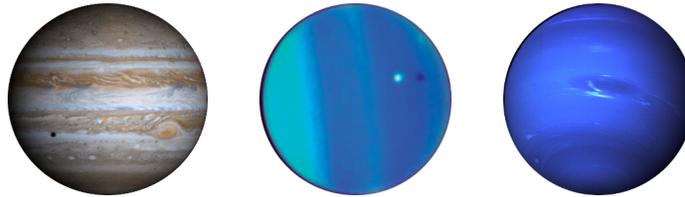


Arvind Borde

# AST 9: Homework 9

- 1] Fill out the rest of the planetary table, if you have not already done so.
- 2] The composition of Jupiter makes it similar to a star. Why? (We've mentioned how the sun works previously in class, but you may need to look up the composition of the sun.)
- 3] If you went to JIU (Jupiter International University), not LIU, and the semester was  $1/3$  of a Jupiter-year long, how many Jupiter days would that be? To compensate for the pain, how many hours might a workday be?
- 4] Neptune was discovered in 1846. How many years have elapsed since its discovery? (Round to the nearest year.) Can there be a second, different answer to this question? Explain.
- 5] Here are Jupiter, Uranus and Neptune. (I've left out Saturn because the rings are distracting.) Notice the bands in their appearance. Notice the angles of the bands. Was the camera rotated at random angles when the picture was taken, or might the angles of the bands be related to how the planet behaves? What aspect of planetary behavior?



- 6] What might the tiny black dots be in the pictures of Jupiter and Uranus above?
- 7] What pattern do you notice overall in the average temperature on a planet as you get further from the sun? Does this make sense? Is there a planet that breaks the pattern? Which is it and why does it do so?
- 8] It's sunrise on Venus. Should you look West or East to view it? Is there another planet on which sunrise might be in the same general direction? Why?
- 9] Do the planets that have rings also have larger amounts of something else than the other planets (ones that don't have rings)? What? Does it seem plausible that there might be a connection?
- 10] We'd seen that the equatorial radius of the Earth is 6,378 km while the polar radius is 6,357 km. What is the reason for this "flattening at the poles"? The numbers mean that the polar radius of the Earth is 99.7% of its equatorial radius. Saturn has the lowest such percentage of any planet: the polar radius is only about 90.2% of the equatorial. Jupiter is next with a value of 93.5%. The ratio for all other planets is greater than 97.7%, with Mercury and Venus topping the chart at 100%. Why do you think Mercury and Venus are at the top, and Saturn and Jupiter at the bottom?
- 11] Jupiter is about 300 times as massive as the Earth but its radius is only about 11 times as big. Do you expect it, on average, to be more dense than the Earth or less?
- 12] These are some of the units we use to measure time: years, months, days, hours, minutes, seconds. Initially, all arose from astronomy. Which seem to you primary, or directly related to astronomical phenomena, and which seem secondary (defined as multiples or as subdivisions of the primary ones)? Some of these are now defined independently of astronomical considerations. Take your best guess at which. (Hint: where might you need greater precision, and are astronomical definitions likely to give you that?)