CHEM 191: The Thin Atmosphere Homework

Name: _____

Grading: This assignment counts 10 points toward your homework grade.

1. [Not Graded] Mars has a radius of roughly 3400 km, about half the size of Earth. The surface pressure on Mars is 0.636 kPa, or about 0.5% the atmospheric pressure on Earth. Remember, g (the acceleration due to gravity) is much lower on Mars, about 3.7 m/s^2. Use this information to approximate the mass of Mars' entire atmosphere.

2. [Not Graded] Venus has a radius of roughly 6051 km, only slightly smaller than Earth. The surface pressure on Venus is 9.2 MPa, or about 90 times the atmospheric pressure on Earth! Remember, g (the acceleration due to gravity) is slightly lower on Venus, about 8.9 m/s^2. Use this information to approximate the mass (in kg) of Venus' entire atmosphere.

3. Both Mars and Venus have atmospheres that are roughly 95% CO_2 (carbon dioxide). CO_2 is known to cause a strong greenhouse effect in planetary atmospheres, and is implicated in global climate change on Earth. As expected, Venus has a very high average surface temperature of 462°C, yet Mars has an average temperature of -63°C. Why isn't the greenhouse effect stronger on Mars? (Hint - watch this video on YouTube: https://youtu.be/e_lhfFKF-G0, "The Surprising Ways Mars is Hostile to Life" by Physics Girl.)