

**APPARENT PLACES OF STARS, 2024**  
 NORTHERN CIRCUMPOLAR STARS AT UPPER TRANSIT AT GREENWICH  
 EQUINOX BASED RIGHT ASCENSION – WHOLE NUTATION

**FK6 Star No. 907 = Hipparcos Star No. 11767 =  $\alpha$  Ursae Minoris (Polaris)**

Day	January		February		March		April		May		June	
	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.
	03 <sup>h</sup> 02 <sup>m</sup>	+ 89°22'	03 <sup>h</sup> 01 <sup>m</sup>	+ 89°22'	03 <sup>h</sup> 00 <sup>m</sup>	+ 89°22'	03 <sup>h</sup> 00 <sup>m</sup>	+ 89°21'	03 <sup>h</sup> 00 <sup>m</sup>	+ 89°21'	03 <sup>h</sup> 01 <sup>m</sup>	+ 89°21'
1	85.138	10.581	92.017	15.425	97.321	14.462	54.780	68.257	41.965	59.653	01.336	51.028
2	83.496	10.807	90.197	15.441	95.817	14.311	53.955	68.041	41.836	59.392	02.389	50.740
3	81.895	11.014	88.481	15.460	94.374	14.175	53.015	67.831	41.671	59.109	03.646	50.449
4	80.367	11.205	86.842	15.490	92.939	14.057	51.952	67.615	41.557	58.798	05.097	50.168
5	78.933	11.389	85.229	15.536	91.448	13.956	50.801	67.378	41.584	58.462	06.684	49.909
6	77.600	11.571	83.574	15.602	89.842	13.866	49.641	67.111	41.820	58.109	08.327	49.680
7	76.350	11.762	81.805	15.684	88.086	13.776	48.574	66.810	42.282	57.756	09.942	49.479
8	75.141	11.970	79.865	15.771	86.190	13.669	47.695	66.482	42.933	57.418	11.470	49.299
9	73.904	12.199	77.742	15.847	84.220	13.531	47.048	66.142	43.691	57.105	12.882	49.131
10	72.562	12.447	75.483	15.895	82.281	13.354	46.617	65.807	44.467	56.820	14.182	48.965
11	71.045	12.707	73.186	15.904	80.482	13.142	46.331	65.490	45.187	56.557	15.399	48.791
12	69.322	12.964	70.960	15.874	78.891	12.908	46.100	65.197	45.807	56.309	16.575	48.607
13	67.417	13.200	68.887	15.815	77.512	12.668	45.844	64.925	46.321	56.065	17.754	48.407
14	65.406	13.404	66.995	15.741	76.294	12.437	45.511	64.668	46.744	55.816	18.983	48.194
15	63.389	13.570	65.262	15.667	75.159	12.224	45.080	64.417	47.112	55.557	20.299	47.970
16	61.453	13.704	63.631	15.603	74.029	12.029	44.554	64.164	47.467	55.282	21.733	47.740
17	59.651	13.816	62.033	15.554	72.846	11.849	43.957	63.901	47.854	54.992	23.302	47.510
18	57.993	13.919	60.405	15.520	71.573	11.677	43.325	63.624	48.315	54.687	25.009	47.289
19	56.450	14.026	58.699	15.496	70.200	11.505	42.699	63.328	48.886	54.371	26.836	47.083
20	54.968	14.144	56.886	15.476	68.737	11.326	42.123	63.014	49.594	54.049	28.748	46.900
21	53.484	14.277	54.960	15.452	67.208	11.132	41.639	62.684	50.452	53.728	30.689	46.744
22	51.938	14.424	52.932	15.417	65.649	10.920	41.281	62.342	51.454	53.417	32.593	46.616
23	50.285	14.580	50.831	15.365	64.104	10.687	41.070	61.993	52.572	53.123	34.400	46.511
24	48.500	14.739	48.696	15.291	62.617	10.432	41.011	61.646	53.761	52.852	36.072	46.417
25	46.580	14.892	46.571	15.193	61.228	10.160	41.091	61.308	54.961	52.607	37.611	46.321
26	44.544	15.031	44.501	15.073	59.966	09.874	41.275	60.987	56.111	52.385	39.057	46.211
27	42.422	15.151	42.521	14.933	58.849	09.581	41.513	60.687	57.161	52.180	40.486	46.079
28	40.259	15.248	40.660	14.780	57.875	09.289	41.748	60.409	58.090	51.979	41.983	45.924
29	38.099	15.321	38.928	14.621	57.023	09.006	41.925	60.149	58.911	51.772	43.620	45.751
30	35.984	15.372	37.321	14.462	56.259	08.738	42.002	59.901	59.674	51.548	45.439	45.573
31	33.949	15.405			55.530	08.488	41.965	59.653	60.454	51.300	47.438	45.401
32	32.017	15.425			54.780	08.257			61.336	51.028		
	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )
	91.02	91.01	91.09	91.09	90.95	90.94	90.63	90.63	90.28	90.28	89.99	89.98

