

# Orbital Mechanics (2025-26)

## Assignment 1: Interplanetary Explorer Mission



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Group ID	Departure	Flyby	Arrival	Earliest Departure	Latest Arrival
2501	Earth	Jupiter	Asteroid N.433873	00:00:00 01/01/2030	00:00:00 01/01/2060
2502	Earth	Mars	Asteroid N.572188	00:00:00 01/01/2030	00:00:00 01/01/2060
2503	Earth	Jupiter	Asteroid N.347449	00:00:00 01/01/2030	00:00:00 01/01/2060
2504	Mercury	Mars	Asteroid N.358598	00:00:00 01/01/2030	00:00:00 01/01/2060
2505	Earth	Mars	Asteroid N.621133	00:00:00 01/01/2030	00:00:00 01/01/2060
2506	Venus	Earth	Asteroid N.76148	00:00:00 01/01/2030	00:00:00 01/01/2060
2507	Mercury	Earth	Asteroid N.290999	00:00:00 01/01/2030	00:00:00 01/01/2060
2508	Mars	Earth	Asteroid N.363024	00:00:00 01/01/2030	00:00:00 01/01/2060
2509	Mars	Earth	Asteroid N.152756	00:00:00 01/01/2030	00:00:00 01/01/2060
2510	Earth	Mars	Asteroid N.247560	00:00:00 01/01/2030	00:00:00 01/01/2060
2511	Mars	Earth	Asteroid N.497626	00:00:00 01/01/2030	00:00:00 01/01/2060
2512	Mars	Earth	Asteroid N.381181	00:00:00 01/01/2030	00:00:00 01/01/2060
2513	Mercury	Earth	Asteroid N.426437	00:00:00 01/01/2030	00:00:00 01/01/2060
2514	Jupiter	Mars	Asteroid N.152941	00:00:00 01/01/2030	00:00:00 01/01/2060
2515	Earth	Mars	Asteroid N.490183	00:00:00 01/01/2030	00:00:00 01/01/2060
2516	Venus	Earth	Asteroid N.93364	00:00:00 01/01/2030	00:00:00 01/01/2060
2517	Earth	Jupiter	Asteroid N.540205	00:00:00 01/01/2030	00:00:00 01/01/2060
2518	Jupiter	Mars	Asteroid N.170903	00:00:00 01/01/2030	00:00:00 01/01/2060
2519	Mars	Earth	Asteroid N.470864	00:00:00 01/01/2030	00:00:00 01/01/2060
2520	Mercury	Mars	Asteroid N.590166	00:00:00 01/01/2030	00:00:00 01/01/2060
2521	Earth	Mars	Asteroid N.614176	00:00:00 01/01/2030	00:00:00 01/01/2060
2522	Earth	Jupiter	Asteroid N.308607	00:00:00 01/01/2030	00:00:00 01/01/2060
2523	Earth	Jupiter	Asteroid N.523649	00:00:00 01/01/2030	00:00:00 01/01/2060
2524	Mercury	Mars	Asteroid N.194348	00:00:00 01/01/2030	00:00:00 01/01/2060
2525	Venus	Earth	Asteroid N.85774	00:00:00 01/01/2030	00:00:00 01/01/2060
2526	Venus	Earth	Asteroid N.464885	00:00:00 01/01/2030	00:00:00 01/01/2060
2527	Venus	Earth	Asteroid N.607829	00:00:00 01/01/2030	00:00:00 01/01/2060
2528	Mercury	Mars	Asteroid N.280946	00:00:00 01/01/2030	00:00:00 01/01/2060
2529	Venus	Mars	Asteroid N.561182	00:00:00 01/01/2030	00:00:00 01/01/2060
2530	Venus	Earth	Asteroid N.307564	00:00:00 01/01/2030	00:00:00 01/01/2060
2531	Earth	Mars	Asteroid N.136789	00:00:00 01/01/2030	00:00:00 01/01/2060
2532	Venus	Earth	Asteroid N.19664	00:00:00 01/01/2030	00:00:00 01/01/2060
