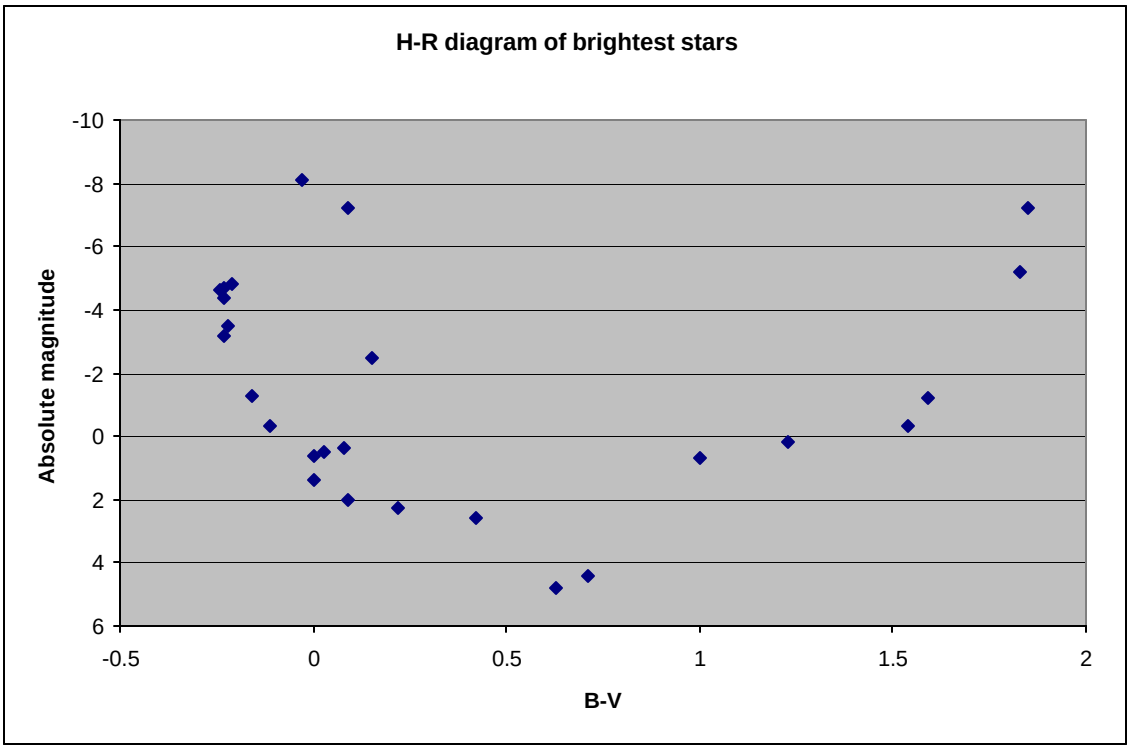
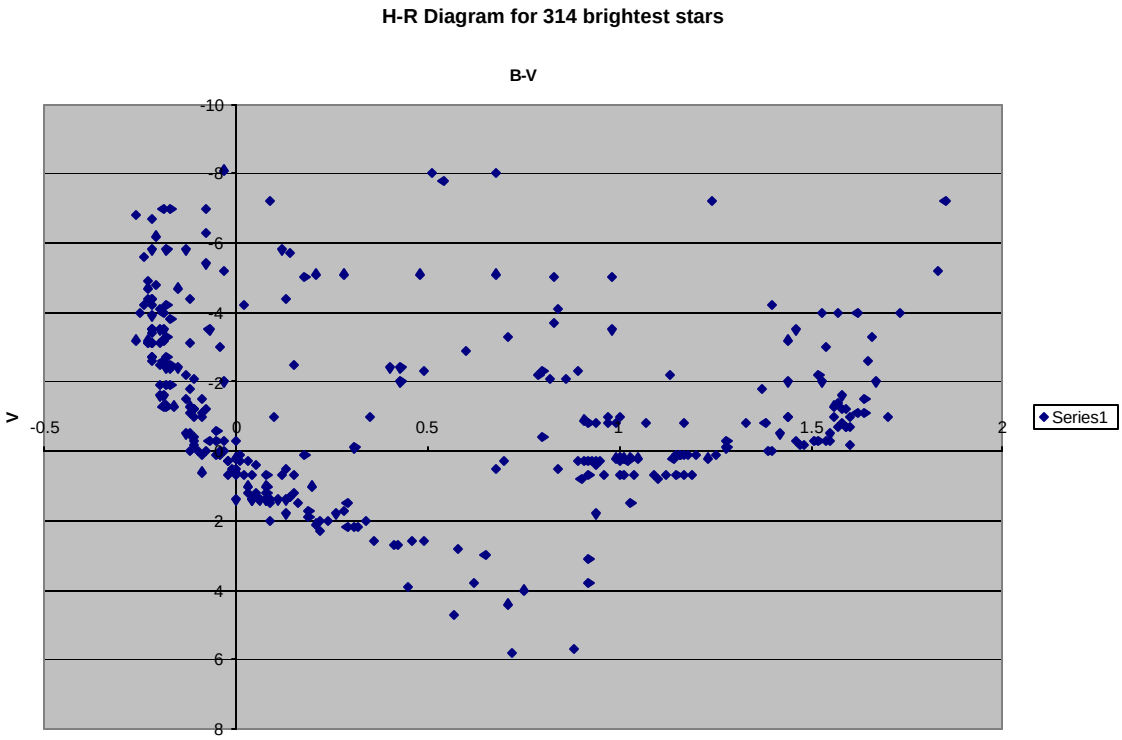
Exercise 1. Here is the diagram for the 26 brightest stars:



