



- 3) With this new probability entered into the spreadsheet the following values are calculated.

$pM = .448$

Giving expected counts:		
<b>J(MM)</b>	33.11616	41.25
<b>J(OO)</b>	50.27616	41.25
<b>J(MO)</b>	81.60768	82.5
with standard deviations:		
<b>s(MM)</b>	9.891526395	10.99147397
<b>s(OO)</b>	11.97134514	10.99147397
<b>s(MO)</b>	6.715018237	6.422616289

$pM = 49/67 \sim 0.731$

Giving expected counts:		
<b>J(MM)</b>	88.25239474	41.25
<b>J(OO)</b>	11.90911116	41.25
<b>J(MO)</b>	64.8384941	82.5
with standard deviations:		
<b>s(MM)</b>	13.86250063	10.99147397
<b>s(OO)</b>	5.607333187	10.99147397
<b>s(MO)</b>	9.992250719	6.422616289

- 4) z-scores can be calculated using the formula  $z = (\text{Observer-Expected}) / \text{Std Deviation}$

$pM = .448$

	<b>z-score</b>
	= (O-E)/std
<b>J(MM)</b>	6.155151143
<b>J(OO)</b>	-2.36198687
<b>J(MO)</b>	-4.8559332

$pM = 0.731$

	<b>z-score</b>
	= (O-E)/std
<b>J(MM)</b>	0.414615329
<b>J(OO)</b>	1.799587879
<b>J(MO)</b>	-1.58507773

- 5) These z-scores can be compared to a critical value of  $\pm 1.96$  for a significance value of .05. Values greater than  $\pm 1.96$  would be considered significant, like the ones based on votes which all seem to be significant. The z-scores calculated based on counties won however are not as significant, however the joins of OO and MO seem to be more significant than MM, and may be significant depending on the level of significance being used.

- 6) The following values were calculated for Moran's I and Geary's C

<b>Moran's I</b>	0.418951444
<b>Geary's C</b>	0.464309547

- 7) Assuming these values are significant, and Moran's I of .419 on the -1 to +1 (Dispersed – Random – Clustered) scale there is some clustering, as it's positive, but not entirely clustered on a global scale. The Geary's C value of .464 on a scale of 0-2 (Clustered-Random-Dispersed) indicates clustering as well being closer to 0 than 2, but again it is also not completely clustered.
- 8) This pattern would have about half of the counties that voted for McCain being clustered, and the other half being either random or dispersed.

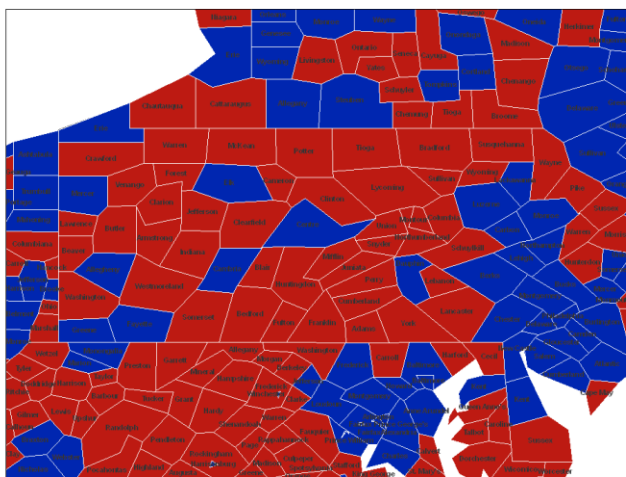
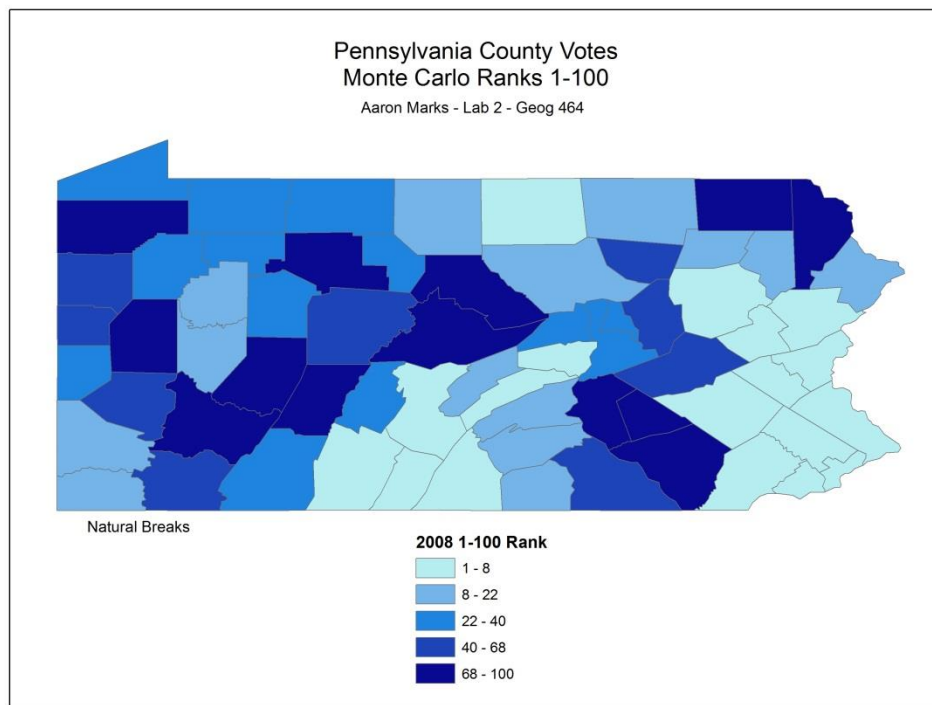
9) If most of the McCain-voting counties tended to neighbor to Obama-voting counties, this would give values of dispersion, I values closer to -1 and C values closer to 2. Vice versa, if McCain-voting counties tended to neighbor to other McCain-voting counties these would give values of clustering, I values closer to +1 and V values closer to 0.

