Assignment #3

You have been hired as a data analyst for the Philadelphia Police Department. The Department needs your help in determining whether they should change their current allocation of police officers on patrol for two precincts. They provide you with the data for the past 20 weeks. For each week there is a count of the number of property crimes in Precinct 1 (Prec1) and Precinct 2 (Prec2). Summary statistics are also provided. The question is this: should they move patrol officers from one precinct to the other based on a forecast of what will happen to the amount of property crime in the next several weeks? To address this question, you will need to examine the trend lines for the two precincts and variation around those trend lines.

1) Plot both crime counts on the same scatterplot. Time should be on the horizontal axis and the crime count should be on the vertical axis. Describe what you see that might of use to the police.
2) Compute the two regression lines. Interpret the slope and intercept for each. Be specific using the computed values. Talk about their numerical values. Assume that both regression lines are "real," not a results of noise.
3) Overlay the two regression lines on your scatterplot. (Hint: a regression line goes through the means of the two variables.)
4) What do the two regression lines tell you about the crime patterns for the two precincts over the past 20 weeks?
5) Construct error bands around each of the two regression lines. You don't know how to do this, but assume they are plus and minus 10 crimes. What does the variation around the regression lines in combination with the error bands tell you about crime patterns in the two precincts?
6) What is your recommendation to the Philadelphia Police Department? Be specific. What caveats do you offer as well?

[You can do the plotting by hand on any lined paper. But use different colors or plot symbols for the two precincts so you can tell them apart. If you have access to Excel or any graphics software you can alternatively use that. I have provided the necessary summary statistics so that you can compute the two slopes and two intercepts very easily. But again, if you want to use some statistical software, that is fine too.]

week	Prec1	Prec2
1	0	14
2	8	10
3	11	16
4	13	17
5	23	27
6	28	26
7	25	31
8	23	25

9	27	27
10	37	31
11	36	36
12	42	42
13	50	37
14	45	30
15	68	37
16	64	55
17	63	53
18	75	47
19	67	48
20	75	60

week: mean=9.5, sd=5.9
Prec1: mean=39.0, sd=23.5
Prec2: mean=33.5, sd=14.1
correlation for week and Prec1=.98
correlation for week and Prec2=.93