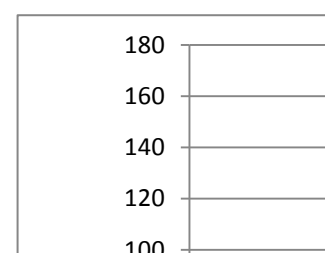
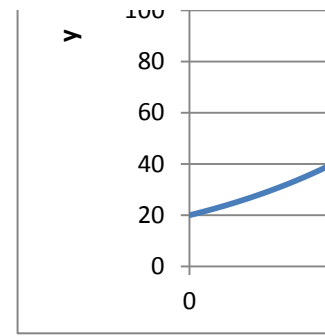
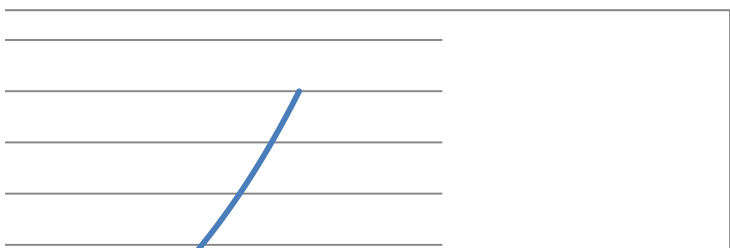


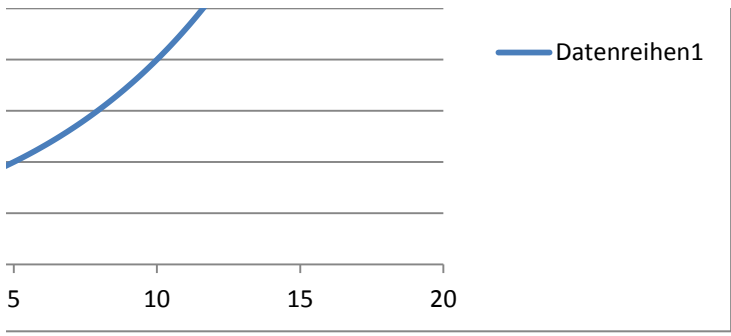
t	y
0	20
0.25	20.70515
0.5	21.43515
0.75	22.1909
1	22.97329
1.25	23.78327
1.5	24.6218
1.75	25.4899
2	26.3886
2.25	27.319
2.5	28.28219
2.75	29.27934
3	30.31165
3.25	31.38036
3.5	32.48675
3.75	33.63214
4	34.81792
4.25	36.04551
4.5	37.31638
4.75	38.63205
5	39.99411
5.25	41.4042
5.5	42.864
5.75	44.37527
6	45.93982
6.25	47.55953
6.5	49.23636
6.75	50.9723
7	52.76944
7.25	54.62995
7.5	56.55606
7.75	58.55007
8	60.61439
8.25	62.75149
8.5	64.96394
8.75	67.25439
9	69.6256
9.25	72.08041
9.5	74.62177
9.75	77.25273
10	79.97645
10.25	82.79621
10.5	85.71538
10.75	88.73747
11	91.86612
11.25	95.10507
11.5	98.45822
11.75	101.9296
12	105.5234



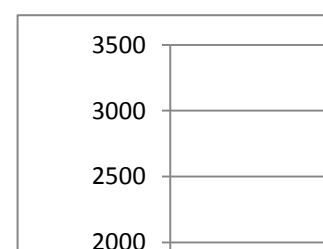
12.25	109.2438
12.5	113.0955
12.75	117.0829
13	121.2109
13.25	125.4845
13.5	129.9087
13.75	134.489
14	139.2307
14.25	144.1396
14.5	149.2216
14.75	154.4827
15	159.9294