2533	Earth	Mars	Asteroid N.56103	00:00:00 01/01/2030	00:00:00 01/01/2060
2534	Earth	Mars	Asteroid N.298724	00:00:00 01/01/2030	00:00:00 01/01/2060
2535	Jupiter	Mars	Asteroid N.303262	00:00:00 01/01/2030	00:00:00 01/01/2060
2536	Venus	Earth	Asteroid N.620105	00:00:00 01/01/2030	00:00:00 01/01/2060
2537	Venus	Earth	Asteroid N.144579	00:00:00 01/01/2030	00:00:00 01/01/2060
2538	Earth	Jupiter	Asteroid N.613717	00:00:00 01/01/2030	00:00:00 01/01/2060
2539	Earth	Mars	Asteroid N.257323	00:00:00 01/01/2030	00:00:00 01/01/2060
2540	Venus	Earth	Asteroid N.29884	00:00:00 01/01/2030	00:00:00 01/01/2060
2541	Venus	Earth	Asteroid N.147080	00:00:00 01/01/2030	00:00:00 01/01/2060
2542	Jupiter	Mars	Asteroid N.448628	00:00:00 01/01/2030	00:00:00 01/01/2060
2543	Jupiter	Mars	Asteroid N.526670	00:00:00 01/01/2030	00:00:00 01/01/2060
2544	Venus	Mars	Asteroid N.30692	00:00:00 01/01/2030	00:00:00 01/01/2060
2545	Mercury	Earth	Asteroid N.551938	00:00:00 01/01/2030	00:00:00 01/01/2060
2546	Mercury	Earth	Asteroid N.293118	00:00:00 01/01/2030	00:00:00 01/01/2060
2547	Mercury	Mars	Asteroid N.305412	00:00:00 01/01/2030	00:00:00 01/01/2060
2548	Venus	Earth	Asteroid N.458062	00:00:00 01/01/2030	00:00:00 01/01/2060
2549	Venus	Earth	Asteroid N.434051	00:00:00 01/01/2030	00:00:00 01/01/2060
2550	Venus	Mars	Asteroid N.579584	00:00:00 01/01/2030	00:00:00 01/01/2060
2551	Mercury	Mars	Asteroid N.14898	00:00:00 01/01/2030	00:00:00 01/01/2060
2552	Mercury	Mars	Asteroid N.129211	00:00:00 01/01/2030	00:00:00 01/01/2060
2553	Venus	Mars	Asteroid N.184430	00:00:00 01/01/2030	00:00:00 01/01/2060
2554	Earth	Mars	Asteroid N.123626	00:00:00 01/01/2030	00:00:00 01/01/2060
2555	Mercury	Earth	Asteroid N.426645	00:00:00 01/01/2030	00:00:00 01/01/2060
2556	Mars	Earth	Asteroid N.89136	00:00:00 01/01/2030	00:00:00 01/01/2060
2557	Venus	Earth	Asteroid N.401664	00:00:00 01/01/2030	00:00:00 01/01/2060
2558	Mercury	Earth	Asteroid N.316801	00:00:00 01/01/2030	00:00:00 01/01/2060
2559	Venus	Mars	Asteroid N.277356	00:00:00 01/01/2030	00:00:00 01/01/2060
2560	Venus	Earth	Asteroid N.434786	00:00:00 01/01/2030	00:00:00 01/01/2060
2561	Venus	Mars	Asteroid N.226706	00:00:00 01/01/2030	00:00:00 01/01/2060
2562	Mercury	Earth	Asteroid N.324457	00:00:00 01/01/2030	00:00:00 01/01/2060
2563	Venus	Earth	Asteroid N.363267	00:00:00 01/01/2030	00:00:00 01/01/2060
2564	Earth	Jupiter	Asteroid N.37117	00:00:00 01/01/2030	00:00:00 01/01/2060
2565	Mars	Earth	Asteroid N.194268	00:00:00 01/01/2030	00:00:00 01/01/2060
2566	Mercury	Earth	Asteroid N.160426	00:00:00 01/01/2030	00:00:00 01/01/2060
2567	Earth	Mars	Asteroid N.348220	00:00:00 01/01/2030	00:00:00 01/01/2060
