

```

clc; close all; clear all
%...Input data:
% Earth:
m1 = 5.974e24;% *4903/398600;           %moon %5.974e24 - earth;
R =6378.137 ;                          %6378.137%1737;
m2 = 1000;
v0 = [-2.294079 6.758849 2.049468] ;
r0 = [6837.432552 1868.795099 1455.480629 ];
t0 = 0;
tf = 200*60;                          %200*hours;
%...End input data

orbit(m1,m2,R,r0,v0,t0,tf)

```

t =

1.0e+04 *

0
 0.0095
 0.0189
 0.0284
 0.0379
 0.0472
 0.0561
 0.0651
 0.0740
 0.0829
 0.0919
 0.1010
 0.1101
 0.1192
 0.1283
 0.1375
 0.1467
 0.1560
 0.1653
 0.1746
 0.1840
 0.1934
 0.2027
 0.2119
 0.2211
 0.2303
 0.2396
 0.2488
 0.2581
 0.2675
 0.2768
 0.2862
 0.2956
 0.3050
 0.3145
 0.3239

0.3334
0.3430
0.3523
0.3614
0.3703
0.3793
0.3883
0.3974
0.4064
0.4156
0.4247
0.4339
0.4431
0.4524
0.4617
0.4710
0.4804
0.4898
0.4993
0.5086
0.5178
0.5270
0.5363
0.5455
0.5548
0.5641
0.5734
0.5828
0.5921
0.6015
0.6109
0.6203
0.6298
0.6393
0.6488
0.6581
0.6672
0.6761
0.6850
0.6939
0.7029
0.7120
0.7210
0.7301
0.7393
0.7484
0.7576
0.7669
0.7762
0.7855
0.7949
0.8043
0.8137
0.8228
0.8320
0.8412
0.8505

0.8597
0.8690
0.8784
0.8877
0.8971
0.9065
0.9159
0.9253
0.9348
0.9443
0.9538
0.9632
0.9724
0.9813
0.9903
0.9992
1.0083
1.0174
1.0265
1.0356
1.0448
1.0540
1.0633
1.0726
1.0819
1.0912
1.1007
1.1101
1.1196
1.1287
1.1379
1.1471
1.1564
1.1657
1.1750
1.1843
1.1936
1.2000

y =

1.0e+03 *

6.8374	1.8688	1.4555	-0.0023	0.0068	0.0020
6.5886	2.4984	1.6422	-0.0030	0.0065	0.0019
6.2777	3.1044	1.8135	-0.0036	0.0063	0.0017
5.9066	3.6829	1.9681	-0.0042	0.0059	0.0015
5.4781	4.2281	2.1044	-0.0048	0.0055	0.0013
5.0112	4.7196	2.2178	-0.0053	0.0051	0.0011
4.5158	5.1553	2.3086	-0.0057	0.0046	0.0009
3.9850	5.5453	2.3794	-0.0061	0.0041	0.0007
3.4209	5.8889	2.4304	-0.0065	0.0036	0.0005
2.8249	6.1845	2.4611	-0.0068	0.0030	0.0002
2.2023	6.4287	2.4709	-0.0070	0.0024	-0.0000
1.5580	6.6186	2.4595	-0.0072	0.0018	-0.0002
0.8978	6.7519	2.4268	-0.0073	0.0011	-0.0005

