

	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	25°	26°	27°	28°	29°	30°	31°	32°	33°	34°	35°	36°	37°	38°	39°	40°	41°	42°	43°	44°				
0'	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2'	.000	.002	.008	.017	.030	.048	.068	.093	.122	.154	.190	.230	.273	.320	.371	.426	.484	.546	.612	.681	.754	.830	.910	.994	.081	.171	.265	.362	.463	.567	.675	.785	.899	.017	.137	.261	.387	.517	.650	.786	.924	.066	.211	.358	.508	.660			
4'	.000	.002	.008	.018	.031	.049	.070	.095	.124	.156	.192	.232	.276	.324	.375	.430	.488	.550	.616	.686	.759	.835	.916	.999	.087	.177	.271	.369	.470	.574	.682	.793	.907	.025	.145	.269	.396	.526	.659	.795	.934	.076	.220	.368	.518	.671			
6'	.000	.002	.008	.018	.032	.049	.071	.096	.125	.157	.194	.234	.278	.325	.377	.432	.490	.553	.619	.688	.761	.838	.918	.002	.090	.180	.275	.372	.473	.578	.686	.797	.911	.029	.149	.273	.400	.530	.663	.799	.938	.080	.225	.373	.523	.674			
8'	.000	.002	.009	.019	.033	.050	.072	.097	.126	.158	.195	.235	.279	.327	.378	.433	.492	.555	.621	.691	.764	.841	.921	.005	.093	.183	.278	.376	.477	.581	.689	.800	.915	.032	.153	.277	.404	.535	.668	.804	.943	.085	.230	.378	.528	.679			
10'	.000	.003	.009	.019	.033	.051	.072	.098	.127	.160	.196	.237	.281	.329	.380	.435	.494	.557	.623	.693	.766	.843	.924	.008	.096	.187	.281	.379	.480	.585	.693	.804	.919	.036	.157	.281	.409	.539	.672	.809	.948	.090	.235	.383	.534	.684			
12'	.000	.003	.009	.019	.034	.051	.073	.099	.128	.161	.198	.238	.282	.330	.382	.437	.496	.559	.625	.695	.769	.846	.927	.011	.098	.190	.284	.382	.484	.588	.697	.808	.923	.040	.161	.286	.413	.543	.677	.813	.953	.095	.240	.388	.539	.689			
14'	.000	.003	.009	.020	.034	.052	.074	.099	.129	.162	.199	.239	.284	.332	.384	.439	.498	.561	.628	.698	.771	.849	.929	.014	.101	.193	.287	.386	.487	.592	.700	.812	.926	.044	.166	.290	.417	.548	.681	.818	.957	.100	.245	.393	.544	.694			
16'	.000	.003	.010	.020	.035	.053	.075	.100	.130	.163	.200	.241	.285	.334	.386	.441	.500	.563	.630	.700	.774	.851	.932	.017	.104	.196	.291	.389	.491	.596	.704	.815	.930	.048	.170	.294	.422	.552	.686	.822	.962	.104	.250	.398	.549	.700			
18'	.000	.003	.010	.021	.035	.053	.075	.101	.131	.164	.201	.242	.287	.335	.387	.443	.502	.565	.632	.702	.776	.854	.935	.019	.107	.199	.294	.392	.494	.599	.708	.819	.934	.052	.174	.298	.426	.557	.690	.827	.967	.109	.255	.403	.554	.705			
20'	.000	.003	.010	.021	.036	.054	.076	.102	.132	.165	.203	.244	.288	.337	.389	.445	.504	.568	.634	.705	.779	.857	.938	.022	.110	.202	.297	.396	.497	.603	.711	.823	.938	.056	.178	.302	.430	.561	.695	.832	.971	.114	.260	.408	.559	.710			
22'	.000	.004	.011	.022	.036	.055	.077	.103	.133	.167	.204	.245	.290	.339	.391	.447	.507	.570	.637	.707	.781	.859	.940	.025	.113	.205	.300	.399	.501	.606	.715	.827	.942	.060	.182	.307	.435	.565	.699	.836	.976	.119	.264	.413	.564	.715			