Here is the diagram for the 314 brightest stars:



Question 1. You can see some of the main sequence, and the stars in the upper right are all red giants. Don't worry if you don't get the groups exactly right. The object of this question is to get you thinking about patterns in the diagram.

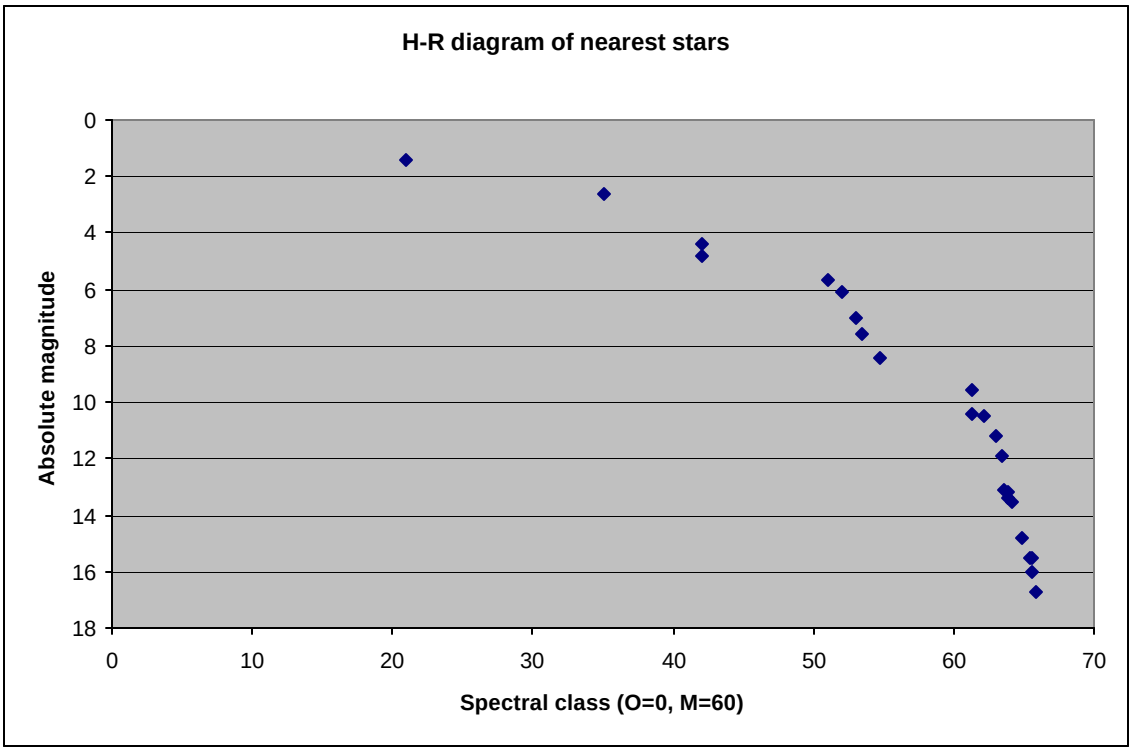
Question 2. The cool star is bright because it is has a large surface area. Because of its large surface area, it radiates a lot of light in spite of its low temperature.

