NAME: _____ QUIZ SECTION: _____

Atmospheric Sciences 101 Fall 2014
Homework #3 (Due Thursday, 23 October 2014)

1. **Of the following city pairs, circle the city that you would expect to have a colder/cooler winter and then give a brief, plausible reason for the difference. You may have to do a little research and look for online maps. Consider latitude, proximity to water, prevailing winds, and elevation, but ignore small differences. [2 points]**

A. Minneapolis, Minnesota or Springfield, Missouri? Why? [0.5]

B. Crescent City, California or Plymouth, Massachusetts? Why? [0.5]

C. Des Moines, Iowa or New Haven, Connecticut? Why? [0.5]

D. Santa Fe, New Mexico or Oklahoma City, Oklahoma? Why? [0.5]

2. **Indicate the dates of the following observations for Seattle, Washington (note that question 'E', on following page, does not refer to Seattle): (2.5pts)**

A. The longest day (most daylight hours). [0.5]

B. The longest night (most hours of darkness). [0.5]

C. Equal hours of day and night. [0.5]

D. The day(s) would Seattle receive the most energy from the sun (assuming clear skies)? [0.5]

E. Assuming clear skies, for a location on the equator, what day(s) would receive the most energy from the sun? [0.5]

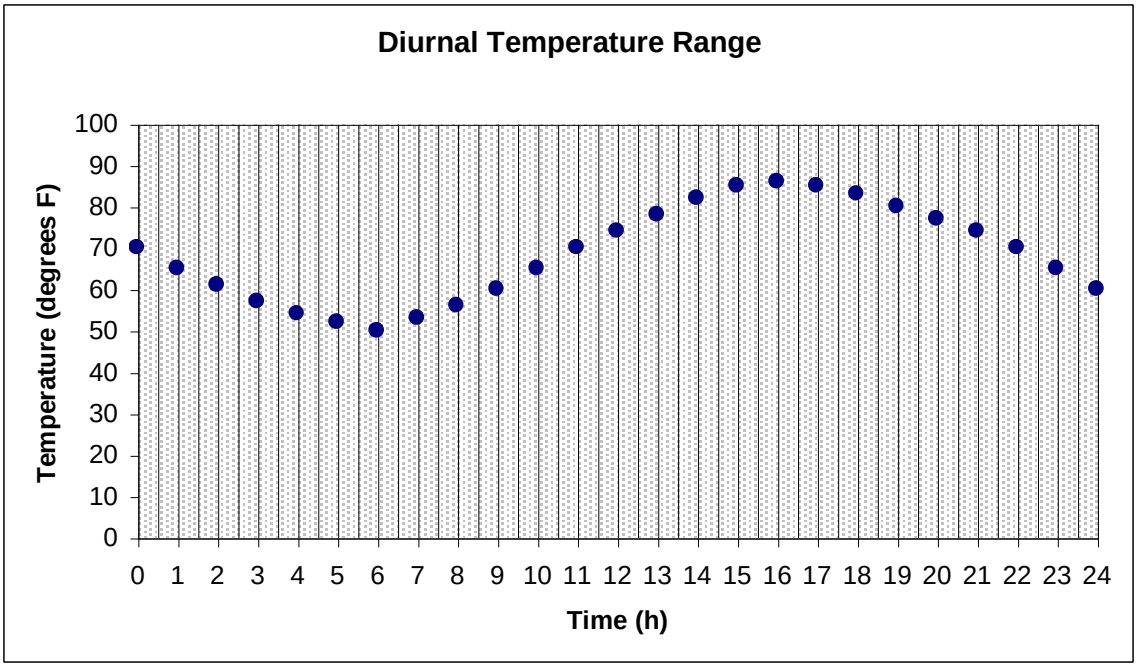
3. Inversion layers can be found in many parts of the atmosphere. In class we discussed the nocturnal surface inversion and the persistent stratospheric inversion. [2.5]

A. What feature defines an inversion layer? [0.5]

B. Circle the correct answers: The (stratospheric / surface) inversion is due to heating by absorption of (short / long) wavelength radiation, while the (stratospheric / surface) inversion is due to cooling by emission of (short / long) wavelengths. [1]

C. Briefly (1-2 sentences) explain why surface inversions contribute to bad air quality. [1]

4. Daily Temperature Cycle: The following graph shows an idealized temperature cycle of one clear 24-hour period. Use it to answer the following questions.



A. At approximately what time do you think the sun rose? [1]

B. At what time did the outgoing terrestrial radiation just exceed the incoming solar radiation? [1]

C. All else being equal, what would happen to both the maximum and minimum daily temperatures on this graph if the entire 24-hour period were cloudy? [1]