STAT 303 Sections 503–504 Exam 1, Spring 1996

Name: __________________________

ID#: __________________________

Form A

Read the following carefully!!

1. Do not begin work until you are told to do so.
2. If there are K correct answers to a multiple choice question, only your first K answers will be considered.
3. There is a total of 100 points. Every correct answer is worth 4 points. The exam is worth 25% of your final grade.
4. You will have 60 minutes to finish this exam.
5. You must work alone on this exam and use no books, notes, or any other materials. This is a closed book, closed notes exam.
6. Good luck!

1. Which *two* of the following statistics can't be negative?
   (a) r.
   (b) $\bar{X}$.
   (c) IQR.
   (d) s.

2. What kind of random sampling is used to obtain a hypergeometric random variable?

   ____

3. (a) How much is the mean of a sample of five points decreased if I decrease the smallest observation by 10,000?

   ____

   (b) How much is the median decreased?

   ____

4. What are the possible values of the coefficient of determinism, R^2?

   ____

5. Which of the four box plots in Figure 1 indicate data that are skewed to the right?
   (a) x.
   (b) y.
   (c) z.
   (d) w.

6. What is $P(Z < 2.32)$? Use the Z table on the last page.

   ____

7. What is the 23rd percentile of Z? (Round your answer to two decimal places, use the Z table.)

   ____

8. On each line below, write down the symbol for one of the parameters we have studied as well as what the parameter represents.

   ____

   ____

   ____

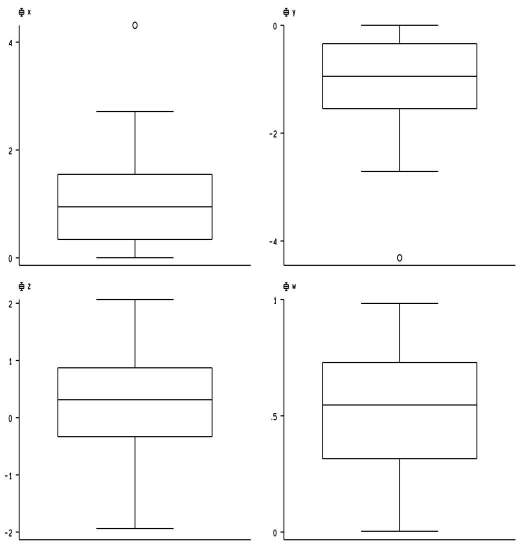

Figure 1: Upper left is x, upper right is y, lower left is z, lower right is w.

9. If $P(A \cap B) = P(A)P(B)$, which *two* of the following statements are true?
   (a) A and B can't be mutually exclusive.
   (b) A and B are independent.
   (c) $P(A|B) = P(A)$.
   (d) $P(A) = P(B)$.
   (e) $A \cup B = A$.

10. Which of the following are either binomial or negative binomial random variables? Note that there may be more than one correct answer.
    (a) The number of non-blue m&m's you have to eat until you get a blue one when you successively choose at random m&m's to eat from the bag.
    (b) The distance from the center of a target an arrow hits when it is randomly shot at the target.
    (c) The number of marbles you have to choose before you get the third red marble when you put back each marble before drawing the next.
    (d) The number of blue m&m's in a randomly chosen handful of 10 from a bag.
    (e) The number of cars going by on a deserted highway in an hour.
    (f) The number of heads in 10 flips of a fair coin.

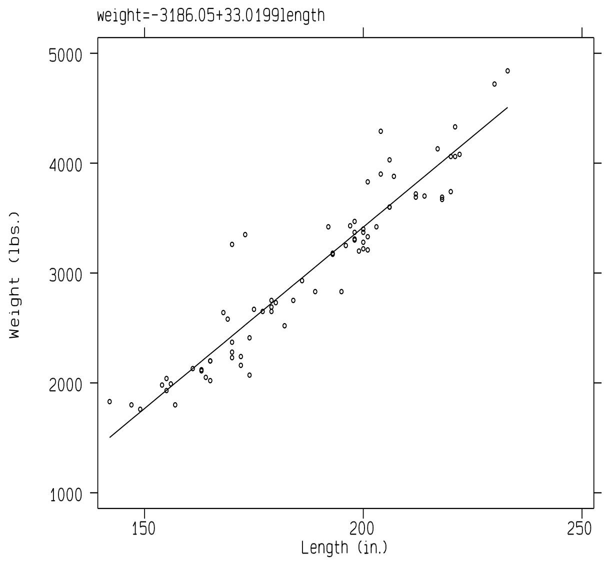

Figure 2: Scatterplot with regression line of car weight versus length for a variety of makes and models of cars.

11. Answer the following questions based on Figure 2.

    (a) What are the slope and intercept of the line?

    (b) Give a rough estimate of the numerical value of r.

    (c) Why does the y intercept make no sense in this problem?

12. If the mean and variance of a population are 10 and 4, respectively, then

    (a) What percent of the elements of the population does Chebychev's rule tell us are are between 6 and 14?

    (b) How about the empirical rule?

13. Which of the following are true? Note there may be more than one correct answer.

    (a) If X and Y are highly correlated, then X could be causing Y.
    (b) The number of elements in the intersection of two sets is always less than the number of elements in either set.
    (c) The complement of a set is always larger than the set itself.
    (d) $5! = 120$.
    (e) The median of the standard normal distribution is 1.

14. If I loaded a die so that it had the following probabilities

x	1	2	3	4	5	6
P(X=x)	.2	.2	.2	.2	.1	.1

what would be the average value of the die if I rolled it many times?

15. Find the IQR of the digits of your student id number. Make sure to write your id down so I can check. In getting the quartiles, include the median in the 'halves' of the sample.

P(Z<z)

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-2.5	.0062	.0060	.0059	.0057	.0055	.0054	.0052	.0051	.0049	.0048
-2.4	.0082	.0080	.0078	.0075	.0073	.0071	.0069	.0068	.0066	.0064
-2.3	.0107	.0104	.0102	.0099	.0096	.0094	.0091	.0089	.0087	.0084
-2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110
-2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143
-2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183
-1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233
-1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294
-1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367
-1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455
-1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559
-1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681
-1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823
-1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985
-1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170
-1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379
-0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611
-0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867
-0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148
-0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451
-0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776
-0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121
-0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483
-0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859
-0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247
0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952