Question 3. Our Sun is one of the dimmest stars on this chart. Only the red giants are cooler than our Sun, but they are also brighter.

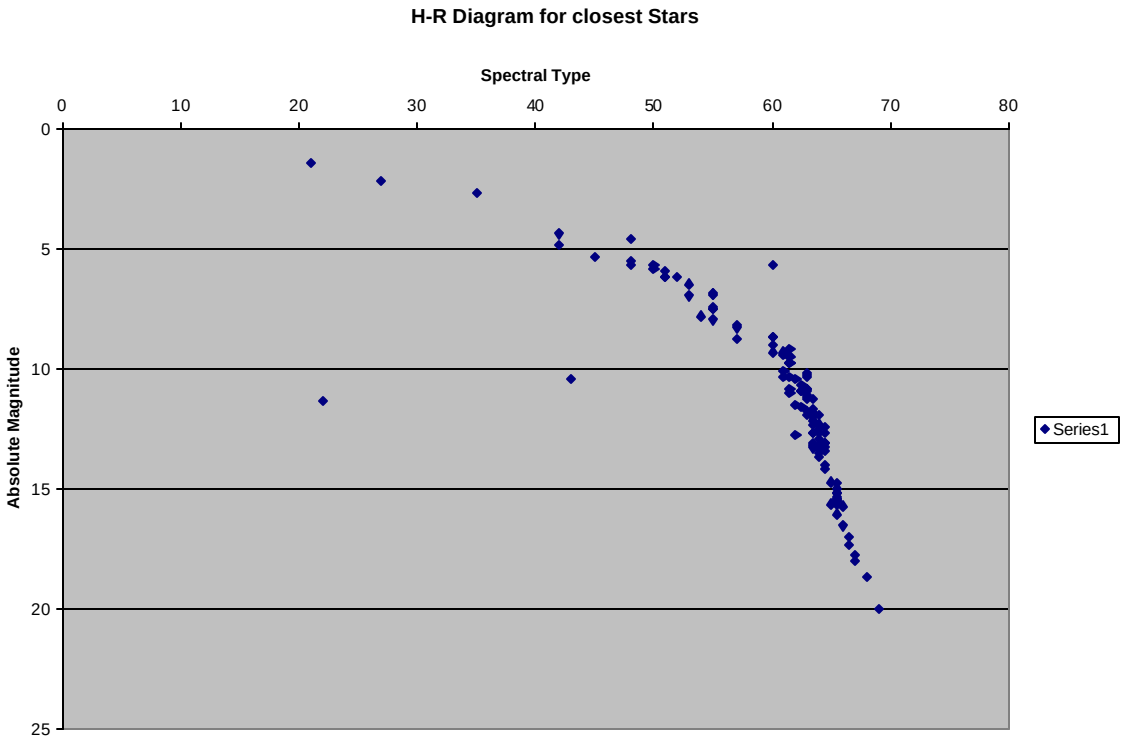
Question 4. This sample of stars is heavily biased toward more luminous stars. The more luminous stars are the brighter ones in the night sky and do not represent a good sample of the stars in our galaxy.

Question 5. The H-R diagram for the nearest stars will have a lot more faint stars than the H-R diagram for the brightest stars. It will have few red giants or blue giants and probably some dwarf stars.

Exercise 2. Here is the diagram for the 26 nearest stars:



Here is the diagram for the 100 nearest stars:



Question 6. The diagram for the nearest stars shows almost exclusively main sequence stars, which are less luminous than red giants. The H-R diagram for the 100 nearest stars also has two white dwarfs.

