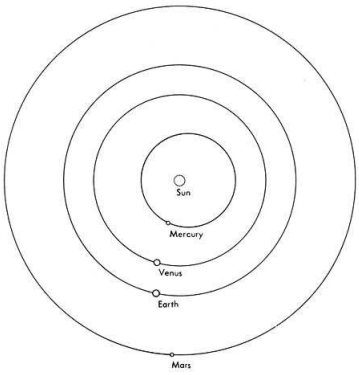
ASTRONOMY 294Z
The History of the Universe
Professor Barbara Ryden

Problem Set # 2
Due Tuesday, January 22
at class time

NAME (please print clearly): _____

SCORE (instructor use only): _____

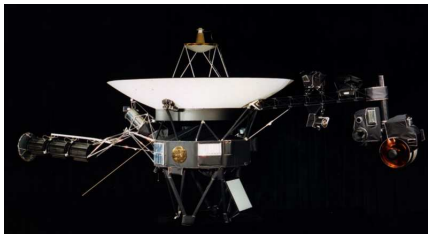
Because of the Martin Luther King Day holiday, there will be special office hours on Friday, January 18, 9 – 11 am, and Tuesday, January 22, 9 – 11 am.



1) [20 points] The orbits of the four innermost planets (Mercury, Venus, Earth, and Mars) are shown above. With a telescope here on Earth, would we ever see Venus in a crescent phase? If so, sketch the relative positions of Venus, Sun, and Earth when that happens.

2) [20 points] With a telescope here on Earth, would we ever see Mars in a crescent phase? If so, sketch the relative positions of Mars, Sun, and Earth when that happens.

3) [20 points] How long does it take light to travel from the Sun to the Earth? The Sun's nearest neighbor among the stars, a dim little star called Proxima Centauri, is at a distance of 1.295 parsecs from us. How long does it take light to travel from Proxima Centauri to the Earth?



4) [20 points] The Voyager 1 spacecraft, pictured above, is presently 105.1 astronomical units from the Sun, and is moving away from the Sun at a speed of 17,200 meters per second. If it were traveling directly toward Proxima Centauri, and maintained its present speed for the entire journey, how long would it take to reach Proxima Centauri?

5) [20 points] Given the answer to the previous problem, is it your opinion that manned interstellar travel is possible with present technology? (That's *interstellar* travel, not travel within our own Solar System.) Mention at least two of the problems that interstellar travelers would face, and briefly discuss how they could be resolved.