10) Edge effects affect the results due to not considering possible additional neighbors the edge counties have. An edge county with currently 2-3 neighbors may in fact have 4 or more neighbors which would affect various parts of the matrix and its calculations depending on how the votes went on these edges.

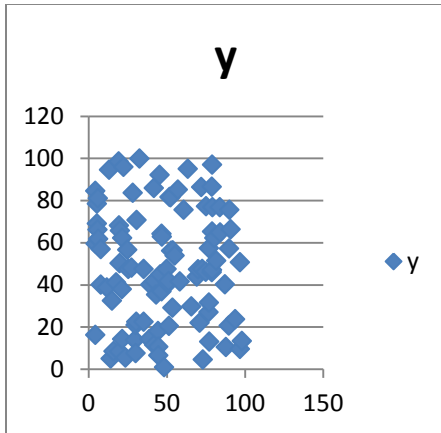
11) List of the 67 counties ranked using 100 permutations – Included in Excel

ID	County	Rank
1	Erie	39
2	Warren	35
3	Crawford	85
4	Mercer	68
5	Venango	27
6	Forest	28
7	McKean	32
8	Potter	14
9	Cameron	38
10	Elk	90
11	Jefferson	38
12	Clarion	18
13	Armstrong	13
14	Butler	79
15	Lawrence	51
16	Beaver	30
17	Washington	13
18	Allegheny	60
19	Westmoreland	78
20	Indiana	80
21	Clearfield	64
22	Clinton	83
23	Lycoming	14
24	Tioga	3
25	Bradford	13
26	Susquehanna	78
27	Wyoming	15
28	Sullivan	57
29	Columbia	53
30	Montour	33
31	Northumberland	27
32	Union	31
33	Centre	85
34	Blair	40
35	Cambria	91
36	Somerset	32
37	Fayette	52
38	Greene	20
39	Bedford	5
40	Huntingdon	1
41	Mifflin	13
42	Snyder	8
43	Juniata	1
44	Fulton	1
45	Franklin	2
46	Perry	14
47	Cumberland	13
48	Dauphin	75
49	Schuylkill	49
50	Luzerne	5
51	Lackawanna	12
52	Wayne	97
53	Pike	14
54	Monroe	4
55	Carbon	2
56	Northampton	1
57	Lehigh	1
58	Berks	5
59	Lebanon	89
60	Adams	22
61	York	61
62	Lancaster	87
63	Chester	2
64	Montgomery	1
65	Bucks	1
66	Philadelphia	1
67	Delaware	1