Mean R.A. 03<sup>h</sup>03<sup>m</sup>40<sup>s</sup>.462

Double lower transit May 7

Mean Dec. +89°21'56".421

**Apparent Places of Northern Circumpolar Stars**

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**APPARENT PLACES OF STARS, 2024**  
 NORTHERN CIRCUMPOLAR STARS AT UPPER TRANSIT AT GREENWICH  
 EQUINOX BASED RIGHT ASCENSION – WHOLE NUTATION

**FK6 Star No. 907 = Hipparcos Star No. 11767 =  $\alpha$  Ursae Minoris (Polaris)**

Day	July		August		September		October		November		December	
	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.
	03 <sup>h</sup> 01 <sup>m</sup>	+ 89°21'	03 <sup>h</sup> 02 <sup>m</sup>	+ 89°21'	03 <sup>h</sup> 03 <sup>m</sup>	+ 89°21'	03 <sup>h</sup> 04 <sup>m</sup>	+ 89°21'	03 <sup>h</sup> 05 <sup>m</sup>	+ 89°22'	03 <sup>h</sup> 05 <sup>m</sup>	+ 89°22'
1	47.438	45.401	51.468	44.130	56.841	47.819	50.142	55.252	24.919	05.616	30.929	16.903
2	49.577	45.250	53.754	44.210	58.591	48.029	51.424	55.528	25.716	05.941	30.765	17.276
3	51.787	45.126	55.908	44.301	60.302	48.224	52.764	55.795	26.564	06.278	30.479	17.664
4	53.992	45.032	57.937	44.393	62.020	48.407	54.184	56.057	27.425	06.633	30.033	18.061
5	56.126	44.962	59.866	44.480	63.787	48.577	55.687	56.322	28.253	07.009	29.413	18.456
6	58.145	44.911	61.739	44.555	65.630	48.741	57.265	56.598	28.897 28.897	07.495 07.495	28.635	18.839
7	60.040	44.866	63.601	44.617	67.566	48.905	58.890	56.890	30.065	08.238	27.746	19.200
8	61.826	44.820	65.497	44.666	69.595	49.076	60.525	57.202	30.349	08.658	26.816	19.532
9	63.539	44.764	67.465	44.706	71.703	49.260	62.122	57.538	30.485	09.066	25.927	19.836
10	65.225	44.696	69.528	44.742	73.861	49.463	63.630	57.897	30.526	09.452	25.149	20.119
11	66.931	44.615	71.698	44.781	76.027	49.691	65.006	58.272	30.554	09.810	24.522	20.392
12	68.698	44.521	73.973	44.830	78.151	49.945	66.218	58.657	30.658	10.142	24.036	20.670
13	70.559	44.421	76.334	44.896	80.177	50.223	67.263	59.040	30.908	10.457	23.632	20.968
14	72.536	44.318	78.746	44.985	82.057	50.519	68.175	59.407	31.326	10.773	23.218	21.290
15	74.637	44.222	81.160	45.102	83.767	50.820	69.029	59.748	31.870	11.104	22.701	21.636
16	76.853	44.139	83.516	45.247	85.321	51.113	69.923	60.062	32.450	11.462	22.012	21.998
17	79.159	44.076	85.754	45.415	86.779	51.384	70.951	60.353	32.963	11.850	21.125	22.361
18	81.509	44.040	87.833	45.596	88.243	51.627	72.158	60.638	33.323	12.259	20.056	22.715
19	83.845	44.032	89.746	45.776	89.814	51.845	73.524	60.935	33.492	12.678	18.847	23.051
20	86.099	44.052	91.539	45.939	91.560	52.050	74.971	61.257	33.468	13.096	17.554	23.363
21	88.218	44.090	93.300	46.077	93.481	52.261	76.394	61.610	33.283	13.503	16.229	23.651
22	90.179	44.134	95.132	46.188	95.520	52.492	77.707	61.989	32.983	13.893	14.919	23.917
23	92.007	44.169	97.115	46.282	97.591	52.752	78.855	62.385	32.619	14.262	13.660	24.166
24	93.769	44.182	99.275	46.373	99.606	53.041	79.823	62.789	32.239	14.611	12.472	24.403
25	95.558	44.170	101.587	46.478	101.501	53.353	80.625	63.189	31.883	14.943	11.363	24.636
26	97.461	44.138	103.985	46.607	103.243	53.680	81.295	63.578	31.582	15.262	10.325	24.872
27	99.530	44.095	106.392	46.765	104.827	54.012	81.877	63.953	31.351	15.576	09.335	25.116
28	101.773	44.056	108.737	46.950	106.271	54.340	82.418	64.310	31.193	15.890	08.352	25.375
29	104.154	44.034	110.967	47.157	107.610	54.658	82.961	64.650	31.094	16.212	07.327	25.651
30	106.611	44.038	113.058	47.376	108.885	54.963	83.545	64.978	31.021	16.549	06.205	25.942
31	109.071	44.071	115.009	47.600	110.142	55.252	84.193	65.298	30.929	16.903	04.937	26.242
32	111.468	44.130	116.841	47.819			84.919	65.616			03.498	26.542
	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )
	89.84	89.84	89.89	89.88	90.12	90.11	90.47	90.47	90.93	90.92	91.35	91.34