2568	Earth	Mars	Asteroid N.188510	00:00:00 01/01/2030	00:00:00 01/01/2060
2569	Venus	Mars	Asteroid N.433984	00:00:00 01/01/2030	00:00:00 01/01/2060
2570	Earth	Jupiter	Asteroid N.606357	00:00:00 01/01/2030	00:00:00 01/01/2060
2571	Venus	Mars	Asteroid N.350486	00:00:00 01/01/2030	00:00:00 01/01/2060

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# Assignment 2: Planetary Explorer Mission

Group ID	Central planet	a [ $10^4$ km]	e [-]	i [deg]	$\omega$ [deg]	$\Omega$ [deg]	Repeating GT ratio k:m		Perturbations		Parameters		Initial date [yyyy-mm-dd hh:mm:ss]
							k	m					
2501	Earth	0.70162	0.0387	71	66	37	2	1	J2	Drag	cD = 2.1	A/M = 0.012 m <sup>2</sup> /kg	2037-9-27-20-6-23
2502	Earth	2.3483	0.22	9	52	42	1	5	J2	Moon			2036-5-16-6-38-30
2503	Earth	2.7132	0.5052	62	136	77	1	5	J2	Moon			2042-2-4-18-18-37
2504	Mercury	3.145	0.0677	59	130	95	34	1	J2	Sun 3B			2058-3-8-19-29-46
2505	Earth	2.1467	0.4503	19	45	160	1	5	J2	Moon			2034-2-4-4-11-13
2506	Venus	24.558	0.2043	127	131	140	42	1	J2	SRP	cR = 1	A/M = 1.1509 m <sup>2</sup> /kg	2041-7-10-15-47-45
2507	Earth	2.0859	0.5385	68	156	63	1	5	J2	Moon			2051-5-28-10-37-10
2508	Mars	21.2643	0.3023	66	76	77	1	13	J2	SRP	cR = 1	A/M = 4.3499 m <sup>2</sup> /kg	2046-10-17-8-18-28
2509	Earth	0.70388	0.0454	66	133	19	1	9	J2	Drag	cD = 2.1	A/M = 0.01521 m <sup>2</sup> /kg	2039-4-19-22-55-28
2510	Earth	2.7195	0.463	63	27	171	1	4	J2	Moon			2036-2-23-5-10-40
2511	Mars	23.7945	0.3311	37	32	45	1	14	J2	Sun 3B			2031-10-21-4-31-20
2512	Earth	2.1975	0.5004	67	41	11	1	6	J2	Moon			2050-11-5-21-47-35
2513	Earth	2.8504	0.3538	76	91	114	1	9	J2	Moon			2051-8-12-10-48-20
2514	Mars	28.3364	0.2379	34	25	4	1	21	J2	Sun 3B			2032-11-18-9-59-14
2515	Earth	0.68861	0.0034	20	67	15	1	8	J2	Drag	cD = 2.1	A/M = 0.0185 m <sup>2</sup> /kg	2052-5-24-17-34-11
2516	Venus	26.9676	0.7408	104	150	30	143	1	J2	SRP	cR = 1	A/M = 4.556 m <sup>2</sup> /kg	2057-4-4-6-21-18
2517	Earth	0.67831	0.0125	7	144	178	4	1	J2	Drag	cD = 2.1	A/M = 0.01076 m <sup>2</sup> /kg	2046-4-8-11-14-48
2518	Mars	21.4769	0.5936	16	7	19	1	8	J2	SRP	cR = 1	A/M = 2.3068 m <sup>2</sup> /kg	2031-9-22-13-52-54
2519	Earth	2.4979	0.5162	59	43	53	1	5	J2	Moon			2041-6-28-22-40-59
2520	Mercury	4.2601	0.3089	69	7	68	42	1	J2	SRP	cR = 1	A/M = 6.534 m <sup>2</sup> /kg	2042-8-21-14-33-35
2521	Mars	23.7929	0.1677	69	168	19	1	23	J2	Sun 3B			2037-4-19-12-37-15
2522	Earth	0.68886	0.0092	30	37	91	1	14	J2	Drag	cD = 2.1	A/M = 0.00366 m <sup>2</sup> /kg	2045-3-25-3-4-34
2523	Earth	0.69707	0.0197	12	70	166	1	14	J2	Drag	cD = 2.1	A/M = 0.0179 m <sup>2</sup> /kg	2033-5-2-12-26-60
2524	Mercury	5.6214	0.426	67	150	58	50	1	J2	Sun 3B			2049-5-26-4-43-39
