Lab 5

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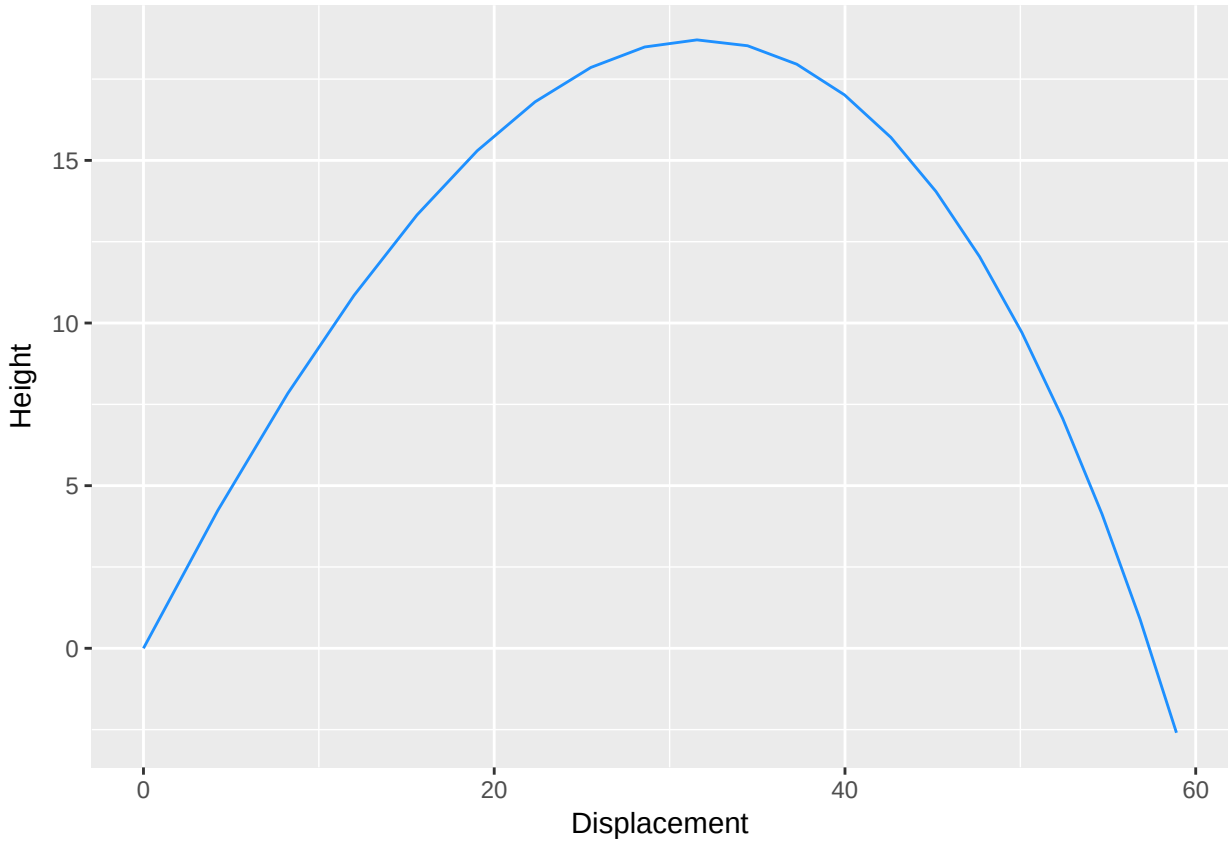
Activity 1

