29:50 Stars, Galaxies, and the Universe
Instructor: Spangler
Homework Assignment #3
September 14, 2010
Note: Corresponding quiz on ICON must be completed by 8AM, Monday,
September 20

1. How can one measure the mass of a star other than the Sun?
   (a) measuring the color of the star and using a color-mass relationship
   (b) the apparent magnitude of a star tells its mass
   (c) the gravitational force on a companion star in a double star
   (d) the mass of a star is determined by its location in the Galaxy

2. "Solar Analog Stars" are stars very, very similar to the Sun. The Sun has an
   absolute magnitude of 4.8. If a solar analog star has an apparent magnitude
   of 3.5, what can you say about it?
   (a) it is more distant than 10 parsecs
   (b) it is closer than 10 parsecs
   (c) it is more massive than the Sun
   (d) it is 10 parsecs away

3. "Solar Analog Stars" are stars very, very similar to the Sun. The Sun has an
   absolute magnitude of 4.8. If a solar analog star has an apparent magnitude
   of 6.0, what can you say about it?
   (a) it is more distant than 10 parsecs
   (b) it is closer than 10 parsecs
   (c) it is more massive than the Sun
   (d) it is 10 parsecs away

4. The star Alpha Ophiuchi has an apparent magnitude m=2.08. Which of the
   following stars is fainter than it?
   (a) Sirius m=-1.47
   (b) Antares m=0.92
   (c) Theta Capricorni m=4.07
   (d) Deneb m=1.26

5. In class, we talked about "Solar Twins" and "Solar Analogs", i.e. stars very
   similar to the Sun. In determining how similar a star is to the Sun, why is
   knowledge of the distance crucial?
   (a) knowledge of the distance is required to determine the absolute magnitude

1

(b) the distance tells us if the star is in our Galaxy

(c) the distance determines the age of a star

(d) distance is the only variable which determines the apparent magnitude

6. The star Fomalhaut is visible in the evening now, and will be more prominent later in the fall. Its apparent magnitude is 1.15. Is it brighter or fainter than Aldebaran, the brightest star in the constellation of Taurus, which will also be visible this fall? How much brighter or fainter is it?
(a) Fomalhaut is 0.36 magnitudes brighter than Aldebaran
(b) Fomalhaut is 1.45 magnitudes fainter than Aldebaran
(c) Fomalhaut is 2.07 magnitudes brighter than Aldebaran
(d) Fomalhaut is 0.29 magnitudes fainter than Aldebaran

7. Imagine looking up in the night sky at a group of stars in a constellation. If you have no other information about the stars other than the naked eye observations you are making, which of the following can you determine?
(a) the apparent magnitudes of the different stars
(b) the absolute magnitudes of the different stars
(c) *differences* in the absolute magnitudes of the different stars
(d) the distances to the different stars

8. The bright star Capella (Alpha Aurigae) is visible in the northeast at about 10 PM these evenings. How far from the Sun is it?
(a) 46 light years
(b) 153 light years
(c) 11.2 light years
(d) 4500 light years