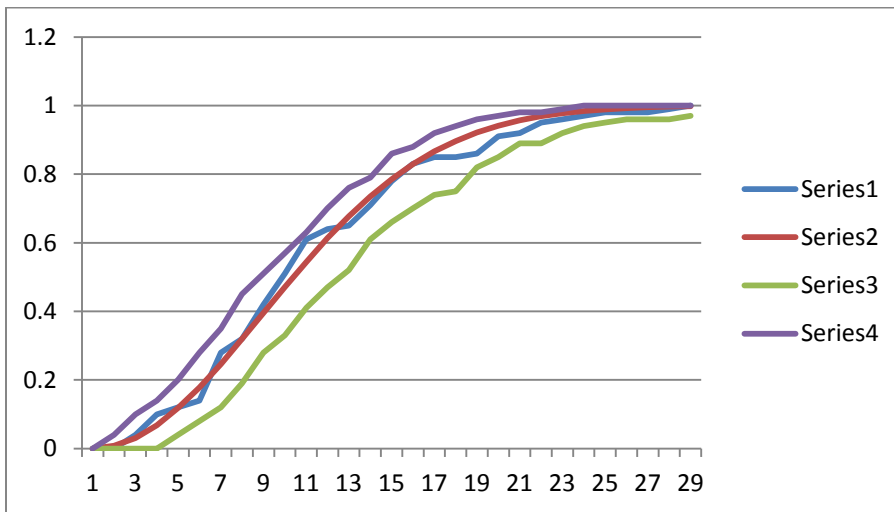
12) This map below represents low ranks, or unusually high observed Moran's I values, as lighter shades of blue and higher ranks in darker shades. The areas of low ranks, high Moran's I values would include I values near 1 indicating clustering. This can be compared to the county election map. Clusters of either Obama or McCain are similarly represented by the light blue. Area where neighboring counties voted differently would have a Moran's I of closer to -1 and would rank high, and be represented as dark blue counties. Areas with randomness, a Moran's I of 0 would be ranked somewhere in the middle, medium blue shade. The two maps have been provided below.



