

AOS 100/101
Spring 2018

HOMEWORK #3
(Due Fri. March 2)

Please provide concise, grammatically correct, neatly written answers to the following questions. All questions can be answered in, at most, a few sentences. Don't forget to write your name on the paper!!!

NAME:

- 1) (a) Explain why an increased concentration of CO₂ (carbon dioxide) in the atmosphere could lead to higher global temperatures.

(b) One result of increased global temperatures would likely be more H₂O vapor (water vapor) in the atmosphere. How might this further change the global temperature and why? (10 pts.)

- 2) (a) Describe the changes we would experience in the summer and winter temperatures in Madison if the tilt of the Earth's axis decreased to 10°. Explain why these changes would occur. Draw a diagram that demonstrates the differences between this hypothetical case and current reality.

(b) If the Earth's axis were tilted at 45°, would the sun ever rise on Christmas day in Winnipeg, Manitoba Canada? Explain. (10 pts.)

- 3) An increase in cloud cover surrounding the Earth would increase the Earth's albedo, yet might not necessarily lead to a lower global average surface temperature. With reference to the radiative properties of clouds, explain this apparent paradox. (10 pts.)

- 4) Consider the following observations taken on successive summer mornings. On the first day, a considerable amount of dew is on the grass at sunrise. On the second day, the grass is dry at sunrise. The air temperature is the same at sunrise on both days. On which day is the air temperature warmer ONE HOUR after sunrise? Explain your answer. (10 pts.)