Mean R.A. 03<sup>h</sup>03<sup>m</sup>40<sup>s</sup>.462

Double lower transit May 7

Mean Dec. +89°21'56"421

**APPARENT PLACES OF STARS, 2024**  
 NORTHERN CIRCUMPOLAR STARS AT UPPER TRANSIT AT GREENWICH  
 EQUINOX BASED RIGHT ASCENSION – WHOLE NUTATION

**FK6 Star No. 1644 = Hipparcos Star No. 72573 = Grb 2196 UMi**

Day	January		February		March		April		May		June	
	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.
	14 <sup>h</sup> 48 <sup>m</sup>	+ 82°24'	14 <sup>h</sup> 48 <sup>m</sup>	+ 82°24'	14 <sup>h</sup> 49 <sup>m</sup>	+ 82°24'	14 <sup>h</sup> 49 <sup>m</sup>	+ 82°24'	14 <sup>h</sup> 49 <sup>m</sup>	+ 82°24'	14 <sup>h</sup> 49 <sup>m</sup>	+ 82°24'
1	50.737	21.123	55.653	16.156	00.446	17.187	04.101	23.609	05.259	32.466	03.714	41.585
2	50.888	20.885	55.815	16.142	00.578	17.348	04.177	23.840	05.272	32.729	03.616	41.882
3	51.036	20.667	55.971	16.127	00.708	17.497	04.259	24.060	05.286	33.010	03.504	42.173
4	51.179	20.466	56.123	16.105	00.837	17.630	04.350	24.281	<sup>05.295</sup> <sub>05.294</sub>	<sup>33.317</sup> <sub>33.652</sub>	03.383	42.446
5	51.315	20.276	56.274	16.068	00.972	17.744	04.445	24.517	05.277	34.007	03.258	42.692
6	51.446	20.090	56.429	16.013	01.114	17.845	04.540	24.780	05.244	34.369	03.136	42.909
7	51.572	19.899	56.592	15.940	01.265	17.941	04.627	25.076	05.198	34.722	03.020	43.100
8	51.697	19.695	56.767	15.858	01.426	18.047	04.701	25.402	05.144	35.054	02.912	43.276
9	51.825	19.471	56.954	15.780	01.590	18.179	04.758	25.748	05.089	35.358	02.812	43.446
10	51.962	19.227	57.149	15.723	01.752	18.347	04.798	26.095	05.038	35.636	02.716	43.620
11	52.111	18.968	57.346	15.701	01.902	18.553	04.829	26.429	04.995	35.897	02.622	43.804
12	52.274	18.706	57.537	15.720	02.037	18.787	04.855	26.741	04.958	36.149	02.527	44.002
13	52.449	18.458	57.716	15.773	02.156	19.034	04.884	27.029	04.927	36.403	02.427	44.213
14	52.631	18.239	57.882	15.847	02.264	19.277	04.918	27.300	04.899	36.665	02.320	44.437