0.2271	6.8267	2.3727	-0.0074	0.0005	-0.0007
-0.4480	6.8417	2.2975	-0.0074	-0.0002	-0.0009
-1.1217	6.7962	2.2018	-0.0073	-0.0008	-0.0012
-1.7880	6.6897	2.0859	-0.0072	-0.0015	-0.0014
-2.4407	6.5226	1.9509	-0.0069	-0.0021	-0.0016
-3.0741	6.2957	1.7975	-0.0067	-0.0028	-0.0017
-3.6821	6.0101	1.6271	-0.0063	-0.0034	-0.0019
-4.2591	5.6677	1.4408	-0.0060	-0.0039	-0.0021
-4.7996	5.2704	1.2400	-0.0055	-0.0045	-0.0022
-5.2891	4.8299	1.0304	-0.0050	-0.0050	-0.0023
-5.7247	4.3522	0.8144	-0.0045	-0.0054	-0.0024
-6.1097	3.8358	0.5912	-0.0039	-0.0058	-0.0025
-6.4417	3.2833	0.3619	-0.0033	-0.0062	-0.0025
-6.7170	2.6996	0.1285	-0.0027	-0.0065	-0.0025
-6.9325	2.0897	-0.1066	-0.0020	-0.0067	-0.0025
-7.0857	1.4592	-0.3415	-0.0013	-0.0069	-0.0025
-7.1747	0.8138	-0.5739	-0.0006	-0.0070	-0.0025
-7.1983	0.1593	-0.8016	0.0001	-0.0070	-0.0024
-7.1558	-0.4984	-1.0225	0.0008	-0.0070	-0.0023
-7.0470	-1.1531	-1.2345	0.0015	-0.0069	-0.0022
-6.8725	-1.7989	-1.4356	0.0022	-0.0068	-0.0021
-6.6333	-2.4296	-1.6239	0.0029	-0.0066	-0.0019
-6.3313	-3.0392	-1.7974	0.0035	-0.0063	-0.0017
-5.9686	-3.6221	-1.9546	0.0041	-0.0060	-0.0016
-5.5480	-4.1726	-2.0937	0.0047	-0.0056	-0.0014
-5.0849	-4.6734	-2.2107	0.0052	-0.0051	-0.0011
-4.5920	-5.1179	-2.3048	0.0057	-0.0047	-0.0009
-4.0653	-5.5148	-2.3785	0.0061	-0.0042	-0.0007
-3.5044	-5.8656	-2.4323	0.0064	-0.0036	-0.0005
-2.9111	-6.1686	-2.4658	0.0067	-0.0031	-0.0003
-2.2902	-6.4203	-2.4785	0.0070	-0.0025	-0.0000
-1.6470	-6.6179	-2.4698	0.0072	-0.0019	0.0002
-0.9870	-6.7588	-2.4398	0.0073	-0.0012	0.0004
-0.3158	-6.8413	-2.3882	0.0074	-0.0006	0.0007
0.3606	-6.8638	-2.3155	0.0074	0.0001	0.0009
1.0363	-6.8254	-2.2220	0.0073	0.0007	0.0011
1.7053	-6.7260	-2.1082	0.0072	0.0014	0.0013
2.3614	-6.5656	-1.9750	0.0070	0.0020	0.0015
2.9988	-6.3449	-1.8234	0.0067	0.0027	0.0017
3.6114	-6.0651	-1.6544	0.0064	0.0033	0.0019
4.1935	-5.7279	-1.4693	0.0060	0.0039	0.0020
4.7396	-5.3354	-1.2694	0.0055	0.0044	0.0022
5.2361	-4.8978	-1.0600	0.0051	0.0049	0.0023
5.6765	-4.4246	-0.8451	0.0045	0.0054	0.0024
6.0669	-3.9122	-0.6225	0.0040	0.0058	0.0025
6.4047	-3.3631	-0.3937	0.0034	0.0061	0.0025
6.6861	-2.7823	-0.1607	0.0027	0.0064	0.0025
6.9079	-2.1748	0.0745	0.0021	0.0067	0.0025
7.0677	-1.5462	0.3095	0.0014	0.0068	0.0025
7.1635	-0.9020	0.5422	0.0007	0.0070	0.0025
7.1940	-0.2481	0.7705	-0.0000	0.0070	0.0024
7.1583	0.4095	0.9922	-0.0007	0.0070	0.0023
7.0564	1.0647	1.2053	-0.0014	0.0069	0.0022
6.8887	1.7116	1.4076	-0.0021	0.0068	0.0021
6.6562	2.3441	1.5972	-0.0028	0.0066	0.0019
6.3607	2.9561	1.7724	-0.0034	0.0063	0.0018
6.0044	3.5419	1.9313	-0.0041	0.0060	0.0016