24'	.000	.004	.011	.022	.037	.055	.078	.104	.134	.168	.205	.247	.292	.340	.393	.449	.509	.572	.639	.710	.784	.862	.943	.028	.116	.208	.304	.402	.504	.610	.719	.831	.946	.064	.186	.311	.439	.570	.704	.841	.981	.124	.269	.418	.569	.720			
26'	.000	.004	.011	.022	.037	.056	.079	.105	.135	.169	.207	.248	.293	.342	.395	.451	.511	.574	.641	.712	.787	.864	.946	.031	.119	.211	.307	.406	.508	.613	.722	.834	.950	.068	.190	.315	.443	.574	.708	.845	.985	.128	.274	.423	.574	.725			
28'	.000	.004	.012	.023	.038	.057	.080	.106	.136	.170	.208	.249	.295	.344	.396	.453	.513	.576	.644	.715	.789	.867	.949	.034	.122	.215	.310	.409	.511	.617	.726	.838	.954	.072	.194	.319	.447	.579	.713	.850	.990	.133	.279	.428	.579	.730			
30'	.000	.004	.012	.023	.039	.058	.080	.107	.137	.171	.209	.251	.296	.345	.398	.455	.515	.579	.646	.717	.792	.870	.952	.037	.125	.218	.313	.412	.515	.621	.730	.842	.958	.076	.198	.324	.452	.583	.717	.855	.995	.138	.284	.433	.584	.735			
32'	.001	.004	.012	.024	.039	.058	.081	.108	.138	.173	.211	.252	.298	.347	.400	.457	.517	.581	.648	.719	.794	.872	.954	.040	.129	.221	.317	.416	.518	.624	.733	.846	.962	.080	.203	.328	.456	.588	.722	.859	.1000	.143	.289	.438	.589	.740			
34'	.001	.005	.013	.024	.040	.059	.082	.109	.139	.174	.212	.254	.299	.349	.402	.459	.519	.583	.651	.722	.797	.875	.957	.043	.132	.224	.320	.419	.522	.628	.737	.850	.965	.084	.207	.332	.460	.592	.726	.864	.004	.148	.294	.443	.595	.746			
36'	.001	.005	.013	.025	.040	.060	.083	.110	.141	.175	.213	.255	.301	.350	.404	.460	.520	.583	.653	.724	.797	.876	.960	.045	.135	.227	.323	.422	.523	.625	.731	.843	.959	.088	.211	.336	.465	.596	.731	.869	.009	.153	.299	.448	.600	.751			
38'	.001	.005	.013	.025	.041	.060	.084	.111	.142	.176	.215	.257	.303	.352	.405	.462	.523	.587	.655	.727	.802	.880	.963	.048	.138	.230	.326	.426	.529	.635	.744	.857	.973	.093	.215	.340	.469	.601	.736	.873	.014	.157	.304	.453	.605	.754			
40'	.001	.005	.014	.026	.041	.061	.085	.112	.143	.177	.216	.258	.304	.354	.407	.464	.525	.590	.658	.729	.804	.883	.965	.051	.141	.233	.330	.429	.532	.639	.748	.861	.977	.097	.219	.345	.473	.605	.740	.878	.019	.162	.309	.458	.608	.759			
42'	.001	.006	.014	.026	.042	.062	.085	.113	.144	.179	.217	.260	.306	.356	.409	.466	.527	.592	.660	.732	.807	.886	.968	.054	.144	.237	.333	.433	.536	.642	.752	.865	.981	.101	.223	.349	.478	.610	.745	.883	.023	.167	.314	.463	.615	.766			
44'	.001	.006	.014	.027	.043	.063	.086	.114	.145	.180	.219	.261	.307	.357	.411	.468	.529	.594	.662	.734	.810	.889	.971	.057	.147	.240	.336	.436	.539	.646	.756	.869	.985	.105	.227	.353	.482	.614	.749	.887	.028	.172	.319	.468	.620	.771			
46'	.001	.006	.015	.027	.043	.063	.087	.115	.146	.181	.220	.263	.309	.359	.413	.470	.531	.596	.665	.737	.812	.891	.974	.060	.150	.243	.339	.439	.543	.649	.759	.873	.989	.109	.231	.357	.487	.619	.754	.892	.033	.177	.323	.473	.625	.774			
