



Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058, India

(Autonomous College Affiliated to University of Mumbai)

Experiment No.	1
Aim	To implement the various functions e.g. linear, non-linear, quadratic, exponential etc.
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Class & Division	SE Comps A, Batch D

Program:

```
#include<stdio.h>
#include<math.h>
float function1(int), function2(int), function3(int), function4(int), function5(int),
function6(int), function7(int), function8(int), function9(int), function10(int),
function11(int);
int main(){
    int a=1;
    printf("%f\n",function4(3));
    for(int i=1;i<=20;i++){
        printf("%.2f %.2f %.2f %.2f %.2f %.2f %.2f %.2f %.2f
%.2f\n",function1(i),function2(i),function3(i),function4(i),function5(i),function6(i)
,function7(i),function8(i),function9(i),function10(i));
        printf("\n%f ",function11(i));
    }
    return 0;
}
float function1(int n){//n
    return n;
}
float function2(int n){//n^3
    return n*n*n;
```

```

}
float function3(int n){//1.5^n
    return pow(1.5,n);
}
float function4(int n){//2^n
    return pow(2,n);
}
float function5(int n){//2^(2^n)
    return pow(2,pow(2,n));
}
float function6(int n){//2^(2^(n+1))
    return pow(2,pow(2,n+1));
}
float function7(int n){//n*(2^n)
    return n*pow(2,n);
}
float function8(int n){//log(n)
    return log(n);
}
float function9(int n){//n*log(n)
    return n*log(n);
}
float function10(int n){//2^(log(n))
    return pow(2,log(n));
}
float function11(int n){
    if(n==0){
        return 1;
    }
    else{
        return n*function11(n-1);
    }
}

```

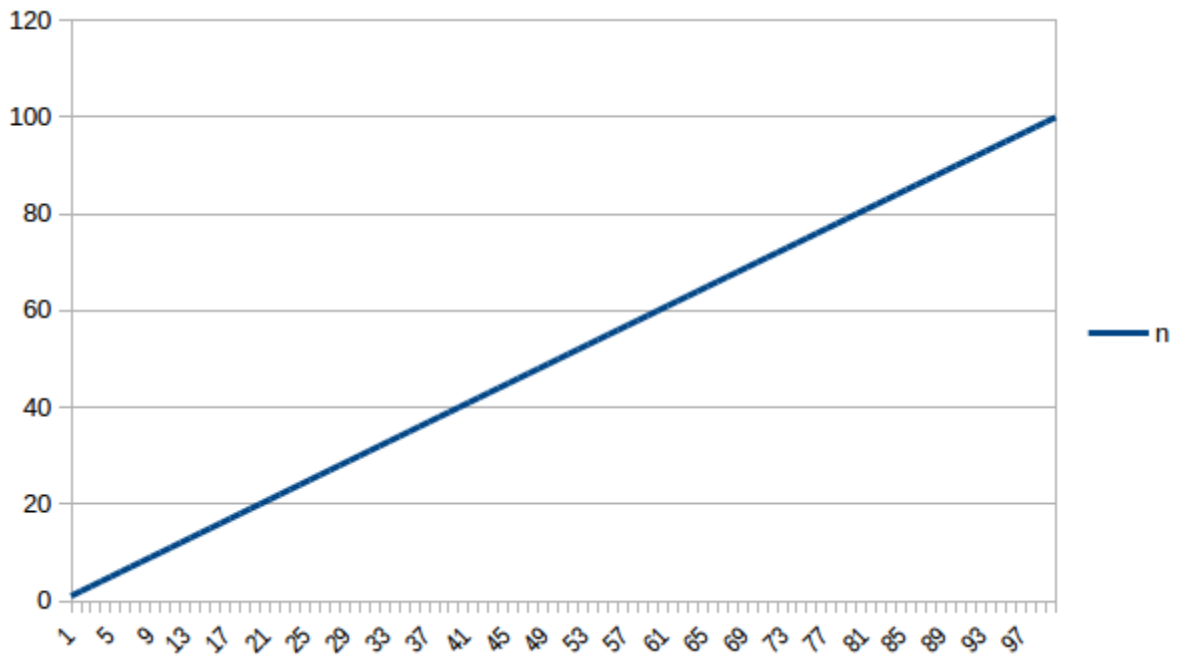
Observations:

