

Homework Set 1

Due September 21, 2023

1. Venus and Mars

- a. Compute the solar flux in Watts per square meter for Venus and Mars. You may assume that the orbit of Venus is at a distance of 1.08×10^{11} meters from the Sun while Mars is at a distance of 2.28×10^{11} meters. Assume that the surface temperature of the Sun is 5780 K and that the radius of the Sun is 6.96×10^8 meters
- b. Assume that Venus and Mars are replaced in their orbits by perfect black bodies. What would their surface temperatures be?
- c. Assume that Venus is replaced by an otherwise perfect black body, but with an albedo of 0.71. What would the surface temperature be? The actual albedo of Venus is about 0.71, and the surface temperature is approximately 737 K. Discuss any discrepancy between this value and your computed value.
- d. Assume that Mars is replaced by an otherwise perfect black body, but with an albedo of 0.17. What would the surface temperature be? The actual albedo of Mars is about 0.17, and the surface temperature is approximately 213 K. Discuss any discrepancy between this value and your computed value.