

ATM OCN (Meteorology) 100
SUMMER 2004
E.J. Hopkins
HOMEWORK #1

NAME: _____
[Please Print!]
DATE DUE: _____

WEATHER ELEMENTS

1. The barometric pressure associated with one standard atmosphere at mean sea level is *[you may round to nearest whole number]*:

_____ inches of mercury
_____ centimeters of mercury
_____ pounds per square inch
_____ millibars
_____ feet of water

- 1b. The *lowest* recorded sea-level corrected pressure in the world was _____ .
[Please include units!]

The *highest* recorded sea-level corrected pressure in the world was _____ .
[Please include units!]

The *range* between the record lowest and highest sea-level corrected pressure (above) is approximately _____ . *[Please include units!]*

- 1c. What is the weight exerted by the atmosphere upon the flat, horizontal roof of a 25-foot by 50-foot building? [Assume standard sea-level conditions; English units should be used here]. *Clearly show your work for partial credit! [Please include units!]*

- 1d. A football fan brought an aneroid barometer to Mile High Stadium in Denver (elevation of 1 mile) and made a reading of 835 mb. What would be the approximate sea-level corrected pressure if we assume that the pressure decreases at approximately 1 mb for every 10 meter ascent through the atmosphere? *Clearly show your work for partial credit!*

How does this sea-level pressure that you calculated compare with the standard sea level pressure?

2. *Current Weather on the Web Question* -- You will need to go to answer the questions appearing in the Online Homework at <http://www.aos.wisc.edu/~hopkins/aos100/homework/s04hmk01k.html>

Current Conditions for _____ (Time and date)

Temperature _____ Pressure _____

Climatological Data for _____ (Date)

High Temperature _____ Low Temperature _____ HDDU Departure _____

3. Convert the following temperature readings:

41°F = _____ °C = _____ K

-40°C = _____ °F = _____ K

258 K = _____ °C = _____ °F

4 a. The record highest temperature for Madison, WI was 107°F on 14 July 1936, while the record low was -37°F on 30 Jan 1951. What is the **range** of Madison's extreme temperatures?

_____ .

4 b. Compare these record temperatures and range with those of the United States and the world [Please include units!]:

	Record High	Record Low	Range
United States			
World			

5. The National Weather Service at Madison reported the following information for two days during this past January. The "normal" high and low temperatures for these days are also included and represent the 30-year averages for the 1971–2000 climatological interval. [Note: Round up the average temperatures to the nearest whole degree Fahrenheit; e.g., 41.5°F is reported as 42°F.]

DAY	Observed			"Normal"		
	High [°F]	Low [°F]	Ave. [°F]*	High [°F]	Low [°F]	Ave. [°F]*
26 Jan 2004	22	15		25	9	
28 Jan 2004	10	-6		26	9	

[* Note: Round up the average temperatures to the nearest whole degree Fahrenheit.]

a. What were the heating degree day units (based upon 65°F) for:

26 Jan 2004 _____

28 Jan 2004 _____

b. What are the "normal" heating degree day units (based upon 65°F):

26 Jan _____

28 Jan _____

c. How would the amount of energy required for space heating on **each** of those dates compare with that of the climatological (or "normal") average for the corresponding dates? (That is, less, equal to, or more.) Explain your reasoning.