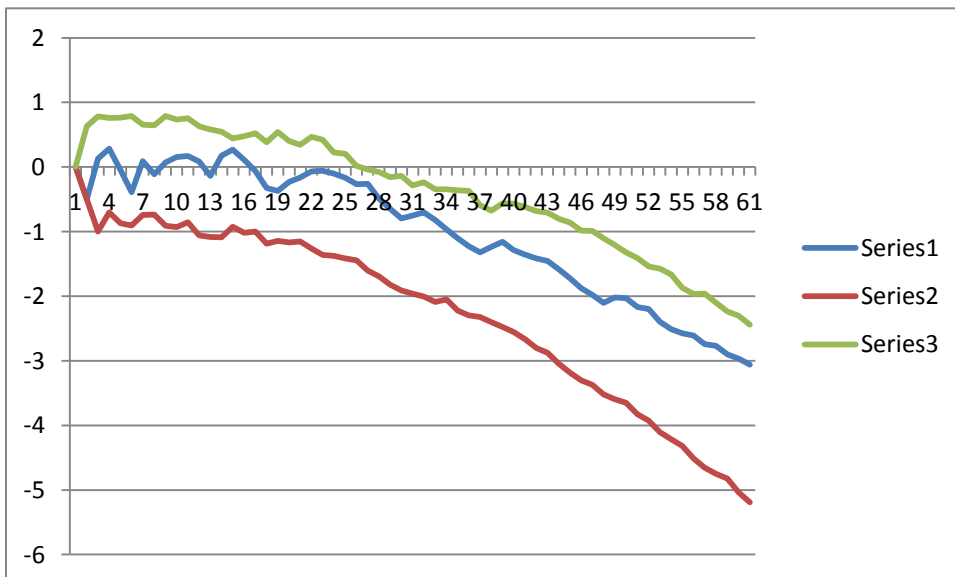
### 13) Random Pattern



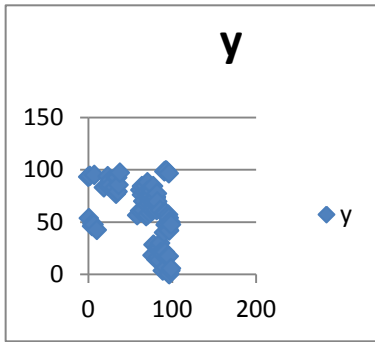
G function -



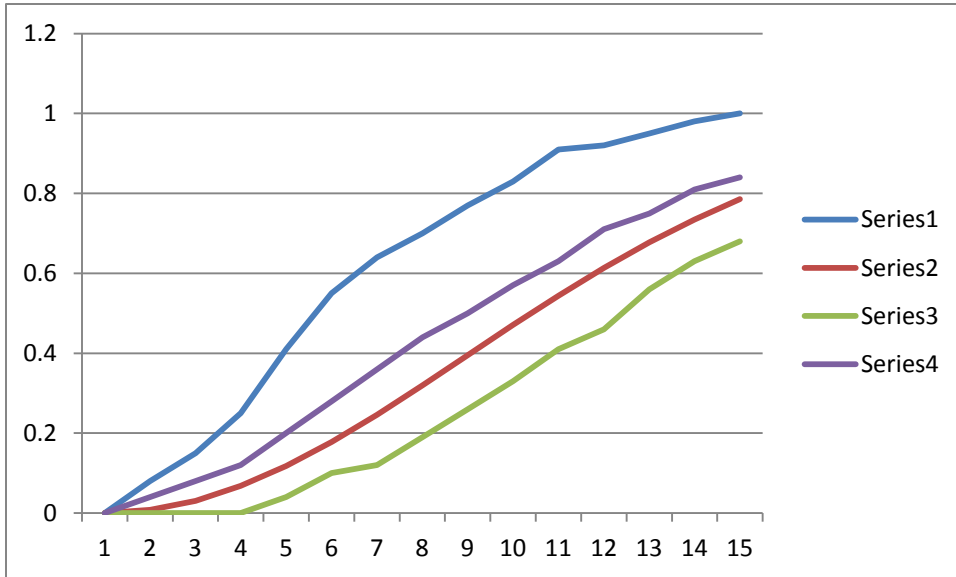
L function



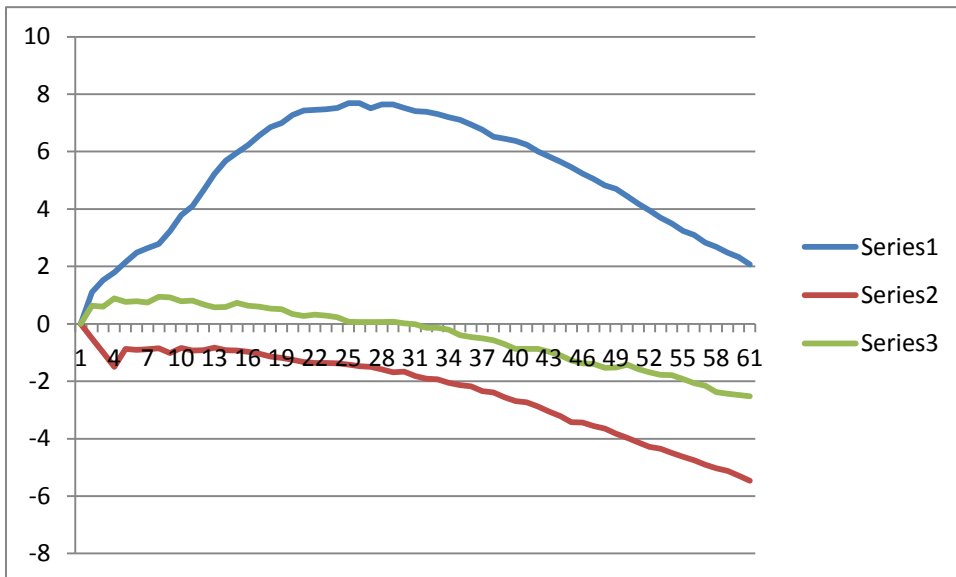
14) Clustered



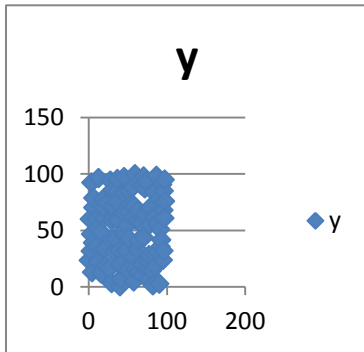
G function -



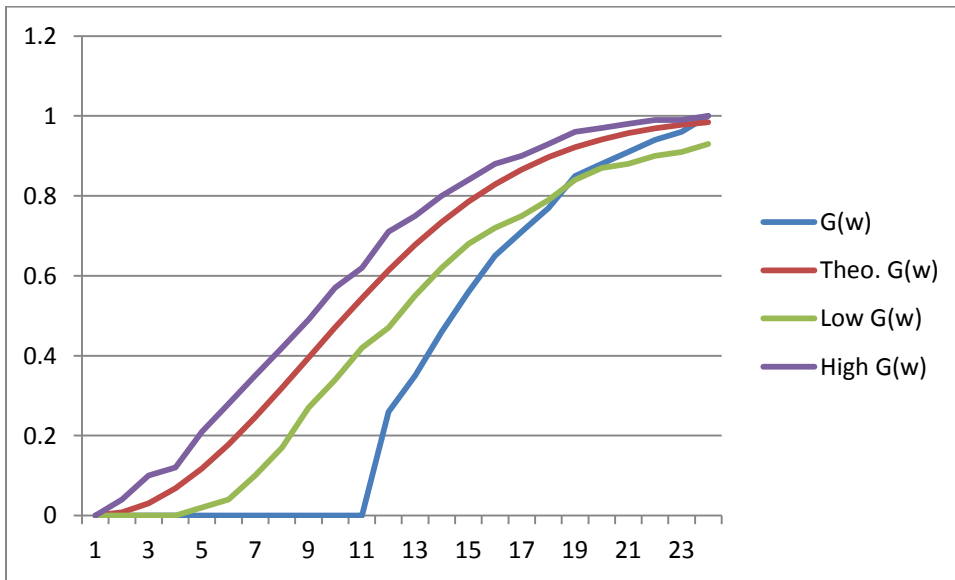
L function



15) Dispersed



G function -



L function