n	N^3	1.5^n	2^n	$2^{\wedge}(2^n)$	$2^{\wedge}(2^{\wedge}(n+1))$	$n^{\wedge}(2^n)$	$\log(n)$	$n^{\wedge}\log(n)$	$2^{\wedge}(\log(n))$	$n!$
1	1	1.5	2	4	16	2	0	0	1	1
2	8	2.25	4	16	256	8	0.69	1.39	1.62	2
3	27	3.38	8	256	65536	24	1.1	3.3	2.14	6
4	64	5.06	16	65536	4294967296	64	1.39	5.55	2.61	24
5	125	7.59	32	4294967296	1.8447E+19	160	1.61	8.05	3.05	120
6	216	11.39	64	1.8447E+19	inf	384	1.79	10.75	3.46	720
7	343	17.09	128	inf	inf	896	1.95	13.62	3.85	5040
8	512	25.63	256	inf	inf	2048	2.08	16.64	4.23	40320
9	729	38.44	512	inf	inf	4608	2.2	19.78	4.59	362880
10	1000	57.67	1024	inf	inf	10240	2.3	23.03	4.93	3628800
11	1331	86.5	2048	inf	inf	22528	2.4	26.38	5.27	39916800
12	1728	129.75	4096	inf	inf	49152	2.48	29.82	5.6	479001600
13	2197	194.62	8192	inf	inf	106496	2.56	33.34	5.92	6227020800
14	2744	291.93	16384	inf	inf	229376	2.64	36.95	6.23	8.7178E+10
15	3375	437.89	32768	inf	inf	491520	2.71	40.62	6.53	1.3077E+12
16	4096	656.84	65536	inf	inf	1048576	2.77	44.36	6.83	2.0923E+13
17	4913	985.26	131072	inf	inf	2228224	2.83	48.16	7.13	3.5569E+14
18	5832	1477.89	262144	inf	inf	4718592	2.89	52.03	7.41	6.4024E+15
19	6859	2216.84	524288	inf	inf	9961472	2.94	55.94	7.7	1.2165E+17
20	8000	3325.26	1048576	inf	inf	20971520	3	59.91	7.98	2.4329E+18
21	9261	4987.89	2097152	inf	inf	44040192	3.04	63.93	8.25	
22	10648	7481.83	4194304	inf	inf	92274688	3.09	68	8.52	
23	12167	11222.74	8388608	inf	inf	192937984	3.14	72.12	8.79	
24	13824	16834.11	16777216	inf	inf	402653184	3.18	76.27	9.05	
25	15625	25251.17	33554432	inf	inf	838860800	3.22	80.47	9.31	
26	17576	37876.75	67108864	inf	inf	1744830464	3.26	84.71	9.57	
27	19683	56815.13	134217728	inf	inf	3623878656	3.3	88.99	9.82	
28	21952	85222.7	268435456	inf	inf	7516192768	3.33	93.3	10.07	
29	24389	127834.04	536870912	inf	inf	1.5569E+10	3.37	97.65	10.32	
30	27000	191751.06	1073741824	inf	inf	3.2212E+10	3.4	102.04	10.56	
31	29791	287626.59	2147483648	inf	inf	6.6572E+10	3.43	106.45	10.81	
32	32768	431439.88	4294967296	inf	inf	1.3744E+11	3.47	110.9	11.05	
33	35937	647159.81	8589934592	inf	inf	2.8347E+11	3.5	115.38	11.29	
34	39304	970739.75	1.718E+10	inf	inf	5.8412E+11	3.53	119.9	11.52	
35	42875	1456109.62	3.436E+10	inf	inf	1.2026E+12	3.56	124.44	11.76	
36	46656	2184164.5	6.8719E+10	inf	inf	2.4739E+12	3.58	129.01	11.99	
37	50653	3276246.5	1.3744E+11	inf	inf	5.0852E+12	3.61	133.6	12.22	
38	54872	4914370	2.7488E+11	inf	inf	1.0445E+13	3.64	138.23	12.45	
39	59319	7371555	5.4976E+11	inf	inf	2.144E+13	3.66	142.88	12.67	
40	64000	11057332	1.0995E+12	inf	inf	4.398E+13	3.69	147.56	12.9	
41	68921	16585998	2.199E+12	inf	inf	9.016E+13	3.71	152.26	13.12	
42	74088	24878998	4.398E+12	inf	inf	1.8472E+14	3.74	156.98	13.34	
43	79507	37318496	8.7961E+12	inf	inf	3.7823E+14	3.76	161.73	13.56	
44	85184	55977744	1.7592E+13	inf	inf	7.7406E+14	3.78	166.5	13.78	
45	91125	83966616	3.5184E+13	inf	inf	1.5833E+15	3.81	171.3	13.99	
46	97336	125949928	7.0369E+13	inf	inf	3.237E+15	3.83	176.12	14.21	
47	103823	188924896	1.4074E+14	inf	inf	6.6147E+15	3.85	180.96	14.42	
48	110592	283387328	2.8147E+14	inf	inf	1.3511E+16	3.87	185.82	14.63	
49	117649	425080992	5.6295E+14	inf	inf	2.7585E+16	3.89	190.7	14.84	
50	125000	637621504	1.1259E+15	inf	inf	5.6295E+16	3.91	195.6	15.05	
51	132651	956432256	2.2518E+15	inf	inf	1.1484E+17	3.93	200.52	15.26	
52	140608	1434648320	4.5036E+15	inf	inf	2.3419E+17	3.95	205.46	15.47	