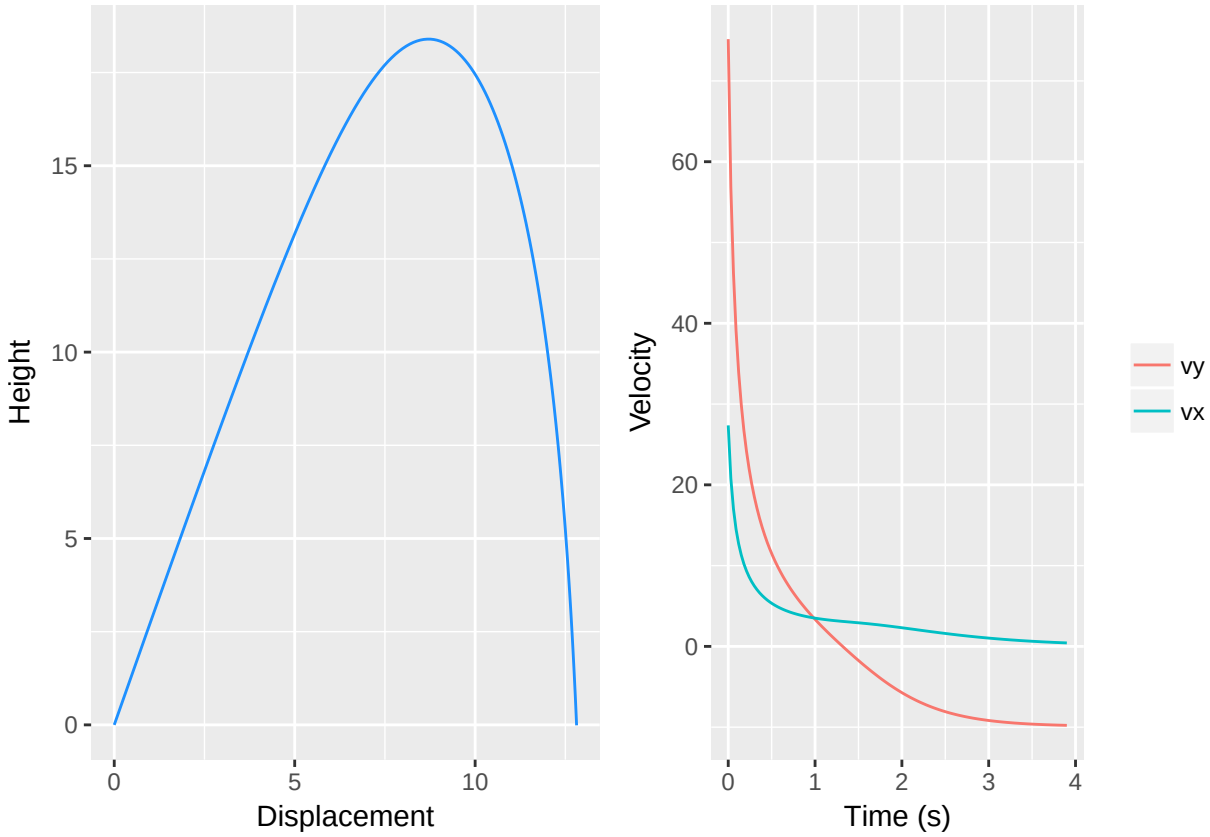
Drag = 0.01, $\theta = 45$**,** $v_0 = 30$



time	vy	vx	x	y
0.0	21.2132034	21.213203	0.000000	0.0000000
0.2	17.9804112	19.940411	4.242641	4.2426407
0.4	15.0548680	18.869617	8.230723	7.8387229
0.6	12.3680366	17.958613	12.004646	10.8496965
0.8	9.8686539	17.175420	15.596369	13.3233039
1.0	7.5176831	16.494974	19.031453	15.2970346
1.2	5.2851322	15.896955	22.330448	16.8005713
1.4	3.1480540	15.364328	25.509839	17.8575977
1.6	1.0893089	14.882394	28.582704	18.4872085
1.8	-0.9032009	14.438238	31.559183	18.7050703
2.0	-2.8370686	14.020497	34.446831	18.5244301
2.2	-4.7159020	13.619381	37.250930	17.9570164
2.4	-6.5399638	13.226795	39.974806	17.0138360
2.6	-8.3069654	12.836464	42.620165	15.7058432

