

Chart Tools: Design, Layout, Format

Change Chart Type, Save As Template, Switch Row/Column, Select Data

Chart Layouts, Chart Styles, Move Chart Location

t	y1	y2	y3
0	10	30	50
0.5	10.71758	32.15273	53.58788
1	11.48665	34.45994	57.43323
1.5	12.3109	36.9327	61.5545
2	13.1943	39.58291	65.97151
2.5	14.14109	42.42328	70.70547
3	15.15583	45.46748	75.77914
3.5	16.24337	48.73012	81.21687
4	17.40896	52.22688	87.04481
4.5	18.65819	55.97456	93.29094
5	19.99706	59.99117	99.98528
5.5	21.432	64.296	107.16
6	22.96991	68.90973	114.8495
6.5	24.61818	73.85453	123.0909
7	26.38472	79.15416	131.9236
7.5	28.27803	84.83408	141.3901
8	30.30719	90.92158	151.536
8.5	32.48197	97.4459	162.4098
9	34.8128	104.4384	174.064
9.5	37.31088	111.9327	186.5544
10	39.98823	119.9647	199.9411
10.5	42.85769	128.5731	214.2885
11	45.93306	137.7992	229.6653
11.5	49.22911	147.6873	246.1455

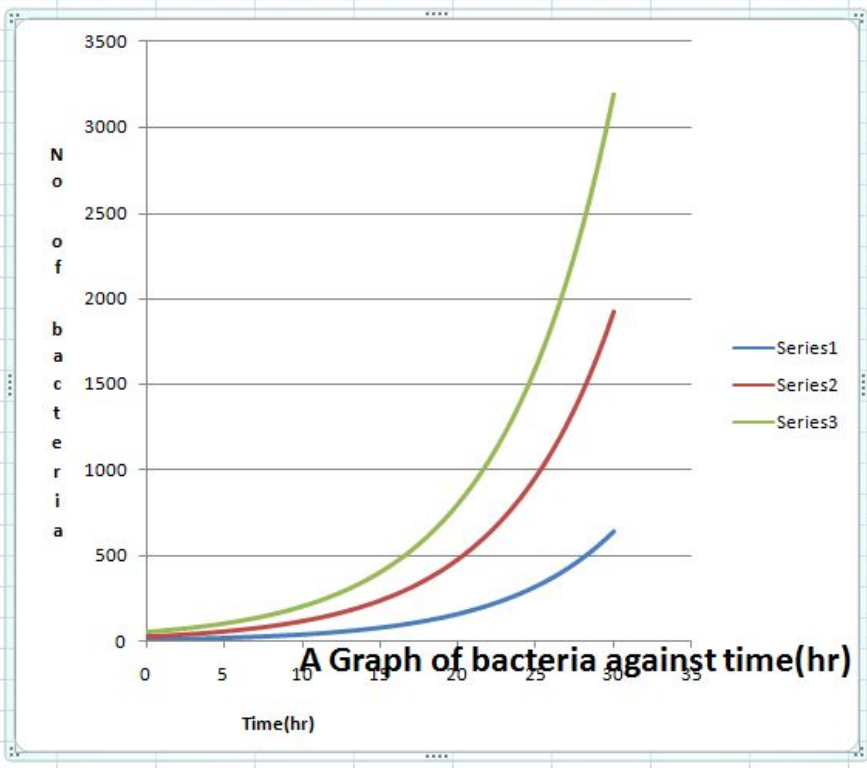


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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
25	11.5	49.22911	147.6873	246.1455																	
26	12	52.76168	158.285	263.8084																	
27	12.5	56.54773	169.6432	282.7387																	
28	13	60.60547	181.8164	303.0273																	
29	13.5	64.95437	194.8631	324.7719																	
30	14	69.61535	208.8461	348.0768																	
31	14.5	74.61079	223.8324	373.0539																	
32	15	79.96468	239.8941	399.8234																	
33	15.5	85.70277	257.1083	428.5138																	
34	16	91.8526	275.5578	459.263																	
35	16.5	98.44373	295.3312	492.2186																	
36	17	105.5078	316.5235	527.5391																	
37	17.5	113.0788	339.2365	565.3941																	
38	18	121.1931	363.5793	605.9655																	
39	18.5	129.8896	389.6689	649.4482																	
40	19	139.2102	417.6306	696.0511																	
41	19.5	149.1996	447.5988	745.9981																	
42	20	159.9058	479.7175	799.5292																	
43	20.5	171.3803	514.1409	856.9015																	
44	21	183.6782	551.0345	918.3908																	
45	21.5	196.8585	590.5754	984.2924																	
46	22	210.9846	632.9538	1054.923																	
47	22.5	226.1244	678.3731	1130.622																	
48	23	242.3505	727.0515	1211.753																	
49	23.5	259.741	779.2231	1298.705																	