15	52.812	18.056	58.035	15.926	02.365	19.505	04.959	27.561	04.871	36.941	02.204	44.669
16	52.986	17.909	58.182	16.000	02.467	19.715	05.005	27.821	04.838	37.232	02.078	44.902
17	53.150	17.788	58.327	16.060	02.572	19.908	05.056	28.088	04.800	37.539	01.943	45.131
18	53.304	17.682	58.474	16.104	02.684	20.090	05.108	28.369	04.752	37.858	01.800	45.346
19	53.450	17.577	58.627	16.137	02.803	20.270	05.158	28.666	04.695	38.186	01.653	45.541
20	53.592	17.463	58.788	16.163	02.927	20.454	05.203	28.982	04.627	38.514	01.505	45.710
21	53.735	17.336	58.956	16.190	03.054	20.650	05.241	29.315	04.550	38.837	01.359	45.850
22	53.883	17.193	59.131	16.226	03.182	20.863	05.269	29.662	04.465	39.145	01.221	45.966
23	54.039	17.040	59.309	16.277	03.308	21.097	05.287	30.018	04.376	39.432	01.093	46.065
24	54.204	16.882	59.488	16.349	03.429	21.352	05.293	30.375	04.287	39.693	00.973	46.160
25	54.379	16.727	59.666	16.444	03.541	21.626	05.291	30.725	04.202	39.931	00.858	46.265
26	54.560	16.583	59.838	16.562	03.644	21.916	05.282	31.062	04.124	40.148	00.744	46.388
27	54.747	16.457	60.003	16.701	03.737	22.216	05.270	31.380	04.054	40.355	00.624	46.535
28	54.936	16.353	60.159	16.856	03.820	22.517	05.259	31.675	03.991	40.564	00.493	46.702
29	55.123	16.273	60.307	17.021	03.894	22.813	05.252	31.950	03.931	40.786	00.349	46.880
30	55.306	16.216	60.446	17.187	03.964	23.096	05.252	32.211	03.868	41.030	00.192	47.056
31	55.483	16.179			04.032	23.362	05.259	32.466	03.798	41.298	00.026	47.216
32	55.653	16.156			04.101	23.609			03.714	41.585		
	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )
	7.57	7.50	7.57	7.50	7.57	7.50	7.57	7.50	7.57	7.50	7.57	7.51

Mean R.A. 14<sup>h</sup>48<sup>m</sup>51<sup>s</sup>.202      Double lower transit      November 2      Mean Dec. +82°24'34".946

**APPARENT PLACES OF STARS, 2024**  
 NORTHERN CIRCUMPOLAR STARS AT UPPER TRANSIT AT GREENWICH  
 EQUINOX BASED RIGHT ASCENSION – WHOLE NUTATION

