

Please type up or print out your homework and staple the pages together. Leave a blank space to write in mathematical equations or diagrams. Make sure you **show your work** for any calculations – “magical” answers will receive no credit. Problems are **due at the beginning of the lecture**.

Review questions, Problems, etc. which have a chapter and number noted are from your text *Stars and Galaxies, 7th edition*.

1. Explain how Shapley used globular clusters to determine the distance and direction to the center of our galaxy.
2. What evidence can you cite that our galaxy has a massive corona?
(Chapter 15, Review Question 3)
3. Why are all spiral tracers young? (Chapter 15, Review Question 9)
4. Why couldn't spiral arms be physically connected structures? What would happen to them?
(Chapter 15, Review Question 10)
5. If the true distance to the center of the galaxy were 7 (instead of 8) kpc and the orbital velocity of the sun were 220 km/s, what would the mass inside the sun's orbit be?
(See slide 24 from lecture 22)
6. If you find that a galaxy has the same size and mass as our Milky Way galaxy and that galaxy has a small satellite galaxy orbiting 60 kpc from the center of the larger galaxy, how long will it take the small galaxy to complete one orbit? What is the orbital velocity of that small satellite galaxy?
7. If you find a galaxy that contains globular clusters that are 2 arc seconds in diameter, how far away is the galaxy? (Hints: Assume that a globular cluster is 25 pc in diameter and use the small-angle formula in Chapter 3.) (Chapter 16, Problem 2)
8. How does the unified model explain the two kinds of Seyfert galaxies?
(Chapter 17, Review Question 7.)
9. What is the difference between hot dark matter and cold dark matter? What difference does it make to cosmology?
(Chapter 18, Review Question 10)
10. What evidence shows that the expansion of the universe is accelerating?
(Chapter 18, Review Question 11)