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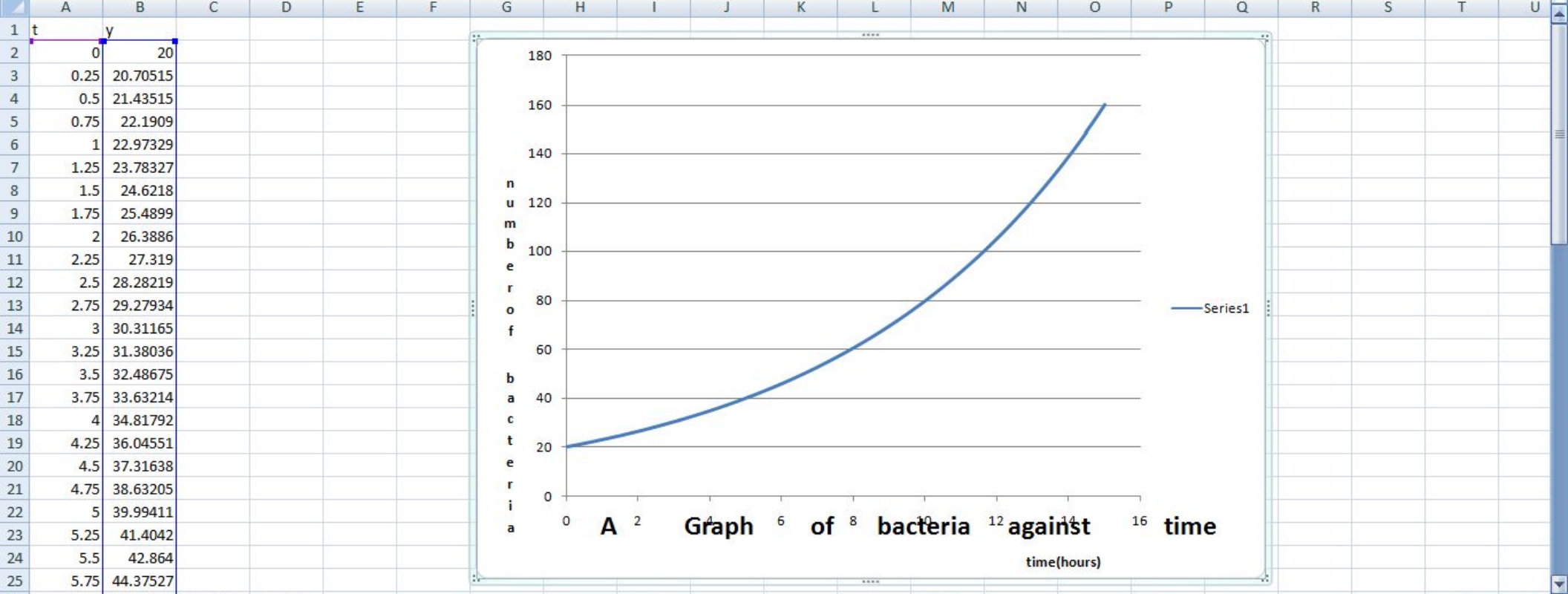
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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
41	19.5	149.1996	447.5988	745.9981																	
42	20	159.9058	479.7175	799.5292																	
43	20.5	171.3803	514.1409	856.9015																	
44	21	183.6782	551.0345	918.3908																	
45	21.5	196.8585	590.5754	984.2924																	
46	22	210.9846	632.9538	1054.923																	
47	22.5	226.1244	678.3731	1130.622																	
48	23	242.3505	727.0515	1211.753																	
49	23.5	259.741	779.2231	1298.705																	
50	24	278.3794	835.1383	1391.897																	
51	24.5	298.3553	895.0659	1491.777																	
52	25	319.7646	959.2938	1598.823																	
53	25.5	342.7102	1028.13	1713.551																	
54	26	367.3023	1101.907	1836.511																	
55	26.5	393.659	1180.977	1968.295																	
56	27	421.9071	1265.721	2109.535																	
57	27.5	452.1822	1356.546	2260.911																	
58	28	484.6297	1453.889	2423.148																	
59	28.5	519.4056	1558.217	2597.028																	
60	29	556.677	1670.031	2783.385																	
61	29.5	596.6228	1789.868	2983.114																	
62	30	639.4351	1918.305	3197.175																	
63																					
64																					
65																					

