Names: _____   _____

_____   _____

Grade	

Image Analysis II

Pre-Lab Quiz

Record your team's answers as well as your reasonings and explanations.

1.

2.

3.

4.

Part 1: Animating Images of the Asteroid 3 Juno
labimage → Asteroid → 3_Juno

1. Open all the images in one of the 3 Juno folders (105 or 106). Using the fits header (ctrl+f), determine on what date the images were taken.

2. Follow the directions below to make an animated image showing the asteroid's movement across the sky. Make sure only the asteroid images are opened.

   ➢ Under the tab **Process** click **Align**

   ◆In the *Select Images* window that appears, click *Add All* and then *OK*

   ◆In the *Align Images* window that appears, set the align mode to *Auto – star matching* and click OK

   ➢ Under the tab **View** click **Animate**

   ◆In the *Select Images* window that appears, add the images

   ◆In the *Animate* window that appears, click the play button

Have the TA mark below once complete and have identified the asteroid 3 Juno.

TA	

3. The semi-major axis of 3 Juno's orbit is 2.67 AU. How long does it take to complete one orbit around the Sun? **Hint**: Think about Kepler's three laws.

Part 2: Determining the Motion of Comet Garradd

labimage → Comet

Follow the directions below to stack the images.

- ➢ Under the tab "Process" click "Stack"
- ➢ In the "Stack" window that appears, select "Add Images"
- ➢ Select the garradd1.fts and garradd2.fts images using either "Add All" (if they are the only options), or by holding the Ctrl key and clicking. Then click "OK"
- ➢ Click on the "Align" tab in the "Stack" window and set the Mode to "Auto – star matching"
- ➢ In the "Stack" window, click the "Combine" tab and set the "Combine Method" to Sum. Then click "Go"

1. Why is it important to align the images?

2. What is the angular distance (in pixels) that the comet traveled from one image to the next? Record the horizontal (Δx) and vertical (Δy) shifts, as well as the total number of pixels traveled.

Δx	Δy	Total

3. If the comet was 2.7×10^{11} meters away when the image was taken, how far did the comet travel in km between the two images?
Note: The pixel scale for this image is 1" / pixel.

4. How much time passed between when the two images were taken? From this, what is the speed of the comet in km / s?
Hint: Review with your TA how to access .fit header information.

5. What assumption(s) did you make when calculating the speed that might cause you to incorrectly estimate the true speed of the comet?