Name:

Date:

Lab 2 - Astronomical Image Data: Prelab

1. The signal-to-noise ratio (SNR) for part A astronomical images in this lab can be found from the following equation:

$$\text{SNR} = Ft\sqrt{\frac{\text{Gain}}{\left(\frac{F}{n} + S\right)t}}.$$

The meaning of each of the variables is explained in the lab. What are the values for t and n for each of the following images:

(a) m101_10.fits: $t =$, $n =$

(b) m101_15.fits: $t =$, $n =$

(c) m101_4x15.fits: $t =$, $n =$

2. In part B of the lab, the files m39B.fits and m39V.fits will be used to determine values of m for the set of stars that you are measuring. According to the given equation

$$m = -2.5\log_{10}(F) + \text{zp},$$

in order to find the *true* value of m for those stars, you need to know the value for zp. The lab has you do this by comparing a different set of stars from m39B.fits and m39V.fits to their standardized values, as given in standard.txt. Explain how the zp values are found from the standardized stars, and then how they are applied to calibrate your data for the non-standardized stars.

3. Explain in your own words how you will find the cluster distance and cluster age from your data at the end of part B of the lab, from the given equations and the HR diagram (i.e., V vs. $B - V$ diagram) found slightly earlier in the lab. How is the diagram used? Which equations that are given in the lab are used, and how?