GLOBULAR CLUSTERS*

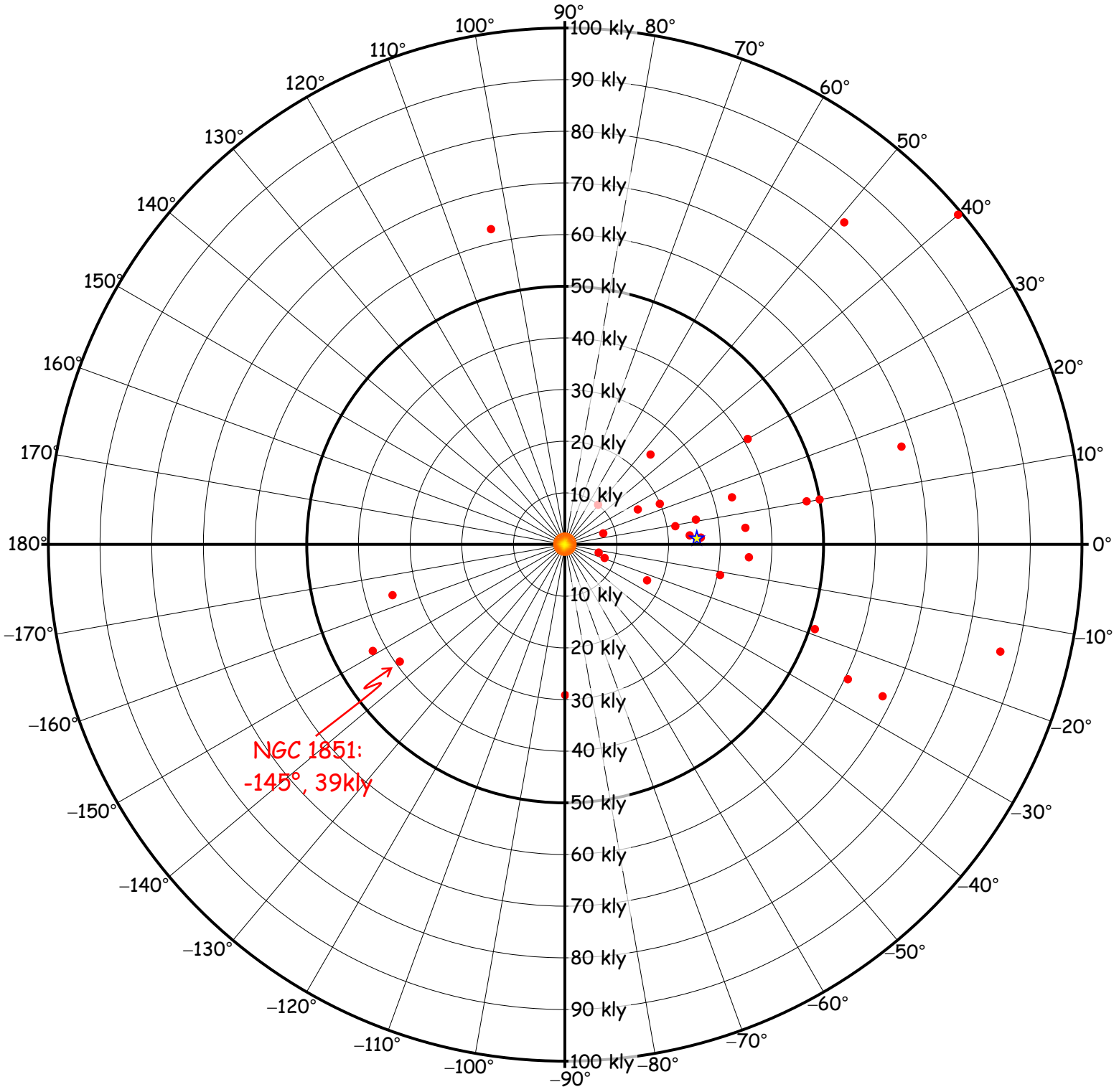
Globular clusters are some of the oldest structures in the galaxy. They are very large, gravitationally bound groups of stars that have the reddish tint of an aging stellar population. Each is on an orbit about the center of the galaxy independent of the motions of other clusters or the disk of stars. Their positions and orbits thus give us information about the center of our home galaxy, the Milky Way.

Plot the positions of some globular clusters relative to the Sun (the motion of the Earth through the seasons must be removed from all astronomical measurements of cosmic bodies, so we consider their positions to be relative to the Sun). Below is a selection of clusters, their galactic latitudes and distances. Plot these on the polar grid on the following page. Number 2, NGC 1851 is plotted for you.

Number	Name	Latitude degrees	Distance light years	
1	NGC 288	-90.6	29000	
2	NGC 1851	-145	39000	Plotted as an example.
3	NGC 1904	-150.6	42000	
4	NGC 2298	-164	35000	
5	NGC 4147	102.8	63000	
6	NGC 5634	49.3	82000	
7	NGC 5897	46	24000	
8	NGC 5904	4	24000	
9	NGC 6121	16	7000	
10	NGC 6144	16	33000	
11	NGC 6171	23	20000	
12	NGC 6218	26.3	16000	
13	NGC 6229	40.3	99000	
14	NGC 6284	10	47000	
15	NGC 6284	9.9	50000	
16	NGC 6316	6	35000	
17	NGC 6333	11	26000	
18	NGC 6356	10.2	50000	
19	NGC 6426	16.2	68000	
20	NGC 6453	-4	36000	
21	NGC 6535	10.4	22000	
22	NGC 6652	-11	31000	
23	NGC 6681	-13	6000	
24	NGC 6715	-14.1	87000	
25	NGC 6723	-17	8000	
26	NGC 6809	-23	17000	
27	NGC 6864	-26	61000	
28	NGC 6864	-25.8	68000	
29	NGC 6934	-18.9	51000	
30	NGC 7099	30	41000	

* Adapted from Desch & Terndrup (2012), *Starry Night Workbook with Starry Night College Software for Understanding Our Universe*, (W. W. Norton & Company, Inc.:New York).

Plot the globular cluster positions on the plot below, centered on the Sun. After finishing, mark the position you see as the center of the galaxy (the centroid of the globular cluster distribution) along the 0° line[31].



Distance to Galactic Center 26.7 kly². Compare to the current average value of 26 kly².

The average of the positions and distances above is marked by a star at 2.64° and 26.7 kly. This is very close to the current average. Cool!

Don't skip this!