

NAME(S) _____
ASTRONOMY 20 (LLOYD)

SECTION DAYS & TIMES _____
FALL 2015

PROBLEM SET #2
LENGTH OF THE DAY
KEPLER'S 2ND LAW

PART I. LENGTH OF THE DAY

In the diagram on the next page, the Earth is shown in December on the left and in June on the right. The North Pole is near the top. Eight locations are shown on the Earth (A—H). A, B, and H are halfway between the equator and the North Pole. E and F are on the equator. C, D, and G are halfway between the equator and the South Pole.

1. Imagine the Earth spinning on its axis. As it rotates, each of the lettered points is carried eastward, parallel to the equator.

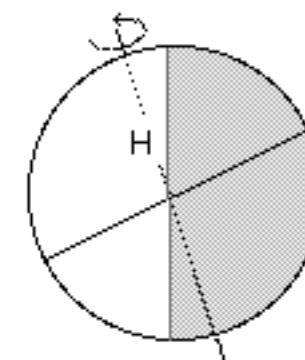
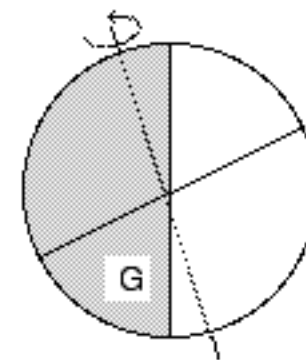
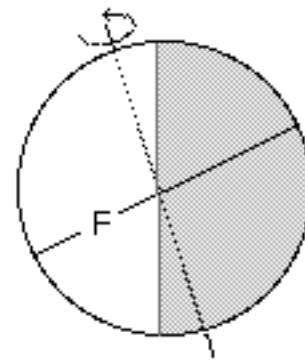
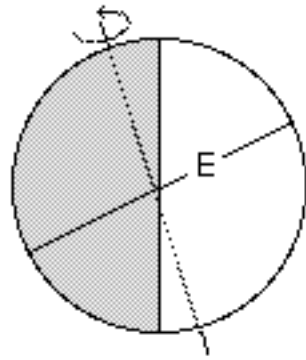
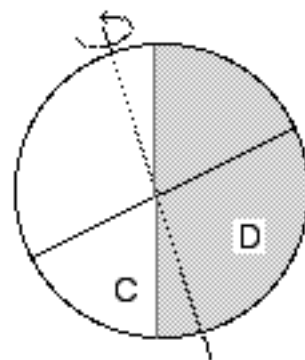
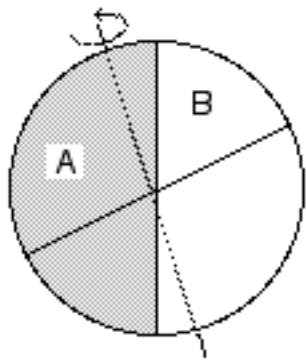
Draw straight lines through each letter parallel to the equator and observe whether the location spends more time in daylight or more time in darkness. Then answer the following questions.

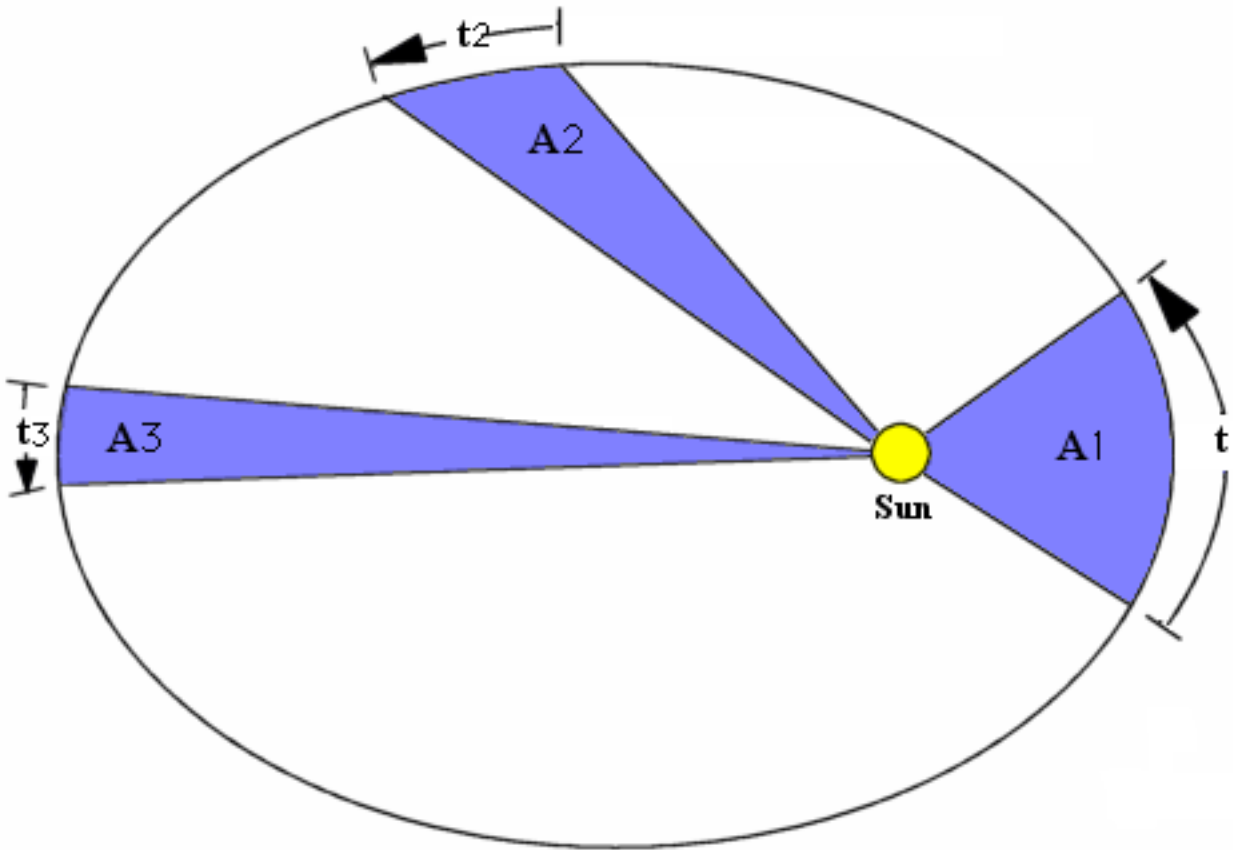
2. Which locations are experiencing 12 hours of day and 12 hours of night?

3. Which locations are experiencing more than 12 hours of daylight?

4. Which locations are experiencing less than 12 hours of daylight?

5. What do you have to do to experience longer hours of daylight (depending on the time of year)?





In the figure above shows an asteroid moving in an elliptical orbit around the Sun. The asteroid is shown as it moves through three different segments of its orbit (A1, A2, A3). During each segment of the orbit the comet sweeps out the triangular shaped area shaded in grey. Assume each of the shaded areas is the same size (area).

1. Rank the time taken to traverse each segment in order from least time to greatest time, or are they all the same time?

Carefully explain your reasoning:

2. Rank the distances the asteroid traveled during each segment, listing them from smallest distance to greatest distance.

3. In which segment is the asteroid going the fastest and in which the slowest?

4. Write a paragraph describing how the speed of an asteroid or planet changes as it goes around its orbit.