Question 7. Our Sun is actually one of the more luminous stars in our local neighborhood.

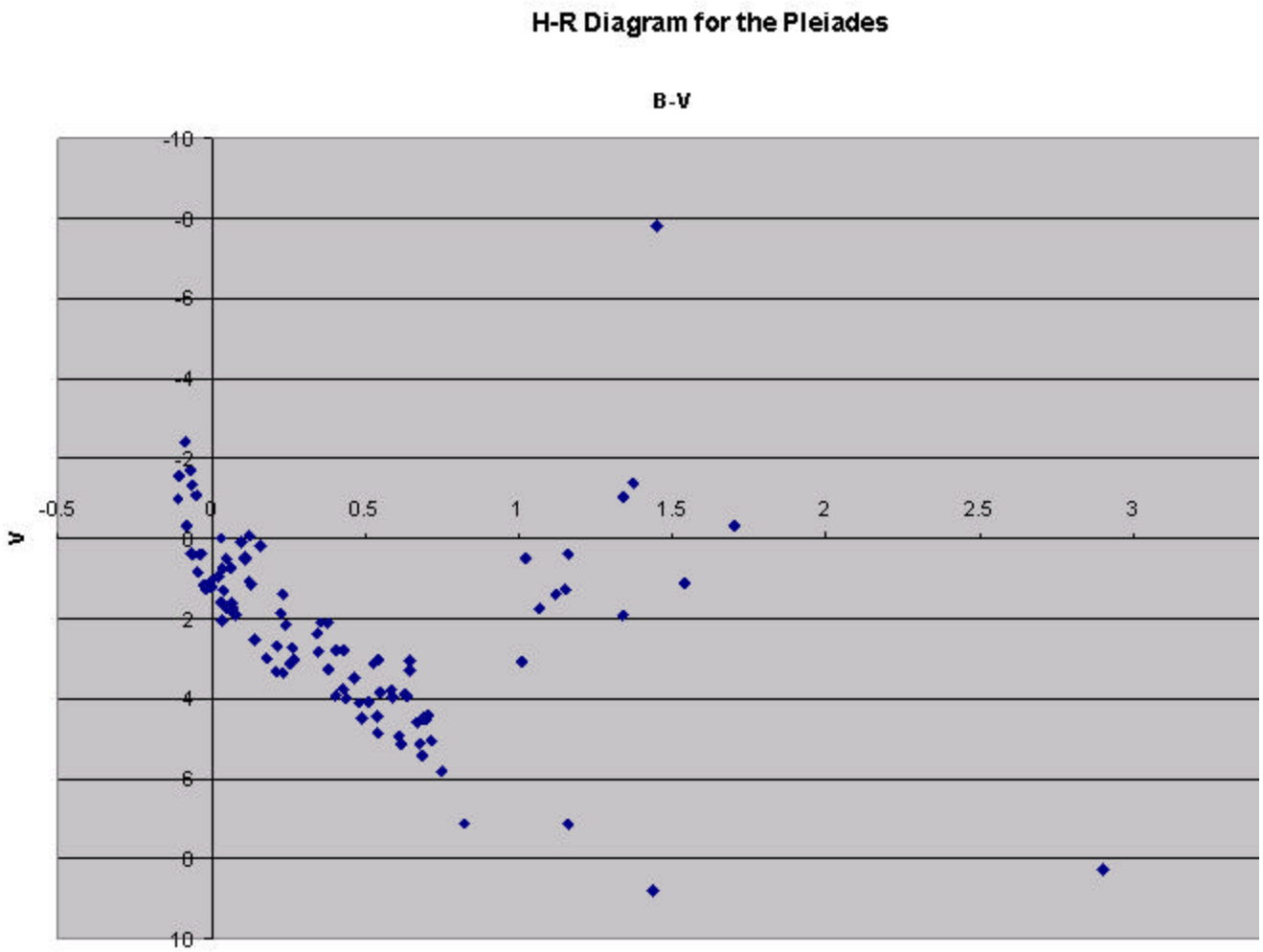
Exercise 3.