48'	.001	.006	.015	.027	.044	.064	.088	.116	.147	.182	.221	.264	.311	.361	.415	.472	.534	.598	.667	.739	.815	.894	.977	.063	.153	.246	.343	.443	.546	.653	.763	.876	.993	.113	.236	.362	.491	.623	.758	.896	.038	.182	.328	.478	.630	.782			
50'	.001	.006	.015	.028	.044	.065	.089	.117	.148	.184	.223	.266	.312	.363	.417	.474	.536	.601	.669	.741	.817	.897	.980	.066	.156	.249	.346	.446	.550	.657	.767	.880	.997	.117	.240	.366	.495	.628	.763	.901	.042	.186	.333	.483	.635	.787			
52'	.001	.007	.016	.028	.045	.065	.090	.118	.149	.185	.224	.267	.314	.364	.418	.476	.538	.603	.672	.744	.820	.898	.982	.069	.159	.252	.349	.450	.553	.660	.770	.884	.001	.112	.244	.370	.500	.632	.767	.906	.047	.191	.338	.488	.641	.792			
54'	.002	.007	.016	.029	.046	.066	.091	.119	.151	.186	.226	.269	.315	.366	.420	.478	.540	.605	.674	.746	.822	.902	.985	.072	.162	.256	.353	.453	.557	.664	.774	.888	.005	.125	.248	.374	.504	.636	.772	.910	.052	.196	.343	.493	.646	.799			
56'	.002	.007	.016	.029	.046	.067	.091	.119	.152	.187	.227	.270	.317	.368	.422	.480	.542	.607	.676	.749	.825	.905	.988	.075	.165	.259	.356	.456	.560	.667	.778	.892	.009	.129	.252	.379	.508	.641	.777	.915	.057	.201	.348	.498	.651	.804			
58'	.002	.007	.017	.030	.047	.068	.092	.121	.153	.189	.228	.272	.319	.370	.424	.482	.544	.610	.679	.751	.828	.907	.991	.078	.168	.262	.359	.460	.564	.671	.782	.896	.013	.133	.256	.383	.513	.645	.781	.920	.061	.206	.353	.503	.656	.810			
60'	.002	.008	.017	.030	.048	.068	.093	.122	.154	.190	.230	.273	.320	.371	.426	.484	.546	.612	.681	.754	.830	.910	.994	.081	.171	.265	.362	.463	.567	.675	.785	.899	.017	.137	.261	.387	.517	.650	.786	.924	.066	.211	.358	.508	.660	.811			
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	90°	91°	92°	93°	94°	95°	96°	97°	98°	99°	100°	101°	102°	103°	104°	105°	106°	107°	108°	109°	110°	111°	112°	113°	114°	115°	116°	117°	118°	119°	120°	121°	122°	123°	124°	125°	126°	127°	128°	129°	130°	131°	132°	133°	134°		
0'	12	12	12	12	13	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	16	17	17	17	17	17	18	18	18	18	18	18	19	19	19	19	20	20	20	20	20	21	21	21	21		
1'	500	718	936	154	372	589	807	1023	1240	1455	1671	1885	2099	2312	2524	2735	2945	3155	3363	3570	3775	3980	4183	4384	4584	4783	4980	5175	5368	5560	5750	5938	6124	6308	6490	6670	6847	7023	7196	7367	7535	7701	7864	8025	183	60'	
2'	507	725	944	161	379	597	814	1031	1247	1463	1678	1892	2106	2319	2531	2742	2951	3159	3366	3572	3777	3980	4181	4380	4578	4775	4970	5163	5354	5544	5732	5919	6104	6287	6468	6647	6823	7000	7175	7348	7519	7688	7854	8018	188	58'	
4'	515	733	951	169	386	604	821	1038	1254	1470	1685	1899	2113	2326	2538	2749	2959	3167	3374	3580	3785	3989	4191	4391	4589	4785	4980	5173	5364	5554	5742	5929	6114	6297	6478	6657	6834	7009	7182	7353	7521	7687	7851	8013	194	56'	