53	148877	2151972608	9.0072E+15	inf	inf	4.7738E+17	3.97	210.43	15.67
54	157464	3227958784	1.8014E+16	inf	inf	9.7278E+17	3.99	215.41	15.88
55	166375	4841938432	3.6029E+16	inf	inf	1.9816E+18	4.01	220.4	16.08
56	175616	7262907392	7.2058E+16	inf	inf	4.0352E+18	4.03	225.42	16.28
57	185193	1.0894E+10	1.4412E+17	inf	inf	8.2146E+18	4.04	230.45	16.48
58	195112	1.6342E+10	2.8823E+17	inf	inf	1.6717E+19	4.06	235.51	16.68
59	205379	2.4512E+10	5.7646E+17	inf	inf	3.4011E+19	4.08	240.57	16.88
60	216000	3.6768E+10	1.1529E+18	inf	inf	6.9175E+19	4.09	245.66	17.08
61	226981	5.5153E+10	2.3058E+18	inf	inf	1.4066E+20	4.11	250.76	17.28
62	238328	8.2729E+10	4.6117E+18	inf	inf	2.8592E+20	4.13	255.88	17.47
63	250047	1.2409E+11	9.2234E+18	inf	inf	5.8107E+20	4.14	261.02	17.67
64	262144	1.8614E+11	1.8447E+19	inf	inf	1.1806E+21	4.16	266.17	17.86
65	274625	2.7921E+11	3.6893E+19	inf	inf	2.3981E+21	4.17	271.34	18.06
66	287496	4.1882E+11	7.3787E+19	inf	inf	4.8699E+21	4.19	276.52	18.25
67	300763	6.2822E+11	1.4757E+20	inf	inf	9.8875E+21	4.2	281.71	18.44
68	314432	9.4234E+11	2.9515E+20	inf	inf	2.007E+22	4.22	286.93	18.63
69	328509	1.4135E+12	5.903E+20	inf	inf	4.073E+22	4.23	292.15	18.82
70	343000	2.1203E+12	1.1806E+21	inf	inf	8.2641E+22	4.25	297.39	19.01
71	357911	3.1804E+12	2.3612E+21	inf	inf	1.6764E+23	4.26	302.65	19.2
72	373248	4.7706E+12	4.7224E+21	inf	inf	3.4001E+23	4.28	307.92	19.38
73	389017	7.1559E+12	9.4447E+21	inf	inf	6.8947E+23	4.29	313.2	19.57
74	405224	1.0734E+13	1.8889E+22	inf	inf	1.3978E+24	4.3	318.5	19.75
75	421875	1.6101E+13	3.7779E+22	inf	inf	2.8334E+24	4.32	323.81	19.94
76	438976	2.4151E+13	7.5558E+22	inf	inf	5.7424E+24	4.33	329.14	20.12
77	456533	3.6227E+13	1.5112E+23	inf	inf	1.1636E+25	4.34	334.47	20.31
78	474552	5.434E+13	3.0223E+23	inf	inf	2.3574E+25	4.36	339.82	20.49
79	493039	8.151E+13	6.0446E+23	inf	inf	4.7753E+25	4.37	345.19	20.67
80	512000	1.2226E+14	1.2089E+24	inf	inf	9.6714E+25	4.38	350.56	20.85
81	531441	1.834E+14	2.4179E+24	inf	inf	1.9585E+26	4.39	355.95	21.03
82	551368	2.751E+14	4.8357E+24	inf	inf	3.9653E+26	4.41	361.35	21.21
83	571787	4.1264E+14	9.6714E+24	inf	inf	8.0273E+26	4.42	366.76	21.39
84	592704	6.1896E+14	1.9343E+25	inf	inf	1.6248E+27	4.43	372.19	21.57
85	614125	9.2845E+14	3.8686E+25	inf	inf	3.2883E+27	4.44	377.63	21.75
86	636056	1.3927E+15	7.7371E+25	inf	inf	6.6539E+27	4.45	383.07	21.92
87	658503	2.089E+15	1.5474E+26	inf	inf	1.3463E+28	4.47	388.53	22.1
88	681472	3.1335E+15	3.0949E+26	inf	inf	2.7235E+28	4.48	394.01	22.27
89	704969	4.7003E+15	6.1897E+26	inf	inf	5.5088E+28	4.49	399.49	22.45
90	729000	7.0504E+15	1.2379E+27	inf	inf	1.1141E+29	4.5	404.98	22.62
91	753571	1.0576E+16	2.4759E+27	inf	inf	2.2531E+29	4.51	410.49	22.8
92	778688	1.5863E+16	4.9518E+27	inf	inf	4.5556E+29	4.52	416	22.97
93	804357	2.3795E+16	9.9035E+27	inf	inf	9.2103E+29	4.53	421.53	23.14
94	830584	3.5693E+16	1.9807E+28	inf	inf	1.8619E+30	4.54	427.07	23.32
95	857375	5.3539E+16	3.9614E+28	inf	inf	3.7633E+30	4.55	432.62	23.49
96	884736	8.0308E+16	7.9228E+28	inf	inf	7.6059E+30	4.56	438.18	23.66
97	912673	1.2046E+17	1.5846E+29	inf	inf	1.537E+31	4.57	443.75	23.83
98	941192	1.8069E+17	3.1691E+29	inf	inf	3.1057E+31	4.58	449.33	24
99	970299	2.7104E+17	6.3383E+29	inf	inf	6.2749E+31	4.6	454.92	24.17
100	1000000	4.0656E+17	1.2677E+30	inf	inf	1.2677E+32	4.61	460.52	24.34

