

PHYS 1040: Elementary Astronomy

Homework #5, Spring 2008

“With every passing hour our solar system comes forty-three thousand miles closer to globular cluster 13 in the constellation Hercules, and still there are some misfits who continue to insist that there is no such thing as progress.”

~Ransom K. Ferm

1: Provide an updated topic or title for your semester project, and a short paragraph describing what interests you about this topic (or alternatively, a short paragraph describing what you want to learn about this topic). Remember, topics should be astronomy based or related to astrophysical science. A list of possibly interesting ideas and topics is posted on the class website; inspiration might also be gained by thumbing through your textbook. If you are having trouble thinking of something, stop by and see me or drop me an email.

2: With a picture and a short paragraph, explain why pulsars “pulse” on and off?

3: We often see dark nebulae which are associated with bright diffuse nebulae, as is the case with the Trifid Nebula (M20) shown here. Explain how this could be if it is all connected as one nebula.



4: We can determine *how much* dust is in an interstellar cloud by looking at how much light is blocked from stars behind the cloud. Suppose the dust in an interstellar cloud blocks *blue* light in the following way: for every parsec¹ that light travels through the cloud, only 90% of the light continues. So after 2 parsecs, 90% of the remaining 90% remains, or 81% ($0.9 \times 0.9 = 0.81$), remains. After 10 parsecs, you might have initially expected ten 10% reductions to remove all the blue light. How much blue light *actually* remains?

¹You may recall from early on this semester that a parsec is just a unit of distance – 1 pc = 3.26 light-years.

5: In an eclipsing binary system, star A is brighter, larger, and cooler than its companion, star B . What can be said about the depths of the minimums in the light curve when each star is eclipsed? *Explain your reasoning.*

6: Describe why it is difficult to detect Earth massed planets around other stars. Of the techniques you know of for detecting planets, which is probably the most useful for detecting Earth sized planets?