2525	Earth	0.70329	0.0375	29	150	133	1	14	J2	Drag	cD = 2.1	A/M = 0.01946 m <sup>2</sup> /kg	2046-5-18-9-45-25
2526	Earth	0.70273	0.0339	31	81	43	1	9	J2	Drag	cD = 2.1	A/M = 0.00105 m <sup>2</sup> /kg	2041-8-9-6-42-38
2527	Venus	36.3691	0.2989	129	169	1	40	1	J2	SRP	cR = 1	A/M = 6.7727 m <sup>2</sup> /kg	2041-2-7-10-20-15
2528	Mercury	4.7533	0.0746	73	3	15	29	1	J2	Sun 3B			2031-12-6-16-35-41
2529	Venus	19.2635	0.3754	142	149	52	78	1	J2	SRP	cR = 1	A/M = 2.8743 m <sup>2</sup> /kg	2037-11-22-19-34-48
2530	Earth	1.9408	0.4011	4	35	129	1	6	J2	Moon			2040-9-22-13-41-54
2531	Earth	2.9267	0.4058	75	77	84	1	4	J2	Moon			2047-2-26-19-18-33
2532	Earth	2.5106	0.2669	70	120	24	5	1	J2	Moon			2052-7-18-8-9-29
2533	Mars	31.2967	0.0644	49	131	103	1	48	J2	SRP	cR = 1	A/M = 6.6624 m <sup>2</sup> /kg	2039-11-27-7-47-54
2534	Earth	2.3817	0.3418	78	168	120	1	1	J2	Moon			2049-7-11-22-49-51
2535	Mars	27.4238	0.4013	88	155	69	1	14	J2	SRP	cR = 1	A/M = 6.8307 m <sup>2</sup> /kg	2032-5-19-22-48-30
2536	Venus	24.3428	0.2944	143	144	18	51	1	J2	Sun 3B			2048-12-6-19-40-16
2537	Earth	0.71026	0.0528	35	89	125	1	11	J2	Drag	cD = 2.1	A/M = 0.01655 m <sup>2</sup> /kg	2050-8-4-10-17-43
2538	Earth	2.1734	0.2262	39	78	21	1	9	J2	Moon			2047-5-13-17-52-44
2539	Earth	0.69427	0.0277	85	130	72	1	12	J2	Drag	cD = 2.1	A/M = 0.01318 m <sup>2</sup> /kg	2037-5-11-13-34-24
2540	Venus	28.0889	0.7151	136	16	162	73	1	J2	SRP	cR = 1	A/M = 4.003 m <sup>2</sup> /kg	2041-6-16-16-44-46
2541	Venus	18.1712	0.2083	133	60	143	34	1	J2	Sun 3B			2053-3-18-7-27-51
2542	Mars	26.0562	0.163	73	95	36	1	24	J2	Sun 3B			2057-11-6-7-53-36
2543	Mars	20.6209	0.5519	62	76	150	1	10	J2	SRP	cR = 1	A/M = 4.3723 m <sup>2</sup> /kg	2059-8-20-17-21-32
2544	Mars	13.4791	0.1669	75	2	155	1	10	J2	Sun 3B			2044-5-22-17-26-42
2545	Mercury	3.1058	0.4668	45	105	137	118	1	J2	Sun 3B			2045-3-16-4-40-36
2546	Mercury	5.2172	0.3272	47	99	122	32	1	J2	SRP	cR = 1	A/M = 6.0382 m <sup>2</sup> /kg	2046-3-26-14-27-57
2547	Mercury	5.4402	0.0154	35	64	25	12	1	J2	SRP	cR = 1	A/M = 3.4218 m <sup>2</sup> /kg	2047-11-12-3-27-19
2548	Earth	0.68513	0.0057	6	70	0	1	1	J2	Drag	cD = 2.1	A/M = 0.01572 m <sup>2</sup> /kg	2043-4-9-10-8-30
2549	Earth	3.0205	0.3206	19	86	67	1	4	J2	Moon			2036-3-8-5-9-36
2550	Venus	30.9504	0.4424	146	177	100	57	1	J2	Sun 3B			2037-9-11-22-57-39
2551	Mercury	4.711	0.5644	32	33	0	82	1	J2	Sun 3B			2043-11-2-13-43-12
2552	Mercury	5.8728	0.2907	67	116	22	29	1	J2	Sun 3B			2049-7-13-7-30-46
2553	Venus	34.1475	0.0142	149	94	46	30	1	J2	SRP	cR = 1	A/M = 5.4766 m <sup>2</sup> /kg	2045-8-25-5-24-60
2554	Earth	0.6833	0.0123	35	67	23	1	4	J2	Drag	cD = 2.1	A/M = 0.00312 m <sup>2</sup> /kg	2048-12-6-5-21-56
2555													