6'	522	740	958	176	394	611	828	1045	1261	1477	1692	1907	2121	2334	2546	2756	2964	3171	3377	3582	3786	3989	4190	4389	4586	4781	4974	5165	5354	5542	5729	6114	6295	6474	6651	6826	7000	7172	7342	7510	7676	7841	8004	8165	8324	199	54'
8'	529	747	965	183	401	618	836	1052	1268	1484	1700	1915	2129	2342	2554	2763	2971	3178	3384	3589	3793	3995	4195	4393	4589	4784	4977	5168	5357	5544	5730	6114	6294	6472	6648	6822	7000	7171	7340	7508	7674	7839	8002	8162	8320	204	52'
10'	536	755	973	191	408	626	843	1059	1275	1491	1707	1922	2135	2347	2558	2766	2973	3179	3384	3588	3791	3992	4191	4388	4583	4776	4967	5156	5343	5529	5713	6100	6279	6456	6631	6804	7000	7169	7337	7504	7670	7835	8000	8162	8321	209	50'
12'	544	762	980	198	415	633	850	1067	1283	1500	1716	1931	2144	2355	2566	2773	2979	3184	3388	3591	3792	3991	4188	4383	4576	4767	4956	5143	5329	5514	5700	6089	6267	6444	6619	6792	6964	7135	7304	7472	7639	7804	7968	8131	214	48'	
14'	551	769	987	205	423	640	857	1074	1290	1507	1723	1938	2151	2362	2573	2779	2984	3188	3391	3593	3793	3990	4185	4378	4569	4758	4945	5130	5314	5497	5680	6070	6247	6423	6597	6769	6939	7108	7275	7441	7606	7770	7932	8093	8253	219	46'
16'	558	776	994	212	430	647	864	1081	1297	1514	1730	1945	2158	2369	2580	2785	2989	3192	3394	3595	3794	3989	4182	4373	4562	4749	4934	5117	5299	5480	5660	6052	6229	6404	6577	6748	6917	7084	7249	7413	7576	7737	7897	8056	8214	224	44'
18'	565	784	1002	220	437	655	872	1088	1304	1521	1737	1952	2165	2376	2587	2791	2993	3194	3394	3593	3791	3986	4178	4367	4554	4739	4922	5103	5282	5460	5637	6030	6207	6382	6555	6726	6895	7062	7227	7391	7553	7714	7874	8032	8189	229	42'
20'	573	791	1009	227	444	662	879	1096	1312	1529	1745	1960	2173	2384	2595	2800	2999	3197	3394	3590	3785	3978	4168	4356	4542	4727	4910	5091	5270	5447	5623	6017	6194	6369	6542	6713	6882	7049	7214	7377	7539	7700	7860	8018	8175	234	40'
22'	580	798	1016	234	452	669	886	1103	1319	1536	1752	1967	2180	2391	2602	2807	2999	3194	3389	3583	3775	3964	4151	4336	4519	4700	4879	5056	5231	5405	5578	5973	6150	6325	6498	6669	6838	7005	7170	7333	7494	7654	7812	7969	8125	239	38'
24'	587	805	1023	241	459	676	893	1110	1326	1543	1759	1974	2187	2398	2609	2814	2999	3191	3384	3576	3765	3951	4135	4317	4497	4675	4851	5025	5197	5368	5763	6140	6315	6488	6659	6828	6995	7160	7323	7484	7644	7802	7959	8114	244	36'	
26'	595	813	1031	249	466	684	901	1117	1333	1550	1766	1981	2194	2405	2616	2821	2999	3188	3379	3568	3755	3939	4121	4301	4478	4653	4827	5000	5171	5340	5735	6112	6287	6460	6631	6800	6967	7132	7295	7456	7615	7772	7928	8083	249	34'	
28'	602	820	1038	256	473	691	908	1124	1340	1557	1773	1988	2201	2412	2623	2828	2999	3187	3376	3563	3748	3931	4111	4288	4463	4637	4809	4979	5148	5315	5710	6087	6262	6435	6606	6775	6942	7107	7270	7431	7591	7749	7905	8060	254	32'	
