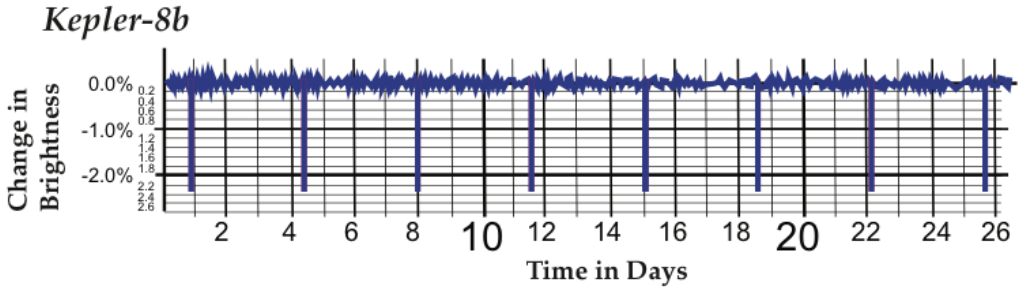
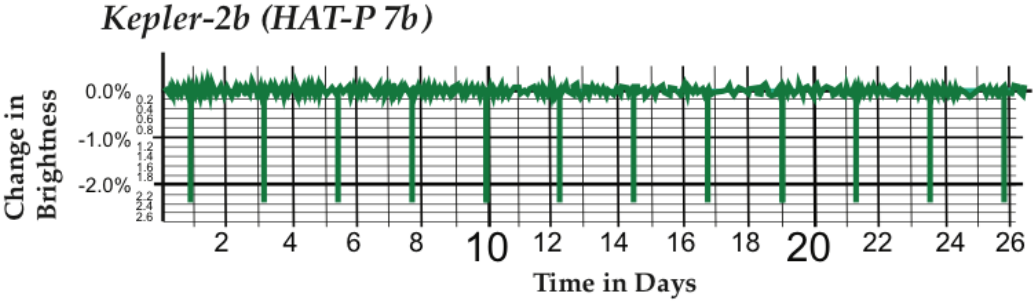
Application of Kepler's 3rd Law practice

1) If Mars has an orbital radius of 1.5 Au, what is its orbital period?
2) Using the graph below determine:



   a. Its orbital period
   b. Its orbital radius (if its host star (Kepler – 8) has a mass of 1.213 $M_\odot$)
   c. Its change in brightness (Z)
   d. Its radius as compared to earth.
3) If Phobos has an orbital radius of 9 377 km and an orbital period of 7.66 hours, what is the mass of Mars?
4) Mars has a second planet, Diemos. It has an orbital period of 30.35 hours, what is its orbital radius.
5) Neptune's moon, Triton has an orbital radius of 354,759km and an orbital period of 5.877 days. What is the orbital period of Proteus (another moon of Neptune) which has an orbital radius of 117,646km?
6) Using either of Neptune's moons from question 5 determine the mass of Neptune.
7) If Neptune has an orbital period of 164.79 years, what is its orbital radius?
8) Using the graph below determine:



   a. Its orbital period
   b. Its orbital radius (if its host star (Kepler – 2 has a mass of 1.52 $M_\odot$)
   c. Its change in brightness (Z)
   d. Its radius as compared to earth.

Formulas!

$$T^2 = r^3$$

$$\frac{T^2_{obj_1}}{r^3_{obj_1}} = \frac{T^2_{obj_2}}{r^3_{obj_2}}$$

$$M_{Object} = \frac{4\pi^2 r^3}{GT^2}$$

$$R = \sqrt[3]{T^2 \times M_\odot}$$

$$r_p = 10\, p_\oplus \times \sqrt{Z}$$

Answers: 1) 1.84 years; 2) a: 3.5 days; b: 0.048135 Au; c: 2.3%; d: 15.17 times the radius of the Earth.; 3) 6.41 x 10^{23} kg; 4) 23 479.23km; 5) 1.12 days; 6) 1.024 x 10^{26} kg; 7) 30.06 yrs; 8) 0.038 Au; 9) a: 2.2 days; b: 0.038 Au; c: 2.4%; d: 15.49 times the radius of the earth (Except for #2 and #9 verified against known data)