Lab 8: Weather and Air Quality

Question 1:
https://www.epa.gov/criteria-air-pollutants/naaqs-table

Time	12am	1am	2am	3am	4am	5am	6am	7am	8am	9am	10am	11am
Temp (°F)	76	72	71.1	71.1	70	69	73	77	81	87.1	89.1	91
Ozone (ppb)	50	46	40	48	22	20	25	44	55	73	82	84
8-hr avg (ppb)	?	?	?	?	?	?	?	?	?	?	?	?

Time	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm
Temp (°F)	93	93	95	96.1	96.4	96.1	93	89.1	86	82.9	81	80.1
Ozone (ppb)	108	118	141	137	139	140	126	111	107	89	69	65
8-hr avg (ppb)	?	?	?	?	?	?	?	?	?	?	?	?

Question 2:
For the table:

After you read the paragraph above the table, it is important to note that you actually won't have twenty-four of average ozone values. This is because when you are taking the forward average, you can't go into the next day. So there will be some hours in the evening for which there is no average.

Also, when you look at your table, note that the time continues on the 4th row. The top 12 hours in AM and the bottom 12 hours (4th row) is PM. It just looks funny because only the AM is bolded and filled in... which is why I put the same chart above in case it is easier to see!

When you tell me the max 8 hour average I want the actual number in ppm, not the time.

Hint for 12am: I gave you that calculation and answer in the powerpoint! The rest is on you.

Question 3:

You are using the equation and the max ozone value you found to get an exact AQI value.

To decipher the equation variables:

I_p is what I'm asking for.

C_p is the max 8-hour ozone average you discovered in number 2 in ppm.

For BP_{hi}, BP_{lo}, I_{hi}, I_{lo}:

Let's look at the first row in the table on page 53 as an example: the BP_{lo} is 0.000 and the BP_{hi} is 0.064 ppm. The I_{lo} is 0 and the I_{hi} is 50.

Do this using the row in that table that corresponds to the range your max ozone falls into. Only give me 4 significant figures in your answer.

Question 4:

https://www.airnow.gov/index.cfm?action=aqibasics.aqi

Question 5:

This is using the handout I gave in class. Plot temperature on the first graph and then use the second graph (page 54) for ozone. You are plotting the HOURLY ozone values, NOT the 8-hour averages you calculated earlier. You must make your own x-axis and label both y-and x-axes. Plot ALL 24 points on each graph. I know that the y-axis for ozone is not tall enough so just go above the graph and reasonably estimate where your points should be.

Question 7:

Do not use the table in the lab manual. It's not quite right. Use this one. Note that different scales on the y-axes. You can use MS EXCEL/any other plotting software to generate these plots, and then email me them with the subject line "AOSC 201: Week 9 Lab"

Year	# Days above 90°F	# Ozone Exceedances	Year	# Days above 90°F	# Ozone Exceedances
1972	22	58	1994	35	63
1973	27	84	1995	51	70
1974	18	79	1996	14	51
1975	23	86	1997	34	56
1976	27	0	1998	38	75
1977	45	108	1999	37	68
1978	26	78	2000	11	37
1979	13	52	2001	22	51
1980	46	93	2002	48	67
1981	22	61	2003	14	29
1982	18	72	2004	11	32
1983	49	83	2005	29	44
1984	15	62	2006	39	37
1985	21	87	2007	45	55
1986	32	73	2008	27	31
1987	37	80	2009	13	11
1988	54	73	2010	59	44
1989	16	51	2011	34	29
1990	17	58	2012	45	30
1991	51	86	2013	26	9
1992	22	45	2014	10	5
1993	42	86	2015	18	8