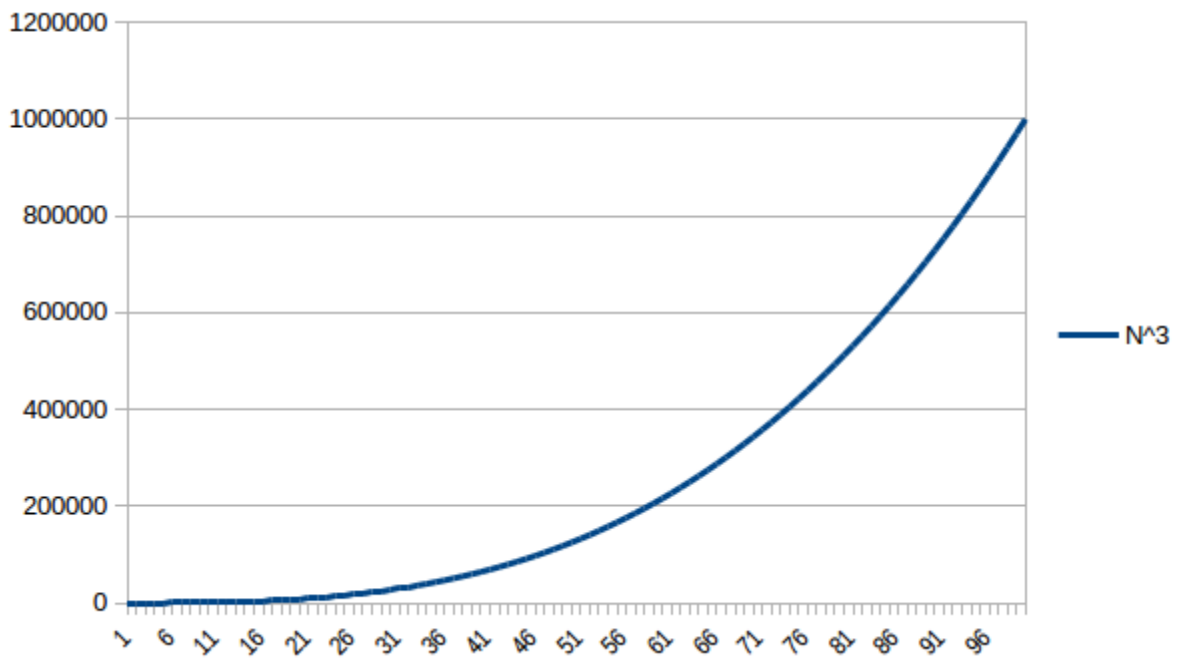
1. n

The graph increases linearly and gradient remains constant.



