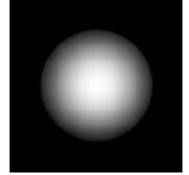


1. The fact that spiral galaxies contain dark matter that is *not* concentrated in the center is evident when you
  - A) Realize the extremities of the galaxies are much darker than they should be
  - B) Plot rotational velocities as a function of distance, and discover they do not fall off with distance
  - C) Plot rotational velocities as a function of distance, and discover they fall off too fast with distance
  - D) Study the temperature of X-rays in the disk of the galaxy
  - E) Realize how little mass is in the black hole in the nucleus
  
2. Which of the following is *not* a likely outcome of a direct collision between galaxies?
  - A) The gas contained in the galaxy can become very hot
  - B) A sudden burst of star formation
  - C) Collision and merger of significant numbers of individual stars
  - D) One of the galaxies may become an active galaxy
  - E) Actually, all of these *are* common outcomes of galaxy collisions
  
4. The most important thing about a standard candle used for measuring distance is that it have a consistent (same for all members):
  - A) Luminosity
  - B) Temperature
  - C) Distance
  - D) Brightness
  - E) Radius
  
7. As viewed from Earth, (almost) all galaxies seem to be moving away from us with a velocity proportional to distance. What would one see if you viewed the universe from some distant galaxy?
  - A) You would see all galaxies moving past you in some direction
  - B) You would see all galaxies moving towards you
  - C) You would see all galaxies moving away from you, but it would not follow Hubble's Law
  - D) You would see all galaxies moving away from you, and it would obey Hubble's Law, but with a different Hubble's Constant
  - E) You would see all galaxies moving away from you, and it would obey Hubble's Law, and with the same Hubble's Constant
  
9. In which portion of our galaxy is the Sun located?
  - A) Disk
  - B) Halo
  - C) Nucleus
  - D) Bulge
  - E) Globular Cluster
  
12. How many *large* galaxies (comparable or larger than our own galaxy) are there in our cluster? Include our own galaxy.
  - A) 1
  - B) 2
  - C) 3
  - D) 4-5
  - E) More than 5
  
13. The best method for estimating the mass of a galaxy cluster is
  - A) Add the mass of each component galaxy to get a total
  - B) Measure the total amount of X-rays, and from this deduce the total mass
  - C) Measure the amount of gravitational lensing acting on some bright object(s) behind the cluster
  - D) Measure the velocity at which a satellite galaxy orbits the collection
  - E) Just make up an answer; no one will ever know

16. What would be the likely galaxy classification shown at right?

- A) Sd      B) S0      C) E7      D) E0      E) Irr



18. Which of the following distance methods is used to study the distance to some of our nearest neighbor stars?

- A) Parallax
- B) Cepheid Variables
- C) Type Ia Supernovae
- D) Hubble's Law
- E) Light Echo Method