Problem set #1

Research Methods (POS3713-2), Prof. Jens Großer

Due: Tuesday, February 17, 2009 (preferably after class)

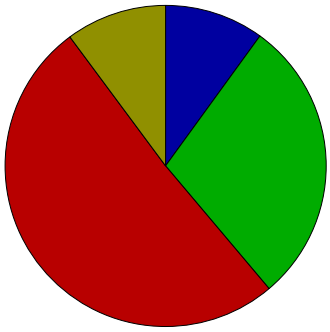
Remarks: The problem set contains 5 exercises. Always explain how you derive your solutions! For example, you can do so by first writing down a definition or formula of a statistical measure (don't forget to define the 'ingredients' of formulas: e.g., *N* denotes the total number of respondents and *k* denotes the number of categories). If you need more than one step to derive the final solution, always show your intermediate results (e.g., present them in different columns of a table). It is often helpful to look up the way we solved similar problems in our lecture notes.

The maximum number of points you can achieve in this problem set is 100 points. Recall that your score for this problem set determines 15% of your final course grade.

1) The following table and pie chart gives the frequencies of responses to the question "What is your highest level of education?".

EDUC CATEG -- EDUCATION LEVEL

	Freq.	%
1) NO H.S. DG	180	10.0
2) H.S. DEGR	519	28.8
3) COLLEGE	918	51.0
4) ADV DEGREE	183	10.2
TOTAL (N)	1800	100.0
Missing	7	



a) What *proportion* of all respondents has a High School Degree as their highest level of education? And what is the *percentage* of these respondents? [4 points]

b) What is the *ratio* of 'No High School Degree' respondents to 'College Degree' respondents? For every respondent with no high school degree, how many respondents are there with a college degree as their highest level of education? [6 points]

2) A city of 100.000 residents had 890 births in the year 2006. In 2007 the same city had 105.000 residents and 892 births.

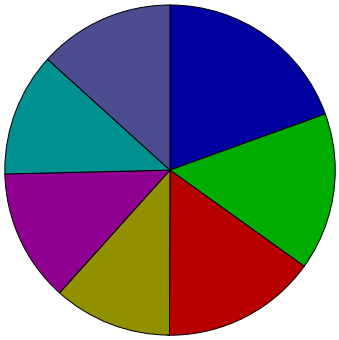
a) What were the city's birth *rates* (i.e., births for every 1000 residents) in 2006 and 2007? [4 points]

b) What is the *percentage change* in birth rates from 2006 to 2007? [6 points]

3) The following table and pie chart gives the frequencies of responses to the question about the strength of the respondents' party identification for 7 different scores.

PARTY ID -- PARTY IDENTIFICATION

	Freq.	%
1) STRONG DEM	346	19.5
2) WEAK DEM	274	15.4
3) IND DEM	269	15.1
4) INDEP IND	206	11.6
5) IND REPUB	230	13.0
6) WEAK REPUB	215	12.1
7) STRONG REP	236	13.3
TOTAL (N)	1776	100.0
Missing	31	

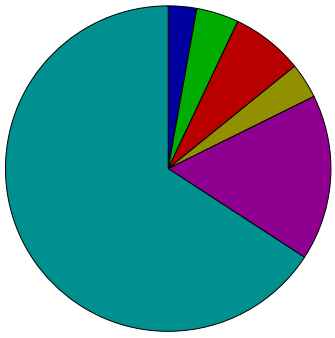


a) Derive the *cumulative frequency distribution* and the *cumulative percentage distribution* and present them in a table. [10 points]
b) What is the *modal* score? [5 points]
c) What is the *median* score (i.e., the score of the median respondent)? [5 points]
d) What is the *mean* score? [10 points]

4) The following table and pie chart gives the frequencies of responses to the question about the respondents' believe about God.

BELIEF GOD -- Which statement comes closest to expressing what you believe about God: don't
God; don't know and no way to find out; believe in higher power; believe in God sometimes; some
believe in God; no doubts about God's existence. (GOD)

	Freq.	%
1) DON'T BEL.	33	2.8
2) DON'T KNOW	49	4.2
3) HIGHER POW	83	7.1
4) BEL.SOMET.	41	3.5
5) BELIEVE,DB	192	16.5
6) NO DOUBTS	766	65.8
TOTAL (N)	1164	100.0
Missing	1653	



a) Compute the *index of qualitative variation* (IQV)? [6 points]
b) For the total number of respondents (N = 1164) and six categories given, suggest a possible frequency distribution that yields the lowest possible variation and calculate its IQV. Also suggest a possible frequency distribution that yields the highest possible variation and calculate its respective IQV. [8 points]

5) The following table shows the voter turnout (in %) for 140 countries (averaged over all elections held from 1945 to 1998 per country).
(Data source: http://www.idea.int/vt/survey/voter_turnout_pop2-2.cfm)