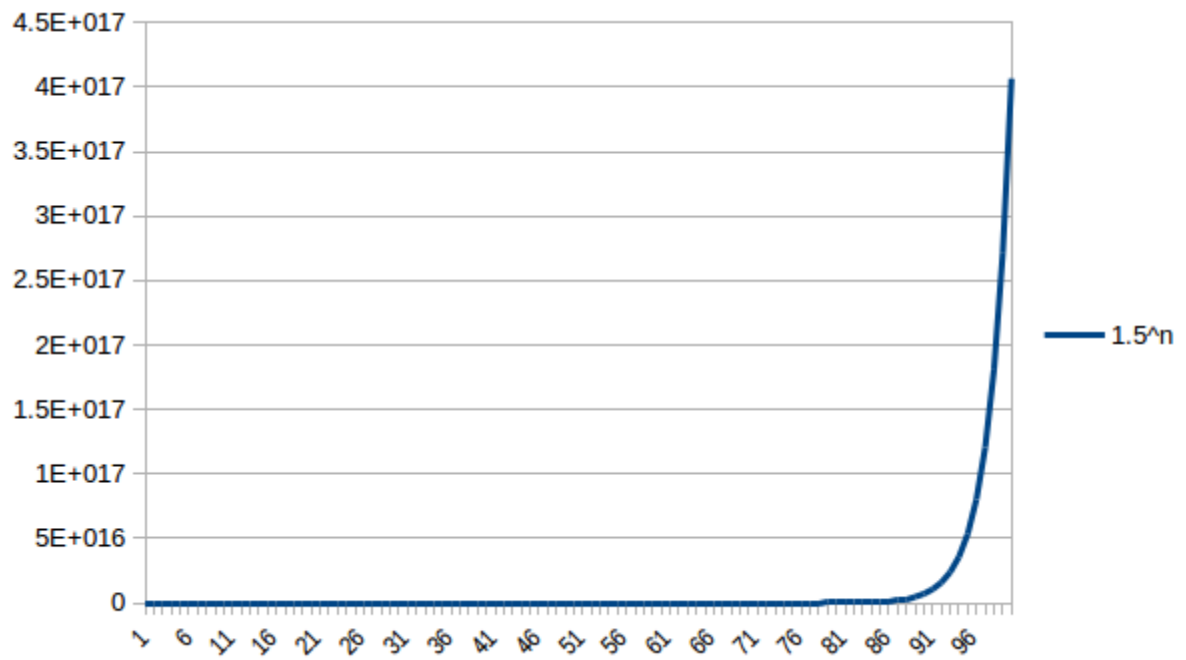
2. n^3

The graph increases non-linearly and gradient increases.



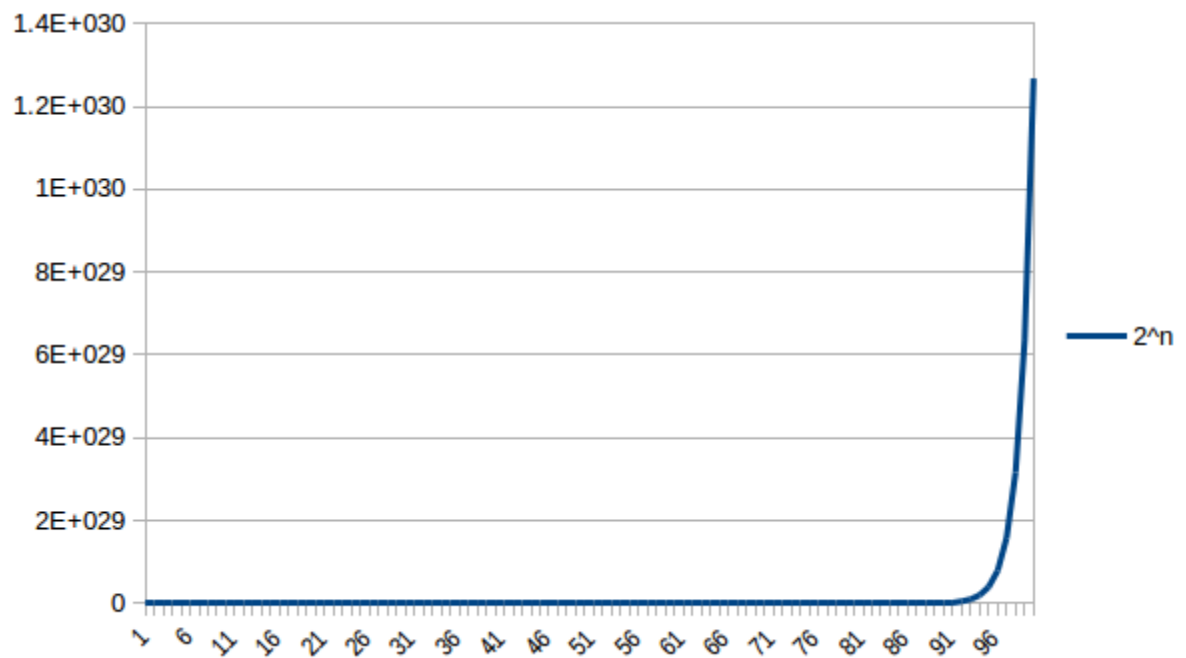
3. 1.5^n

The graph increases exponentially and gradient increases.