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Chart 1



Sheet1, Sheet2, Sheet3



Chart Tools: Design, Layout, Format

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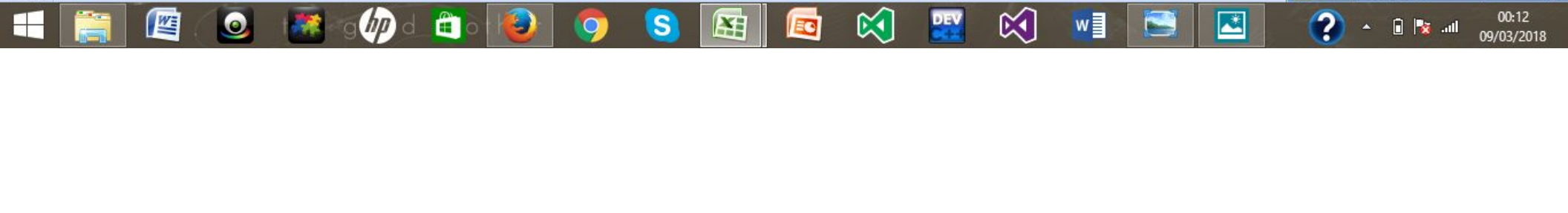
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
25	5.75	44.37527																			
26	6	45.93982																			
27	6.25	47.55953																			
28	6.5	49.23636																			
29	6.75	50.9723																			
30	7	52.76944																			
31	7.25	54.62995																			
32	7.5	56.55606																			
33	7.75	58.55007																			
34	8	60.61439																			
35	8.25	62.75149																			
36	8.5	64.96394																			
37	8.75	67.25439																			
38	9	69.6256																			
39	9.25	72.08041																			
40	9.5	74.62177																			
41	9.75	77.25273																			
42	10	79.97645																			
43	10.25	82.79621																			
44	10.5	85.71538																			
45	10.75	88.73747																			
46	11	91.86612																			
47	11.25	95.10507																			
48	11.5	98.45822																			
49	11.75	101.9296																			

Taskbar: Windows, File Explorer, Word, HP, Store, Firefox, Chrome, Skype, Excel, Outlook, DEV, Word, Photos, Help, System tray (100%, 09/03/2018)

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
41	9.75	77.25273																			
42	10	79.97645																			
43	10.25	82.79621																			
44	10.5	85.71538																			
45	10.75	88.73747																			
46	11	91.86612																			
47	11.25	95.10507																			
48	11.5	98.45822																			
49	11.75	101.9296																			
50	12	105.5234																			
51	12.25	109.2438																			
52	12.5	113.0955																			
53	12.75	117.0829																			
54	13	121.2109																			
55	13.25	125.4845																			
56	13.5	129.9087																			
57	13.75	134.489																			
58	14	139.2307																			
59	14.25	144.1396																			
60	14.5	149.2216																			
61	14.75	154.4827																			
62	15	159.9294																			
63																					
64																					
65																					



2022-23 1012301  
Date: \_\_\_\_\_

Name: Ibezim Favour C  
Course: Eng 282  
Mat No: 16 (EN 01/010  
Dept: Chemical Engineering

a)  $\frac{dy}{dt} = ky$  — (a)

$t = 5$  hours

$y_0 = \text{initial}$

$y = \text{final}$

$y_0 = 20$

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

$$\ln y = kt + C$$

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

$$y = e^{kt} \cdot e^C$$

$$y = y_0 \cdot e^{kt}$$

Since it doubles every 5 hours

$$y = 2y_0$$

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

$$2 = e^{kt}$$

$$2 = e^{5k}$$

$$\ln 2 = 5k$$

$$k = \frac{\ln 2}{5} = 0.1386$$

b) when  $t = 1\frac{1}{2}$  days = 36 hours

1 day = 24 hours

$$y = y_0 \cdot e^{kt}$$

$$y = 20 \cdot e^{kt}$$

$$y = 20 \cdot e^{0.1386 \times 36}$$

$$y = 20 \cdot e^{4.9906}$$

$$y = 20 \cdot 147.033$$

$$y = 2940.66$$



16211 M FAVOUR

half

- e) Increase in time led to an exponential growth (increase) in the population of the bacteria in the growth medium.