**FK6 Star No. 1644 = Hipparcos Star No. 72573 = Grb 2196 UMi**

Day	July		August		September		October		November		December	
	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.
	14 <sup>h</sup> 48 <sup>m</sup>	+ 82°24'	14 <sup>h</sup> 48 <sup>m</sup>	+ 82°24'	14 <sup>h</sup> 48 <sup>m</sup>	+ 82°24'	14 <sup>h</sup> 48 <sup>m</sup>	+ 82°24'	14 <sup>h</sup> 48 <sup>m</sup>	+ 82°24'	14 <sup>h</sup> 48 <sup>m</sup>	+ 82°24'
1	60.026	47.216	54.994	48.238	49.946	44.144	45.974	36.192	43.721	25.239	44.015	13.831
2	59.855	47.351	54.827	48.143	49.811	43.930	45.874	35.905	43.674	24.889	44.058	13.453
3	59.685	47.456	54.669	48.043	49.676	43.730	45.769	35.624	43.627	24.523	44.111	13.058
4	59.520	47.534	54.516	47.947	49.536	43.542	45.659	35.343	43.585	24.138	44.176	12.653
5	59.364	47.591	54.367	47.859	49.390	43.362	45.544	35.054	43.551	23.732	44.253	12.245
6	59.217	47.636	54.218	47.785	49.239	43.184	45.428	34.750	43.527	23.308	44.341	11.846
7	59.077	47.680	54.065	47.724	49.081	43.002	45.313	34.427	43.515	22.873	44.435	11.466
8	58.941	47.730	53.906	47.673	48.919	42.809	45.203	34.081	43.515	22.435	44.532	11.113
9	58.805	47.792	53.741	47.627	48.755	42.598	45.101	33.713	43.525	22.006	44.626	10.788
10	58.667	47.867	53.568	47.581	48.593	42.364	45.008	33.325	43.541	21.595	44.712	10.489
11	58.524	47.954	53.388	47.528	48.435	42.105	44.928	32.925	43.558	21.211	44.788	10.203
12	58.373	48.051	53.204	47.459	48.285	41.820	44.860	32.523	43.569	20.853	44.856	09.919
13	58.214	48.151	53.018	47.370	48.146	41.515	44.800	32.131	43.571	20.516	44.918	09.620
14	58.047	48.247	52.833	47.254	48.019	41.200	44.744	31.761	43.562	20.186	44.983	09.298
15	57.872	48.334	52.653	47.110	47.903	40.886	44.685	31.418	43.545	19.846	45.056	08.951
16	57.692	48.402	52.483	46.940	47.793	40.590	44.617	31.101	43.527	19.482	45.142	08.585
17	57.511	48.445	52.323	46.753	47.682	40.319	44.537	30.796	43.515	19.089	45.242	08.213
18	57.331	48.460	52.175	46.560	47.563	40.076	44.447	30.487	43.515	18.671	45.355	07.847
19	57.158	48.447	52.035	46.378	47.432	39.851	44.351	30.156	43.529	18.239	45.476	07.497
20	56.995	48.411	51.896	46.219	47.288	39.627	44.259	29.796	43.557	17.804	45.603	07.169
21	56.842	48.363	51.752	46.086	47.137	39.387	44.175	29.407	43.596	17.378	45.731	06.866
22	56.699	48.319	51.596	45.975	46.985	39.121	44.105	28.997	43.643	16.968	45.856	06.586
23	56.559	48.291	51.428	45.872	46.837	38.825	44.048	28.577	43.693	16.578	45.978	06.326
24	56.416	48.288	51.249	45.761	46.700	38.503	44.002	28.156	43.743	16.209	46.095	06.079
25	56.264	48.308	51.064	45.630	46.574	38.163	43.966	27.744	43.792	15.858	46.206	05.840
26	56.100	48.343	50.880	45.470	46.460	37.815	43.935	27.347	43.836	15.521	46.314	05.601
27	55.923	48.379	50.702	45.282	46.355	37.468	43.906	26.966	43.876	15.193	46.420	05.355
28	55.737	48.402	50.532	45.070	46.257	37.128	43.877	26.603	43.912	14.867	46.527	05.096
29	55.546	48.402	50.373	44.842	46.163	36.801	43.844	26.254	43.946	14.535	46.639	04.823
30	55.356	48.374	50.223	44.606	46.070	36.489	43.808	25.914	43.979	14.191	46.758	04.533
31	55.171	48.318	50.082	44.371	45.974	36.192	43.766	25.578	44.015	13.831	46.888	04.232
32	54.994	48.238	49.946	44.144			43.721	25.239			47.030	03.927
	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )	sec( $\delta$ )	tan( $\delta$ )
	7.57	7.51	7.57	7.51	7.57	7.51	7.57	7.50	7.57	7.50	7.56	7.50

Mean R.A. 14<sup>h</sup>48<sup>m</sup>51<sup>s</sup>202      Double lower transit      November 2      Mean Dec. +82°24'34"946