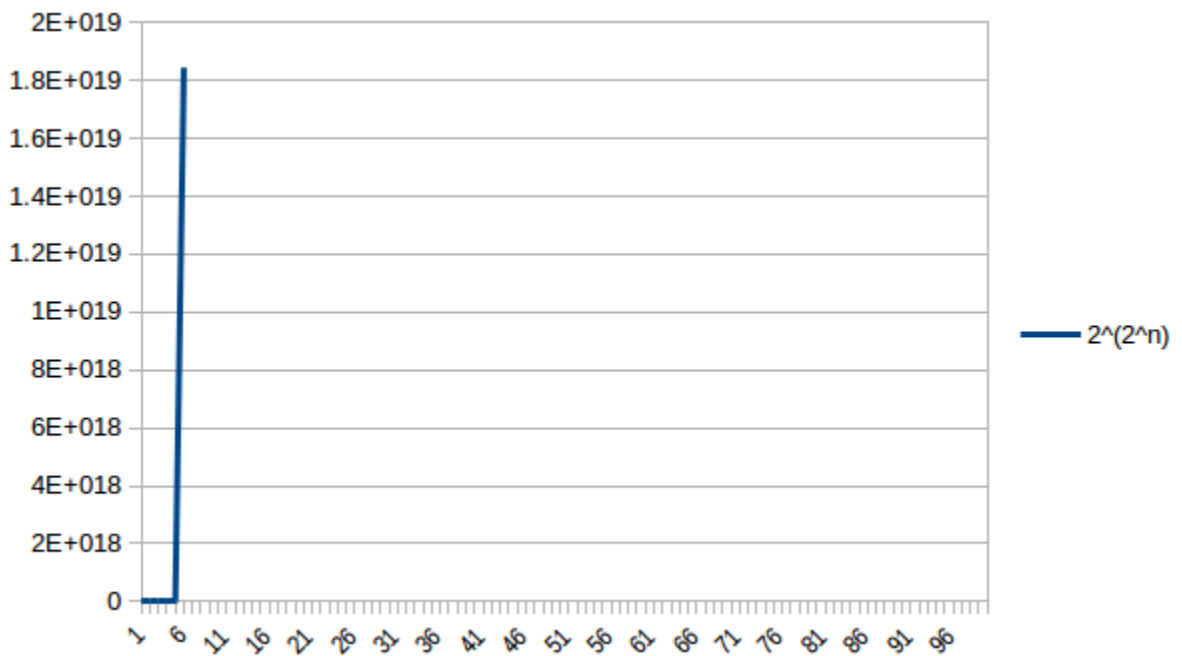
4. 2^n

The graph increases exponentially and gradient increases.



5. $2^{(2^n)}$

The graph increases non-linearly and gradient increases.



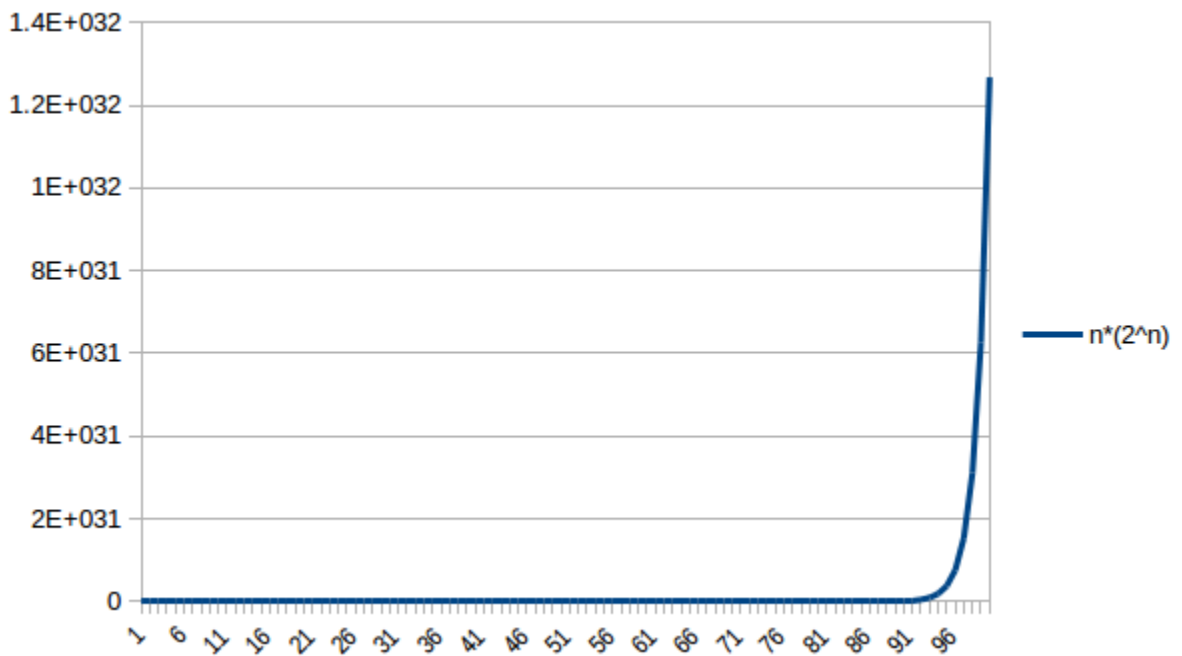
6. $2^{(2^{(n+1)})}$

The graph increases non-linearly and gradient increases.