5.5898	4.0959	2.0723	-0.0046	0.0056	0.0014
5.1313	4.6016	2.1915	-0.0052	0.0052	0.0012
4.6423	5.0513	2.2879	-0.0056	0.0047	0.0010
4.1214	5.4518	2.3635	-0.0061	0.0042	0.0007
3.5659	5.8069	2.4194	-0.0064	0.0037	0.0005
2.9775	6.1149	2.4553	-0.0067	0.0032	0.0003
2.3611	6.3723	2.4704	-0.0070	0.0026	0.0001
1.7218	6.5761	2.4644	-0.0072	0.0019	-0.0002
1.0650	6.7238	2.4370	-0.0073	0.0013	-0.0004
0.3964	6.8135	2.3883	-0.0074	0.0007	-0.0007
-0.2781	6.8436	2.3184	-0.0074	0.0000	-0.0009
-0.9528	6.8134	2.2278	-0.0073	-0.0007	-0.0011
-1.6215	6.7222	2.1169	-0.0072	-0.0013	-0.0013
-2.2782	6.5703	1.9866	-0.0070	-0.0020	-0.0015
-2.9170	6.3583	1.8378	-0.0068	-0.0026	-0.0017
-3.5319	6.0874	1.6715	-0.0064	-0.0032	-0.0019
-4.1172	5.7590	1.4891	-0.0061	-0.0038	-0.0020
-4.6674	5.3754	1.2918	-0.0056	-0.0043	-0.0022
-5.1725	4.9430	1.0831	-0.0051	-0.0049	-0.0023
-5.6197	4.4762	0.8695	-0.0046	-0.0053	-0.0024
-6.0175	3.9696	0.6481	-0.0041	-0.0057	-0.0024
-6.3632	3.4257	0.4201	-0.0035	-0.0061	-0.0025
-6.6531	2.8494	0.1876	-0.0028	-0.0064	-0.0025
-6.8839	2.2456	-0.0473	-0.0022	-0.0066	-0.0025
-7.0530	1.6198	-0.2824	-0.0015	-0.0068	-0.0025
-7.1584	0.9776	-0.5156	-0.0008	-0.0069	-0.0025
-7.1986	0.3248	-0.7447	-0.0001	-0.0070	-0.0024
-7.1728	-0.3326	-0.9675	0.0006	-0.0070	-0.0023
-7.0806	-0.9887	-1.1820	0.0013	-0.0069	-0.0022
-6.9226	-1.6373	-1.3861	0.0020	-0.0068	-0.0021
-6.6996	-2.2723	-1.5777	0.0027	-0.0066	-0.0020
-6.4133	-2.8878	-1.7552	0.0033	-0.0064	-0.0018
-6.0656	-3.4780	-1.9166	0.0040	-0.0061	-0.0016
-5.6594	-4.0372	-2.0604	0.0046	-0.0057	-0.0014
-5.2048	-4.5524	-2.1834	0.0051	-0.0053	-0.0012
-4.7187	-5.0110	-2.2831	0.0056	-0.0048	-0.0010
-4.2022	-5.4185	-2.3617	0.0060	-0.0043	-0.0008
-3.6504	-5.7808	-2.4205	0.0063	-0.0038	-0.0005
-3.0648	-6.0962	-2.4593	0.0067	-0.0032	-0.0003
-2.4504	-6.3613	-2.4773	0.0069	-0.0026	-0.0001
-1.8124	-6.5729	-2.4741	0.0071	-0.0020	0.0002
-1.1561	-6.7285	-2.4494	0.0073	-0.0014	0.0004
-0.4872	-6.8259	-2.4034	0.0073	-0.0007	0.0006
0.1884	-6.8638	-2.3360	0.0074	-0.0001	0.0008
0.8649	-6.8410	-2.2477	0.0073	0.0006	0.0011
1.5361	-6.7571	-2.1390	0.0072	0.0012	0.0013
2.1961	-6.6121	-2.0107	0.0070	0.0019	0.0015
2.8388	-6.4067	-1.8637	0.0068	0.0025	0.0017
3.4583	-6.1418	-1.6990	0.0065	0.0031	0.0018
4.0487	-5.8190	-1.5178	0.0061	0.0037	0.0020
4.6045	-5.4403	-1.3216	0.0057	0.0043	0.0021
5.1167	-5.0111	-1.1132	0.0052	0.0048	0.0023
5.5688	-4.5492	-0.9007	0.0047	0.0053	0.0024
5.9720	-4.0468	-0.6801	0.0041	0.0057	0.0024
6.3236	-3.5066	-0.4526	0.0035	0.0060	0.0025
6.6197	-2.9334	-0.2205	0.0029	0.0064	0.0025
6.8570	-2.3323	0.0143	0.0022	0.0066	0.0025

7.0329	-1.7085	0.2495	0.0016	0.0068	0.0025
7.1452	-1.0678	0.4831	0.0009	0.0069	0.0025
7.1925	-0.4158	0.7127	0.0002	0.0070	0.0024
7.1797	0.0330	0.8654	-0.0003	0.0070	0.0024

Earth Orbit

30-Jan-2017 18:47:35

The initial position is [6837.43, 1868.8, 1455.48] (km).

Magnitude = 7236.11 km

The initial velocity is [-2.29408, 6.75885, 2.04947] (km/s).

Magnitude = 7.42598 km/s

Initial time = 0 h.

Final time = 3.33333 h.

The minimum altitude is 852.503 km at time = 0.280533 h.

The speed at that point is 7.43159 km/s.

The maximum altitude is 875.06 km at time = 1.12901 h.

The speed at that point is 7.40848 km/s