	Country	Voter turnout (in %)		Country	Voter turnout (in %)
1	Seychelles	96.1	71	Lesotho	64.3
2	Italy	92.5	72	Kazakhstan	64.3
3	Cambodia	90.5	73	Algeria	64.2
4	Iceland	89.5	74	Hungary	64.1
5	Indonesia	88.3	75	Luxembourg	64.1
6	New Zealand	86.2	76	Nepal	63.7
7	Uzbekistan	86.2	77	Barbados	63.5
8	Albania	85.3	78	Bahamas	63.2
9	Austria	85.1	79	Latvia	63.1
10	Belgium	84.9	80	Kiribati	62.4
11	Czech Republic	84.8	81	Nicaragua	62.0
12	Netherlands	84.8	82	Singapore	62.0
13	Australia	84.4	83	Bolivia	61.4
14	Denmark	83.6	84	Georgia	60.6
15	Sweden	83.3	85	India	60.6
16	Mauritius	82.8	86	Moldova	60.5
17	Portugal	82.4	87	Sri Lanka	60.5
18	Mongolia	82.3	88	Lebanon	60.2
19	Tuvalu	81.9	89	Benin	60.1
20	Western Samoa	81.9	90	Lithuania	60.1
21	Andorra	81.3	91	St. Lucia	59.9
22	Germany	80.6	92	Fiji	59.9
23	Slovenia	80.6	93	Sao Tomé and Principe	59.6
24	Aruba	80.4	94	Solomon Islands	59.0
25	Namibia	80.4	95	Malaysia	59.0
26	Greece	80.3	96	Zimbabwe	58.8
27	Guyana	80.3	97	Jamaica	58.5
28	Israel	80.0	98	Tunisia	58.4
29	Kuwait	79.6	99	St. Kitts and Nevis	58.1
30	Norway	79.5	100	Morocco	57.6
31	San Marino	79.1	101	Cameroon	56.3
32	Finland	79.0	102	Paraguay	56.0
33	Suriname	77.7	103	Bangladesh	56.0
34	Malta	77.6	104	Estonia	56.0
35	Bulgaria	77.5	105	Gambia	55.8
36	Romania	77.2	106	Honduras	55.3
37	Spain	77.0	107	Russia	55.0
38	Maldives	76.0	108	Panama	53.4

39	Comoros Islands	75.7	109	Poland	52.3
40	Cape Verde Islands	75.6	110	Uganda	50.6
41	Ireland	74.9	111	Antigua and Barbuda	50.2
42	United Kingdom	74.9	112	Burma/Myanmar	50.0
43	Republic of Korea	74.8	113	Switzerland	49.3
44	Monaco	73.8	114	USA	48.3
45	Croatia	73.5	115	Mexico	48.1
46	Turkey	73.5	116	Peru	48.0
47	St. Vincent and the Grenadines	72.4	117	Brazil	47.9
48	Venezuela	72.2	118	Nigeria	47.6
49	Belize	72.1	119	Thailand	47.4
50	Dominica	71.3	120	Sierra Leone	46.8
51	Argentina	70.6	121	Botswana	46.5
52	Cyprus	70.4	122	Chile	45.9
53	Uruguay	70.3	123	Senegal	45.6
54	Vauatu	70.2	124	Ecuador	44.7
55	Taiwan, Republic of China	70.1	125	El Salvador	44.3
56	Philippines	69.6	126	Haiti	42.9
57	Togo	69.3	127	Ghana	42.4
58	Papua New Guinea	69.1	128	Pakistan	41.8
59	Federal Republic of Yugoslavia	69.1	129	Zambia	40.5
60	Japan	69.0	130	Burkina Faso	38.3
61	Dominican Republic	68.7	131	Nauru	37.3
62	Costa Rica	68.4	132	Yemen	36.8
63	Canada	68.4	133	Colombia	36.2
64	Iran	67.6	134	Niger	35.6
65	France	67.3	135	Sudan	32.0
66	Liechtenstein	67.3	136	Jordan	29.9
67	Trinidad and Tobago	66.2	137	Guatemala	29.8
68	Ukraine	66.1	138	Djibouti	28.0
69	Madagascar	66.1	139	Egypt	24.6
70	Grenada	64.8	140	Mali	21.7

Use Microsoft Office Excel or comparable software of your choice to work on the following problems. Print your solutions; do not submit them in electronic form!

a) What are the *modal*, *median*, and *mean* voter turnout (in %)? [6 points]
b) Calculate the *variance* and the *standard deviation* of the voter turnout distribution. [20 points]
c) Create a *bar chart*! For the horizontal axis, use voter turnout (in %) categories of interval size 10 (i.e., the intervals 0-9.9%, 10-19.9%, …, 90-100%). Show the frequencies of countries that fall into each category on the vertical axis. [10 points]

Don't forget to put your name on your solution sheets!

Good luck!