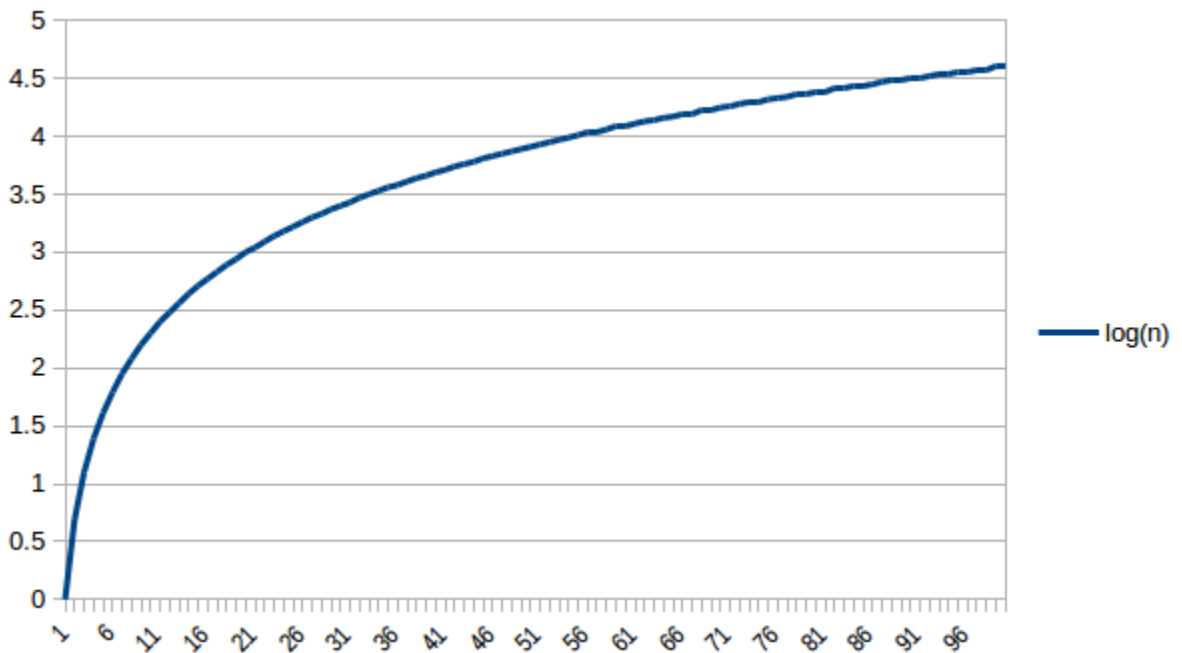
7. $n \cdot 2^n$

The graph increases non-linearly and gradient increases.



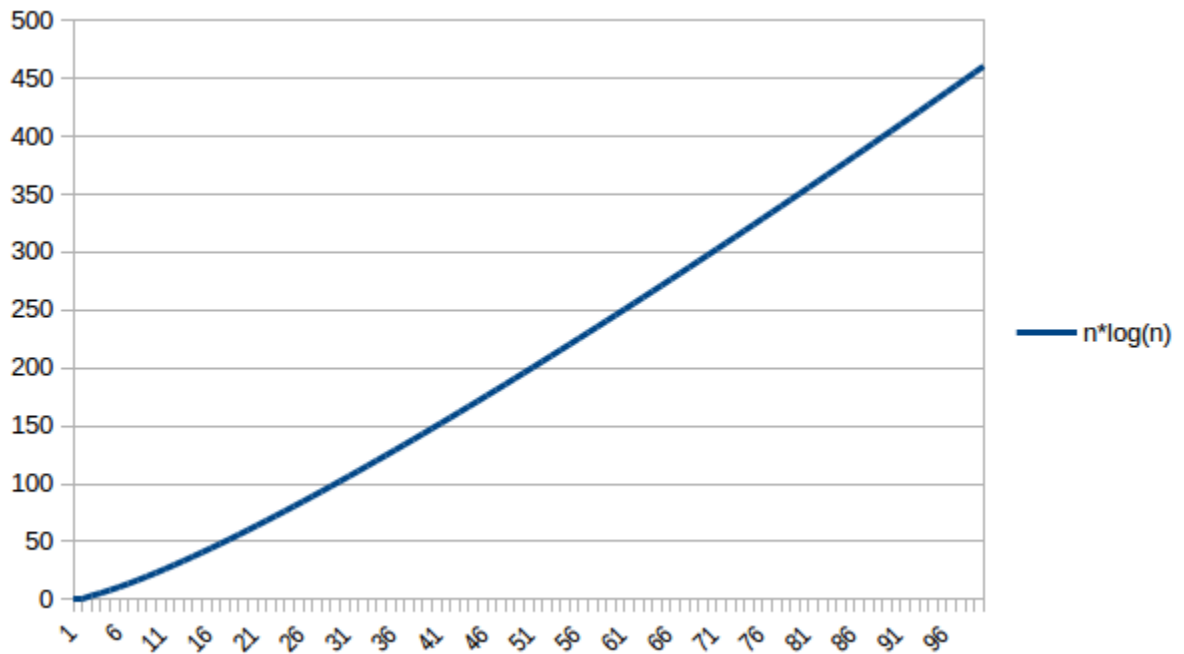
8. $\log(n)$

The graph increases logarithmically and gradient decreases.