RA	Dec	Visual Magnitude (Field H5)	Parallax (milliarc sec)	Distance (parsecs)
06 42 05	-15 12 53.8	6.97	33.75	29.63
06 38 35.43	-16 52 24.6	6.01	7.08	141.24
06 41 33.99	-17 32 01.0	8.13	2.38	420.17
06 48 48.78	-16 12 41.2	7.58	3.60	277.78

Exercise 4.

R.A.	Dec	Visual Magnitude (Field H5)	distance	Absolute Magnitude
06 42 05	-15 12 32.8	6.97	29.63	4.61
06 38 35.43	-16 52 24.6	6.01	141.24	.260
06 41 33.99	-17 32 01.0	8.13	420.17	.0128
06 48 48.78	-16 12 41.2	7.58	277.78	.361

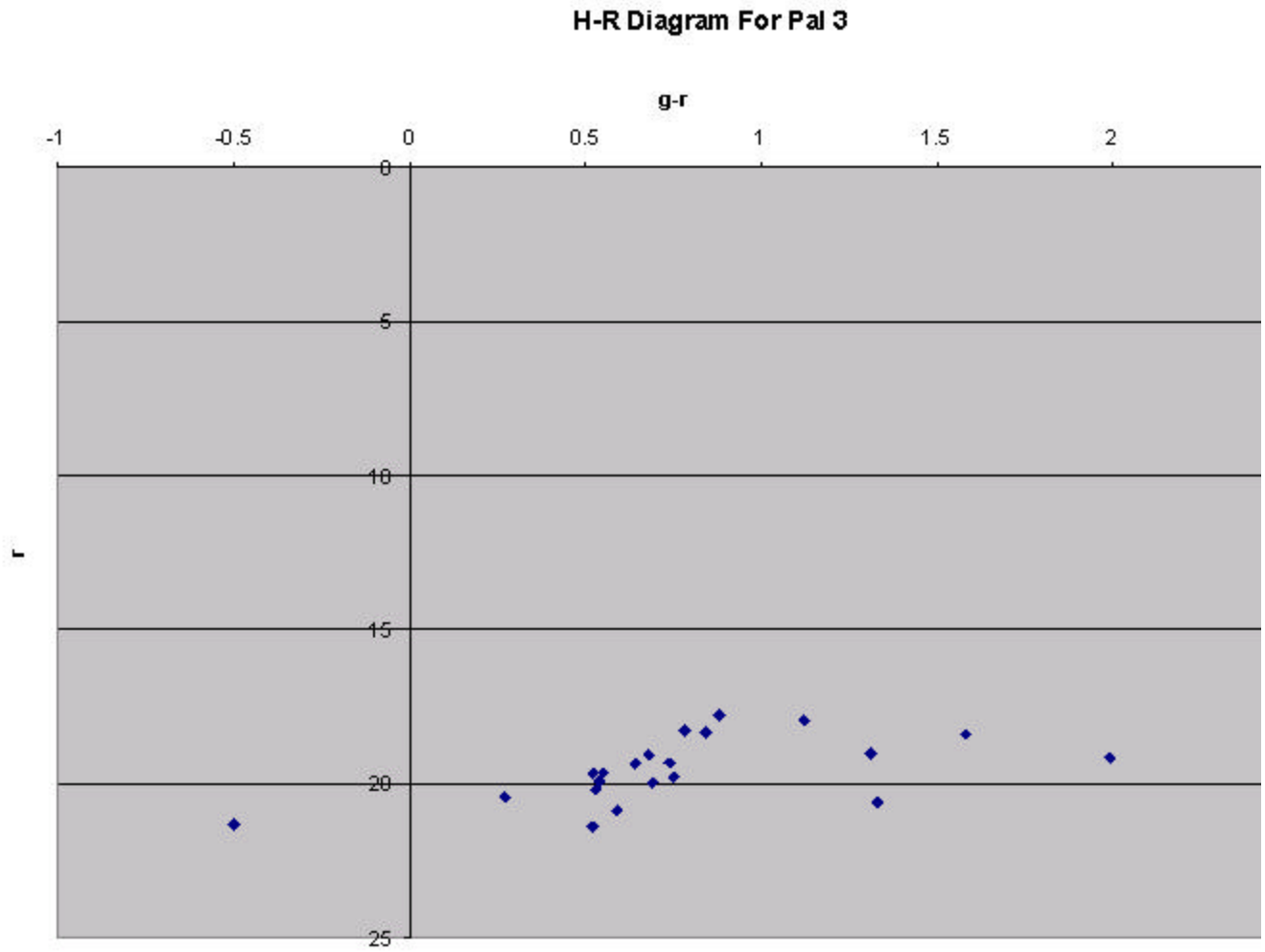
Exercise 5.

