Math 105—Project 1
A bit of Caustic Rain...

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the Lonlinc Building
South 9th Avenue
Lonlinc, SK 08685

31 August 1998

Independent Mathematical Contractors, Inc.
Suite 2, Strawmarket Business Plaza
Lonlinc, SK 04685

Dear IMC:

As you know, the Lonlinc(, Skanebra) Council on the Protection of the Environment (CPE) is charged with the evaluation of all things environmental that may have an impact on the continued health of the residents, animal and human, of the thriving city of Lonlinc. Currently boasting a population of 200,000 and growing at an annual rate of 7%[1], Lonlinc is regarded by some as increasing in size sufficiently fast as to demand appropriate consideration of the environmental impact of such things as the increased traffic attendent with this growth.

One effect of this increase in traffic is an increase of exhaust pollutants in the air, which increase may lead to the phenomenon known as "acid rain." This occurs when NO_X from car exhaust combines with atmospheric water to create nitric acid (NO_3), rendering any precipitation that might fall acidic. In an effort to determine if this is likely to soon be a problem in the Lonlinc area, we have over the past three years monitored the rate of precipitation and the concentration of NO_3 in that precipitation, which data appears in tables 1 and 2 below.

Table 1: Average monthly precipitation (mm)

month	1	2	3	4	5	6	7	8	9	10	11	12
avg. precipitation	173	206	600	705	1098	1140	999	987	1016	623	351	260
month	13	14	15	16	17	18	19	20	21	22	23	24
avg. precipitation	177	218	596	750	1109	1088	1004	1028	965	593	369	255
month	25	26	27	28	29	30	31	32	33	34	35	36
avg. precipitation	173	209	567	134	1089	1055	928	1033	983	609	539	251

Table 2: Average NO_3 concentration in precipitation (g/ml)

month	1	2	3	4	5	6	7	8	9
NO_3 conc.	0.4003	0.4033	0.4060	0.4078	0.4100	0.4124	0.4136	0.4171	0.4184
month	10	11	12	13	14	15	16	17	18
NO_3 conc.	0.4214	0.4248	0.4255	0.4282	0.4307	0.4331	0.4356	0.4380	0.4409
month	19	20	21	22	23	24	25	26	27
NO_3 conc.	0.4440	0.4454	0.4490	0.4513	0.4532	0.4567	0.4587	0.4603	0.4638
month	28	29	30	31	32	33	34	35	36
NO_3 conc.	0.4658	0.4700	0.4715	0.4743	0.4772	0.4805	0.4834	0.4852	0.4879

The critical factor in determining the severity of the acid rain is, of course, the amount of NO_3 that is deposited on the surfaces on which it falls. We therefore need to establish, based on the data we have collected, how the monthly rate of chemical deposition is changing in time, and to predict when (if ever) this is likely to exceed 11.5g/month on a given 1 cm^2 area.

We appreciate your prompt attention to this matter, and look forward to receiving your final report of 3–5 pages on or before the 21st of September. To assure your success in the endeavor, our department's scientific expert, Dr. Gavin LaRose, will be available to answer any questions that you might have in the course of your investigation. *He will, however, be unavailable to assist with this project over the weekend of*

[1] Which has lead some observers to speculate that Lonlinc's population will exceed 1,000,000 by the year 2023!

the 18th–20th. You should also plan on meeting with him during the week of the 7th of September to verify your initial progress towards completion of the project. We have made available, through him, a number of sample reports that may prove useful as you develop your formal response.

Sincerely,

Jack C. Ousteaux
Director, Lonlinc CPE

jco:glr