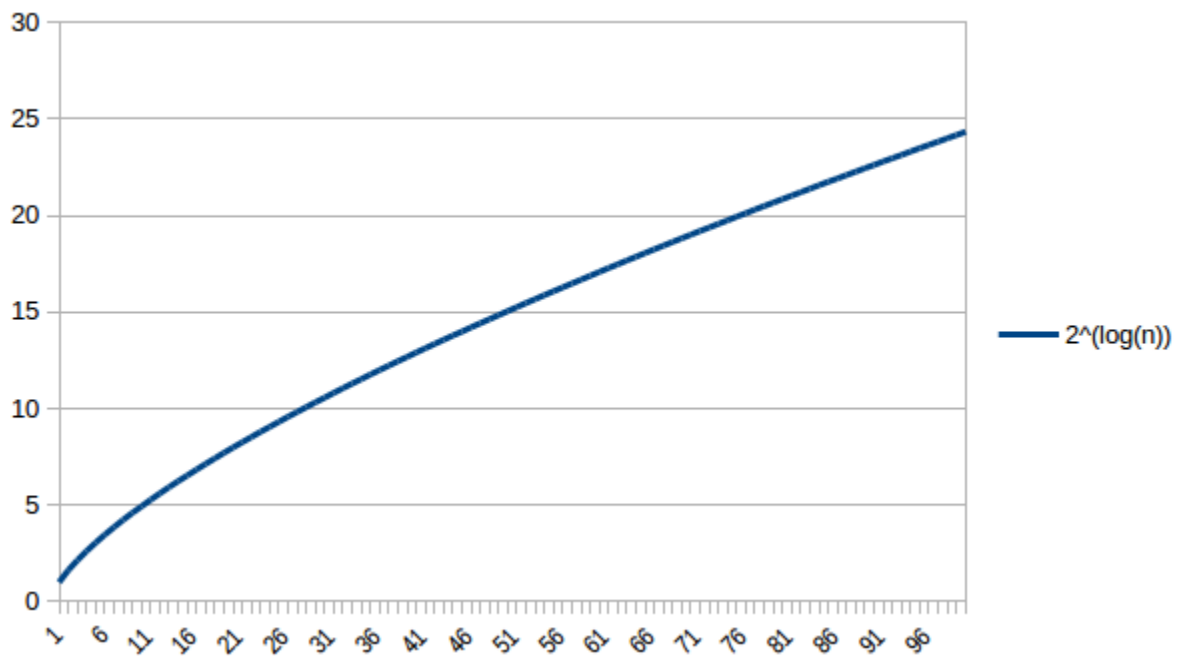
9. $n \cdot \log(n)$

The graph increases non-linearly and gradient increases slowly.



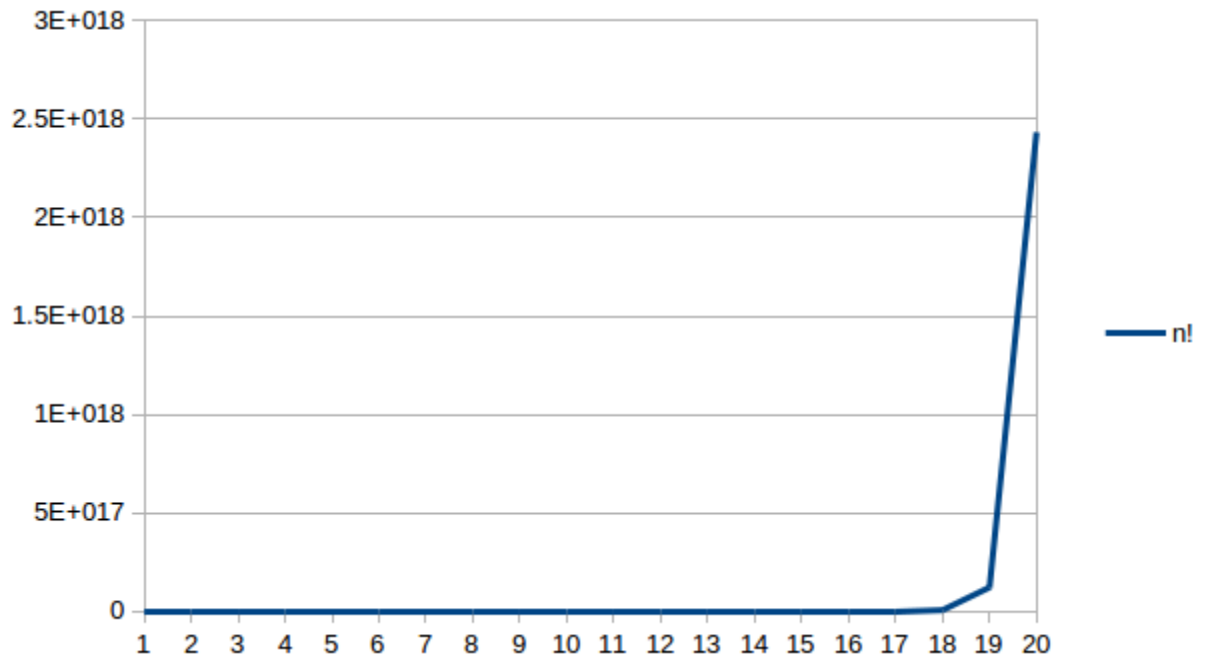
10. $2^{\log(n)}$

The graph increases non-linearly and gradient decreases slowly.



11. $n!$

The graph increases non-linearly and gradient increases.



Conclusion:

I have learnt about various functions and their outputs and how to write a program for them. Also, plotting a graph for these functions and interpreting it.