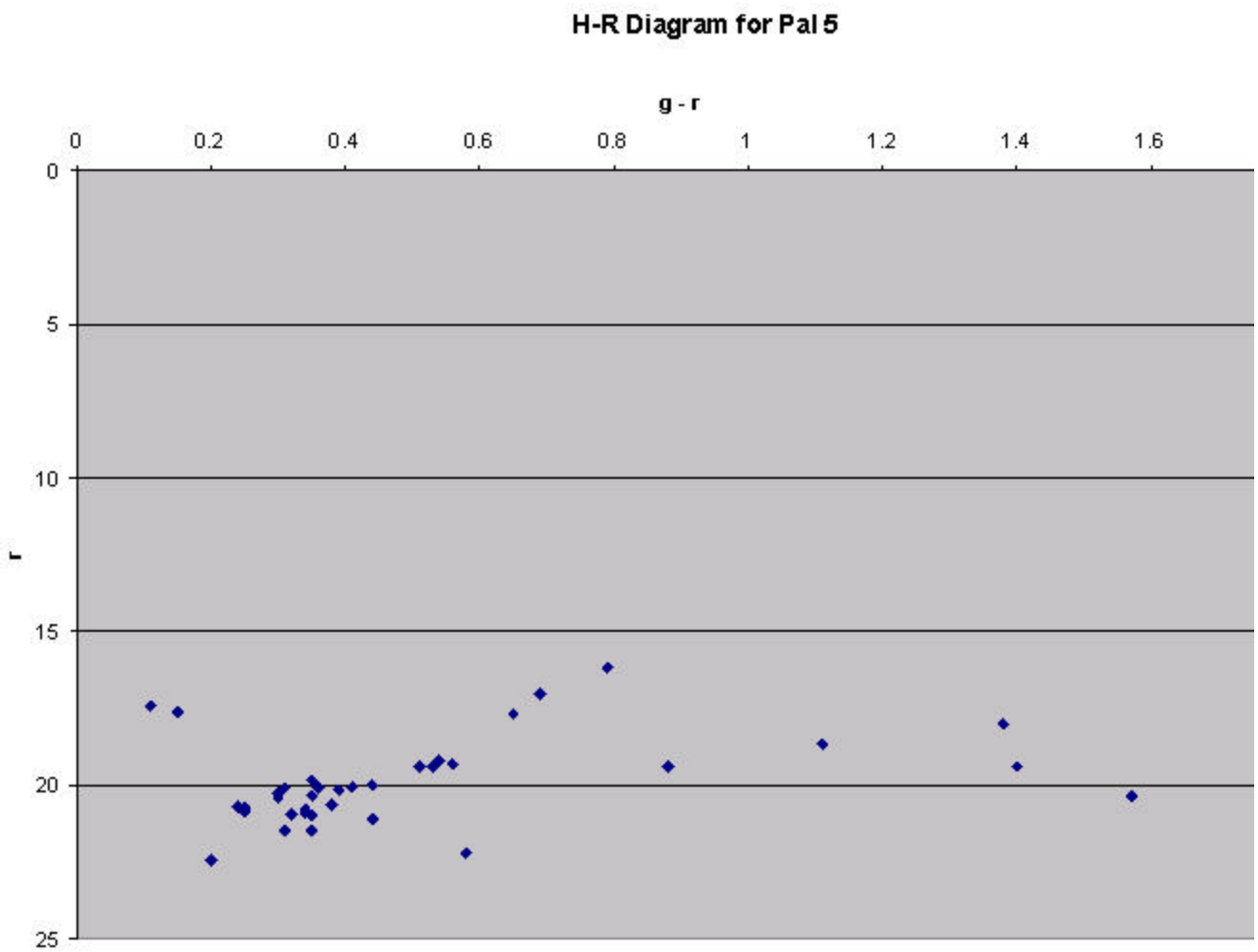


Question 8. Answers will vary. Stars at very different distances are probably not part of the cluster.

