making charts in excel sheets to represent the data output.