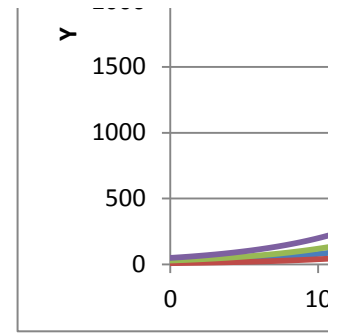


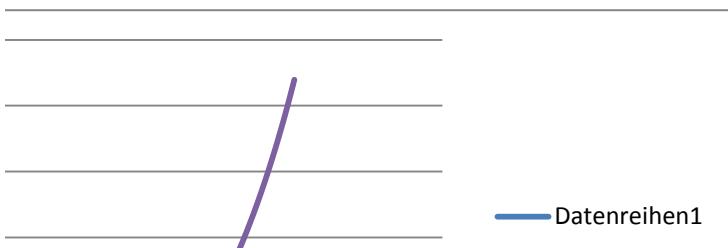


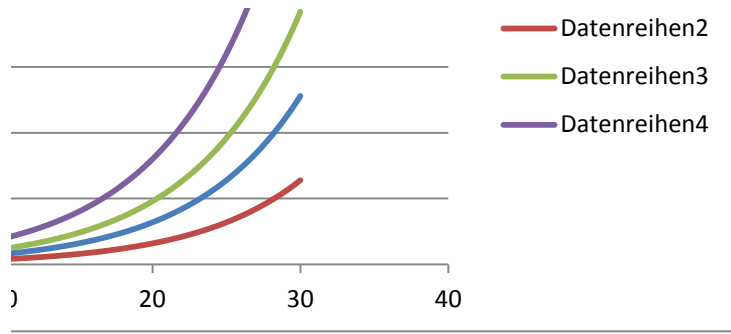
t	y	y1	y2	y3
0	20	10	30	50
0.5	21.43515	10.71758	32.15273	53.58788
1	22.97329	11.48665	34.45994	57.43323
1.5	24.6218	12.3109	36.9327	61.5545
2	26.3886	13.1943	39.58291	65.97151
2.5	28.28219	14.14109	42.42328	70.70547
3	30.31165	15.15583	45.46748	75.77914
3.5	32.48675	16.24337	48.73012	81.21687
4	34.81792	17.40896	52.22688	87.04481
4.5	37.31638	18.65819	55.97456	93.29094
5	39.99411	19.99706	59.99117	99.98528
5.5	42.864	21.432	64.296	107.16
6	45.93982	22.96991	68.90973	114.8495
6.5	49.23636	24.61818	73.85453	123.0909
7	52.76944	26.38472	79.15416	131.9236
7.5	56.55606	28.27803	84.83408	141.3901
8	60.61439	30.30719	90.92158	151.536
8.5	64.96394	32.48197	97.4459	162.4098
9	69.6256	34.8128	104.4384	174.064
9.5	74.62177	37.31088	111.9327	186.5544
10	79.97645	39.98823	119.9647	199.9411
10.5	85.71538	42.85769	128.5731	214.2885
11	91.86612	45.93306	137.7992	229.6653
11.5	98.45822	49.22911	147.6873	246.1455
12	105.5234	52.76168	158.285	263.8084
12.5	113.0955	56.54773	169.6432	282.7387
13	121.2109	60.60547	181.8164	303.0273
13.5	129.9087	64.95437	194.8631	324.7719
14	139.2307	69.61535	208.8461	348.0768
14.5	149.2216	74.61079	223.8324	373.0539
15	159.9294	79.96468	239.8941	399.8234
15.5	171.4055	85.70277	257.1083	428.5138
16	183.7052	91.8526	275.5578	459.263
16.5	196.8875	98.44373	295.3312	492.2186
17	211.0156	105.5078	316.5235	527.5391
17.5	226.1576	113.0788	339.2365	565.3941
18	242.3862	121.1931	363.5793	605.9655
18.5	259.7793	129.8896	389.6689	649.4482
19	278.4204	139.2102	417.6306	696.0511
19.5	298.3992	149.1996	447.5988	745.9981
20	319.8117	159.9058	479.7175	799.5292
20.5	342.7606	171.3803	514.1409	856.9015
21	367.3563	183.6782	551.0345	918.3908
21.5	393.717	196.8585	590.5754	984.2924
22	421.9692	210.9846	632.9538	1054.923
22.5	452.2487	226.1244	678.3731	1130.622
23	484.701	242.3505	727.0515	1211.753
23.5	519.4821	259.741	779.2231	1298.705
24	556.7589	278.3794	835.1383	1391.897



24.5	596.7106	298.3553	895.0659	1491.777
25	639.5292	319.7646	959.2938	1598.823
25.5	685.4203	342.7102	1028.13	1713.551
26	734.6045	367.3023	1101.907	1836.511
26.5	787.318	393.659	1180.977	1968.295
27	843.8142	421.9071	1265.721	2109.535
27.5	904.3643	452.1822	1356.546	2260.911
28	969.2594	484.6297	1453.889	2423.148
28.5	1038.811	519.4056	1558.217	2597.028
29	1113.354	556.677	1670.031	2783.385
29.5	1193.246	596.6228	1789.868	2983.114
30	1278.87	639.4351	1918.305	3197.175







Ajayeeba Oyunkon Edoho
16161616161616

Mechanical Engineering
ENR 282 ASSIGNMENT

Since the bacteria model is an exponential growth,

$$\frac{dy}{dt} = ky$$

$$dy = kdt$$

$$\int \frac{dy}{y} = \int k dt$$

$$\ln y = kt + C$$

$$y = e^{kt+C}$$

$$y = e^{kt} \cdot e^C \quad \text{where } e^C = y_0$$

$$y = y_0 e^{kt} \quad (\text{General solution})$$

a $y = 2y_0 \quad t = 5 \text{ hrs}$

$$2y_0 = y_0 e^{kt}$$

$$2 = e^{kt}$$

$$\ln 2 = kt + C$$

$$\ln 2 = k(5)$$

$$5k = 0.693$$

$$k = \frac{0.693}{5}$$

$$k = 0.1386$$

$$y = y_0 e^{0.1386t}$$

at $y = 20 \quad t = 0$

$$20 = y_0 e^{0.1386(0)}$$

$$20 = y_0$$

$$\therefore y = 20 e^{0.1386t} \quad (\text{solution for molecule})$$

b for $1\frac{1}{2}$ days,

$$1 \text{ day} = 24 \text{ hrs}$$

$$\frac{1}{2} \text{ days} = 12 \text{ hrs}$$

$$1\frac{1}{2} \text{ days} = 12 + 24 = 36 \text{ hrs}$$

$$y = 20e^{0.1386(36)}$$

$$y = 20e^{4.9896}$$

$$y = 2937.5$$

$$y \approx 2,938 \text{ bacteria,}$$

I observed from the graph in (d) that as the number of the bacteria reduced the time increased. That is more bacteria was created in lesser time.