Question 9. Most of the stars in the Pleiades are main sequence stars.It is a relatively young cluster

Exercise 6.

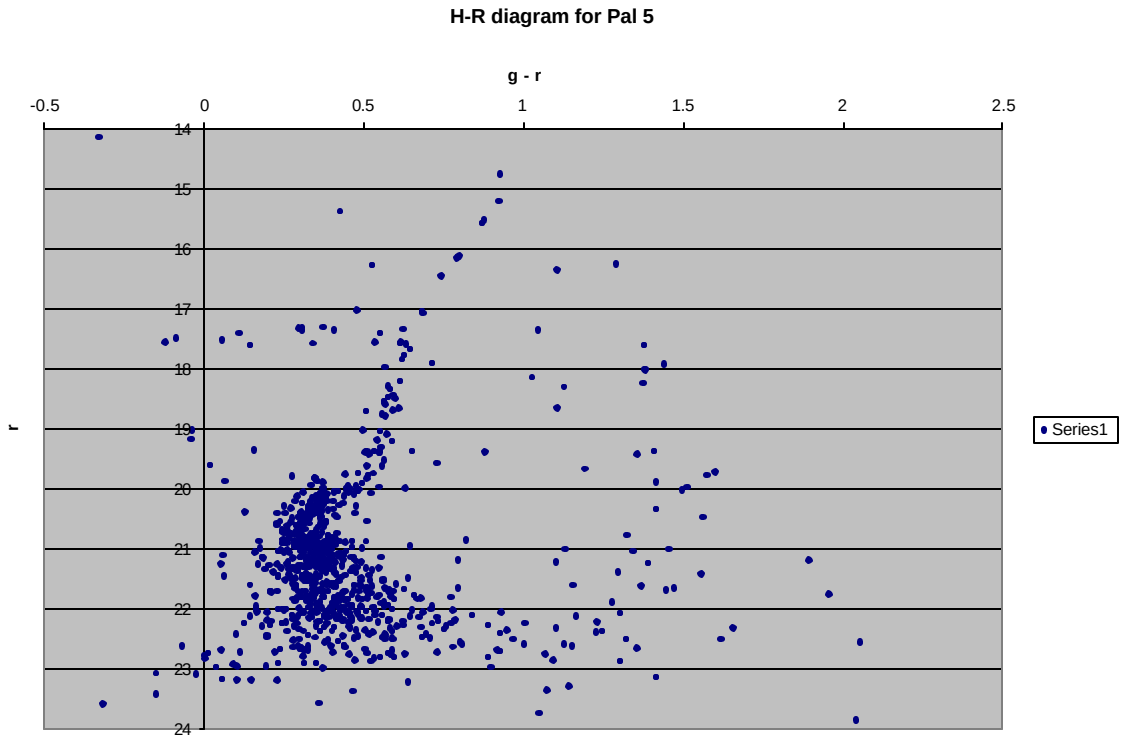




Question 10. There is no distinct pattern to the H-R diagrams for these clusters. To make a pattern, you need more data… but you will get much more in the next section.

Question 11. You see very few main sequence stars because most are just too faint to see in the Navigation tool. The stars are in the SDSS data, around magnitude 20 to 23, but are very hard to pick out from the Navigation tool. Blue giants (hot main-sequence stars) would be easier to see, but the cluster is old enough that all blue giants would have burned out.

Exercise 7.



Question 12. You can see part of the main sequence – the broad diagonal line in the lower left, running from around magnitude 20 to 23. You can clearly see the red giant group – the diagonal line from around magnitude 20 to magnitude 15 – and the horizontal branch of giants – the horizontal line between r magnitudes 17 and 18. The main sequence cuts off abruptly at around magnitude 20 and moves on to the red giant branch.