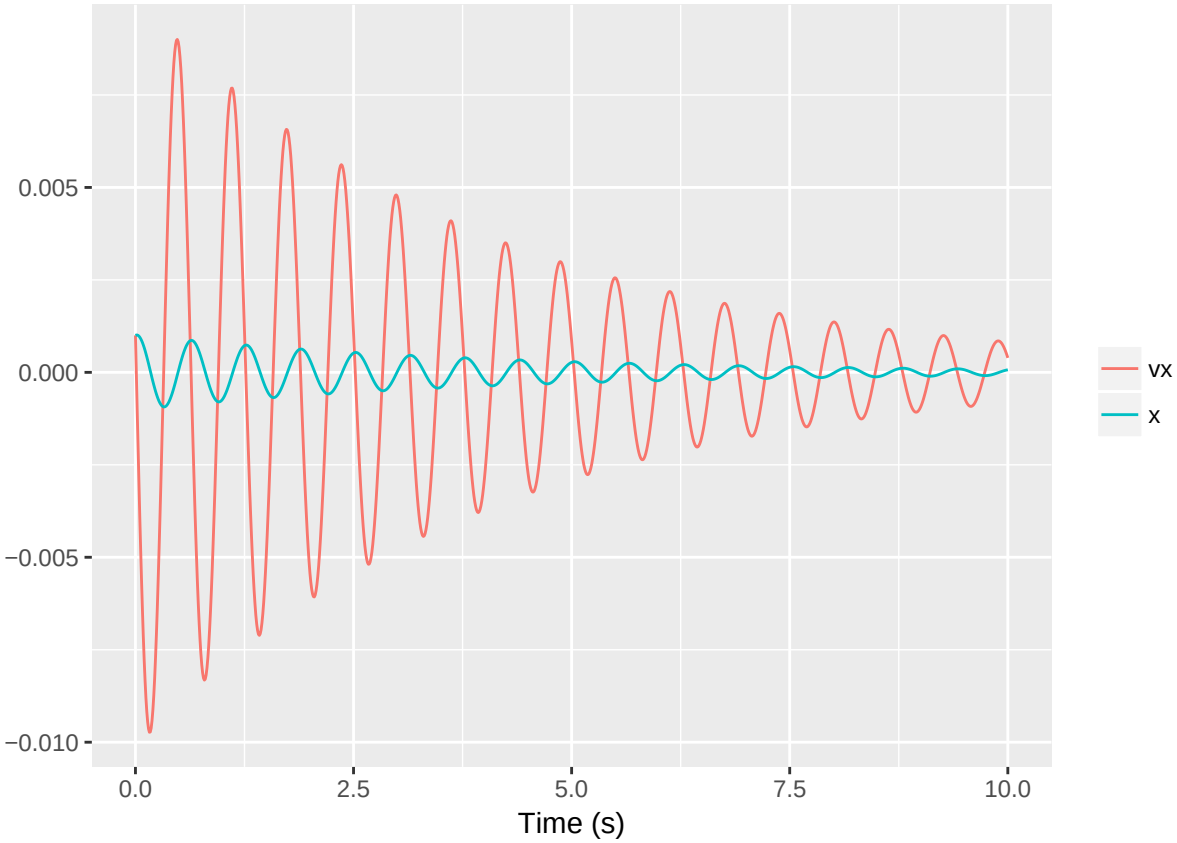
time	vy	vx	x	y
2.8	-10.0129404	12.443928	45.187458	14.0444501
3.0	-11.6530835	12.046415	47.676244	12.0418621
3.2	-13.2224632	11.642610	50.085527	9.7112453
3.4	-14.7165640	11.232378	52.414049	7.0667527
3.6	-16.1316587	10.816480	54.660524	4.1234399
3.8	-17.4650301	10.396318	56.823820	0.8971081
4.0	-18.7150723	9.973705	58.903084	-2.5958979

Terminal Velocity



v_y appears to reach $-9.9\frac{m}{s}$ around 4 seconds.

