Names: _____ _____

_____ _____

| Grade | |
|---|---|

# Exoplanets

# Pre-Lab Quiz

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

| |
|---|
| 1. |
| 2. |
| 3. |
| 4. |

# Part 1: Transit Simulation

1. In the in-class demonstration, when switching from the smaller exoplanet to the larger exoplanet, how much deeper is the depth of the eclipse? What exoplanet property (or properties) increase by this same numerical factor when switching from the smaller exoplanet to the larger exoplanet? Choose from: radius, diameter, area, and speed.

The relationship below links $R_p/R_*$ and transit depth.

$$\frac{R_p}{R_*} = \sqrt{Transit\ Depth}$$

# Part 2: Detecting Alien Worlds

*This PC → labimage → Exoplanets → WASP-6*

1. G8 star WASP-6 is orbited by exoplanet WASP-6b; we will perform photometry to create an exoplanet transit lightcurve. Following instructions from your TA also found in the tutorial on the lab webpage, create a lightcurve of WASP-6 and detail your analysis below to find $R_p$ the radius of exoplanet WASP-6b in kilometers (km).

**Note:** In the images of WASP-6, there are 4-5 bright stars. The start at the bottom is both WASP-6 and WASP-6b. The star at the top, UCAC2 22823434, will be our reference star for photometry; UCAC2 22823434 has an R magnitude of 11.8.
Host star WASP-6 has a radius ($R_*$) of 0.87 $R_{Sun}$. $R_{Sun}$ = 696,340 km.

| | |
|---|---|
| **$m_2$**<br>(Maximum Magnitude when WASP-6 not Eclipsed) | |
| **$m_1$**<br>(Minimum Magnitude when WASP-6 Eclipsed) | |
| $\frac{b_1}{b_2}$<br>Brightness Ratio, $2.512^{m_2-m_1} = \frac{b_1}{b_2}$ | |
| **Transit Depth**<br>$1 - \frac{b_1}{b_2}$ = Transit Depth | |
| $\frac{R_p}{R_*}$<br>(Use Equation from Part 1) | |
| $R_p$ ($R_{Sun}$) | |
| $R_p$ (km) | |