30'	609	827	1045	263	481	698	915	1132	1348	1565	1781	1996	2209	2420	2631	2836	2999	3185	3372	3558	3742	3923	4101	4276	4449	4621	4791	4959	5125	5290	5685	6062	6237	6410	6581	6750	6917	7082	7245	7406	7566	7724	7880	8035	259	30'	
32'	616	834	1053	270	488	705	922	1139	1355	1572	1788	2003	2216	2427	2638	2843	2999	3183	3368	3552	3735	3915	4091	4264	4435	4604	4771	4936	5100	5263	5658	6035	6210	6383	6554	6723	6890	7055	7218	7379	7539	7697	7853	8008	264	28'	
34'	624	842	1060	278	495	713	929	1146	1362	1579	1795	2010	2223	2434	2645	2850	2999	3181	3364	3546	3727	3904	4077	4248	4417	4584	4749	4912	5073	5233	5628	6005	6180	6353	6524	6693	6860	7025	7188	7349	7508	7665	7820	7973	8125	269	26'
36'	631	849	1067	285	502	720	937	1153	1369	1586	1802	2017	2230	2441	2652	2857	2999	3179	3360	3540	3719	3894	4065	4234	4401	4566	4729	4890	5050	5208	5603	5980	6155	6328	6499	6668	6835	7000	7163	7324	7484	7642	7798	7952	8104	274	24'
38'	638	856	1074	292	510	727	944	1160	1376	1593	1809	2024	2237	2448	2659	2864	2999	3177	3356	3534	3711	3885	4055	4222	4387	4550	4711	4870	5028	5184	5579	5956	6131	6304	6475	6644	6811	6976	7140	7301	7460	7617	7772	7926	8078	279	22'
40'	645	864	1082	299	517	734	951	1168	1384	1601	1817	2032	2245	2456	2667	2872	2999	3175	3352	3528	3703	3875	4044	4210	4374	4536	4696	4854	5010	5200	5595	5972	6147	6320	6491	6660	6827	6992	7155	7316	7475	7632	7787	7940	8091	284	20'
42'	653	871	1089	307	524	741	958	1175	1391	1608	1824	2039	2252	2463	2674	2879	2999	3173	3348	3522	3695	3865	4032	4197	4360	4521	4680	4837	4992	5182	5577	5954	6129	6302	6473	6642	6809	6974	7137	7298	7457	7614	7769	7922	8073	289	18'
44'	660	878	1096	314	531	749	966	1182	1400	1617	1833	2048	2261	2472	2683	2888	2999	3171	3344	3516	3687	3855	4020	4183	4344	4503	4660	4815	4968	5157	5552	5929	6104	6277	6448	6617	6784	6949	7112	7273	7432	7589	7744	7897	8048	294	16'
46'	667	885	1103	321	539	756	973	1189	1407	1624	1840	2055	2268	2479	2690	2895	2999	3169	3340	3510	3679	3845	4008	4169	4328	4485	4640	4793	4944	5133	5528	5905	6080	6253	6424	6593	6760	6925	7088	7249	7408	7565	7720	7873	8024	299	14'
48'	675	893	1111	328	546	763	980	1196	1412	1629	1845	2060	2273	2484	2695	2900	2999	3167	3336	3504	3671	3836	4000	4161	4319	4475	4630	4783	4934	5123	5518	5895	6070	6243	6414	6583	6750	6915	7078	7239	7398	7555	7710	7863	8014	304	12'
50'	682	900	1118	336	553	770	987	1204	1420	1637	1853	2068	2281	2492	2703	2908	2999	3165	3332	3500	3666	3829	3990	4149	4305	4459	4611	4761	4909	5098	5493	5870	6045	6218	6389	6558	6725	6890	7053	7214	7373	7530	7685	7838	7989	309	10'
52'	689	907	1125	343	560	778	994	1211	1427	1644	1860	2075	2288	2499	2710	2915	2999	3163	3328	3494	3658	3819	3978	4135	4290	4443	4594	4743	4890	5079	5474	5851	6026	6199	6370	6539	6706	6871	7034	7195	7354	7511	7666	7819	7970	314	8'
54'	696	914	1132	350	568	785	1002	1218	1434	1651	1867	2082	2295	2506	2717	2922	2999	31																													