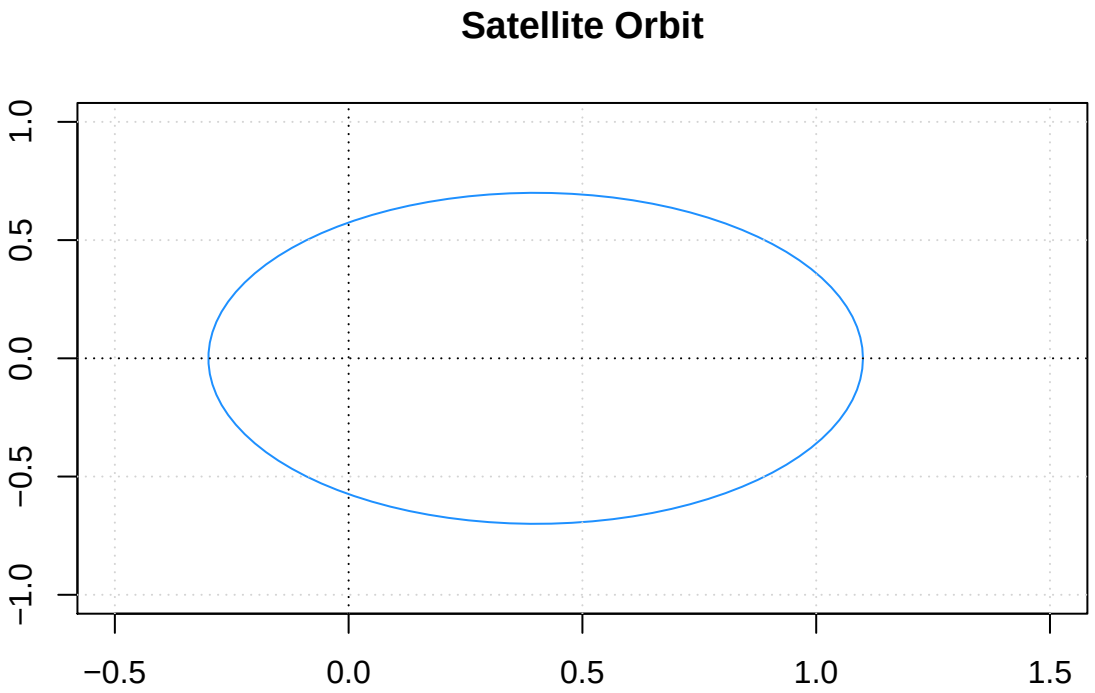
Activity 2



The first 20 values are in the table below.

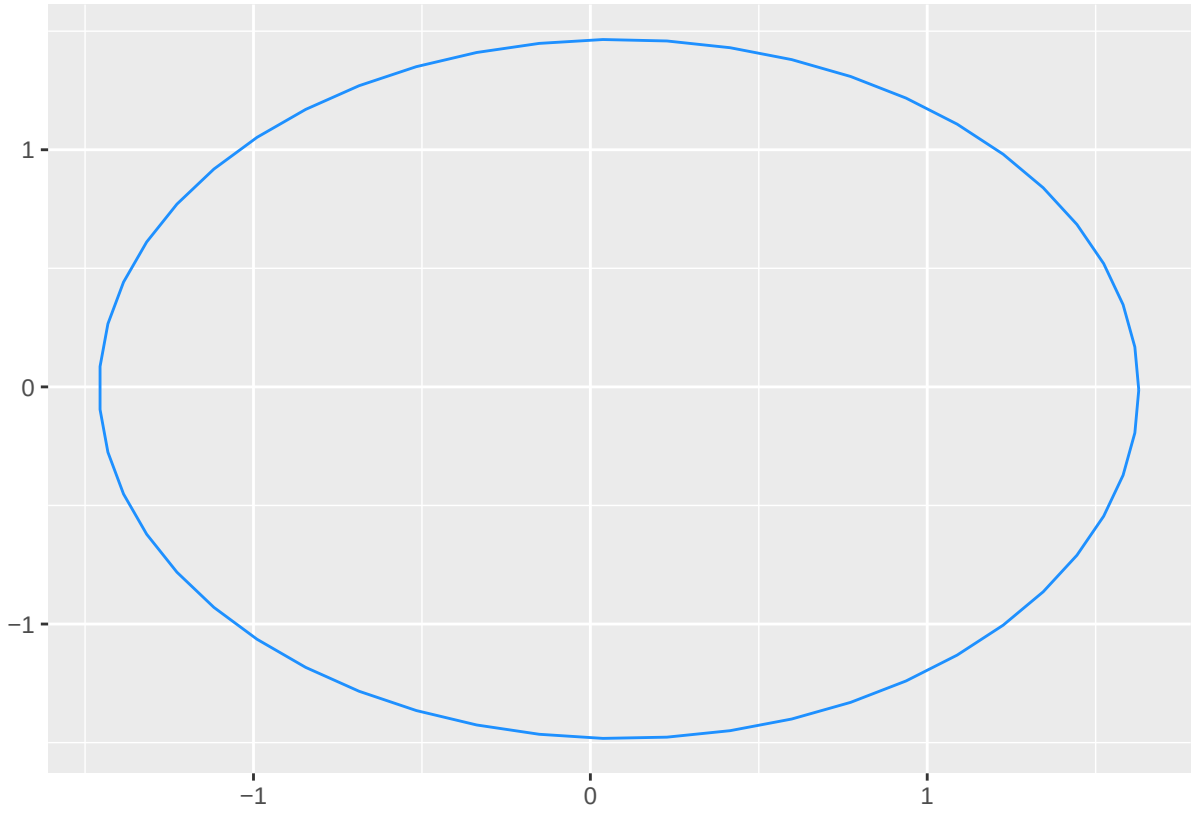
time	vx	x
0.00	0.0010000	0.0010000
0.01	-0.0000150	0.0010100
0.02	-0.0010248	0.0010098
0.03	-0.0020193	0.0009996
0.04	-0.0029886	0.0009794
0.05	-0.0039231	0.0009495
0.06	-0.0048138	0.0009103
0.07	-0.0056519	0.0008622
0.08	-0.0064293	0.0008056
0.09	-0.0071385	0.0007413
0.10	-0.0077727	0.0006700
0.11	-0.0083261	0.0005922
0.12	-0.0087935	0.0005090
0.13	-0.0091705	0.0004210
0.14	-0.0094540	0.0003293
0.15	-0.0096415	0.0002348
0.16	-0.0097317	0.0001384
0.17	-0.0097241	0.0000411
0.18	-0.0096193	-0.0000562
0.19	-0.0094188	-0.0001524

Activity 3



time	x	y	vx	vy
0.00000	1.200000	0.00e+00	0.0000000	2.0000000
0.00005	1.200000	1.00e-04	-0.0003403	0.0000000
0.00010	1.200000	1.00e-04	-0.0006806	-0.0003403
0.00015	1.200000	1.00e-04	-0.0010208	-0.0006806
0.00020	1.200000	9.99e-05	-0.0013611	-0.0010209
0.00025	1.200000	9.99e-05	-0.0017014	-0.0013611
0.00030	1.200000	9.98e-05	-0.0020417	-0.0017014
0.00035	1.200000	9.97e-05	-0.0023819	-0.0020417
0.00040	1.200000	9.96e-05	-0.0027222	-0.0023820
0.00045	1.199999	9.95e-05	-0.0030625	-0.0027223
0.00050	1.199999	9.94e-05	-0.0034028	-0.0030625
0.00055	1.199999	9.92e-05	-0.0037431	-0.0034028
0.00060	1.199999	9.91e-05	-0.0040833	-0.0037431
0.00065	1.199999	9.89e-05	-0.0044236	-0.0040834
0.00070	1.199998	9.87e-05	-0.0047639	-0.0044236
0.00075	1.199998	9.85e-05	-0.0051042	-0.0047639

Earth's Orbit Around the Sun.



hrs	x/1e8 km	y/1e8 km	r/1e8 km	v km/ s
0	1.496	0.000	1.496	29.786
400	1.435	0.423	1.496	29.789
800	1.257	0.812	1.496	29.791
1200	0.976	1.134	1.497	29.792
1600	0.616	1.364	1.497	29.791
2000	0.205	1.483	1.497	29.787
2400	-0.222	1.482	1.498	29.781
2800	-0.632	1.359	1.499	29.772
3200	-0.990	1.127	1.500	29.761
3600	-1.268	0.803	1.501	29.748
4000	-1.444	0.414	1.502	29.734
4400	-1.503	-0.009	1.503	29.719
4800	-1.441	-0.431	1.504	29.704
5200	-1.263	-0.818	1.505	29.690
5600	-0.984	-1.140	1.506	29.677