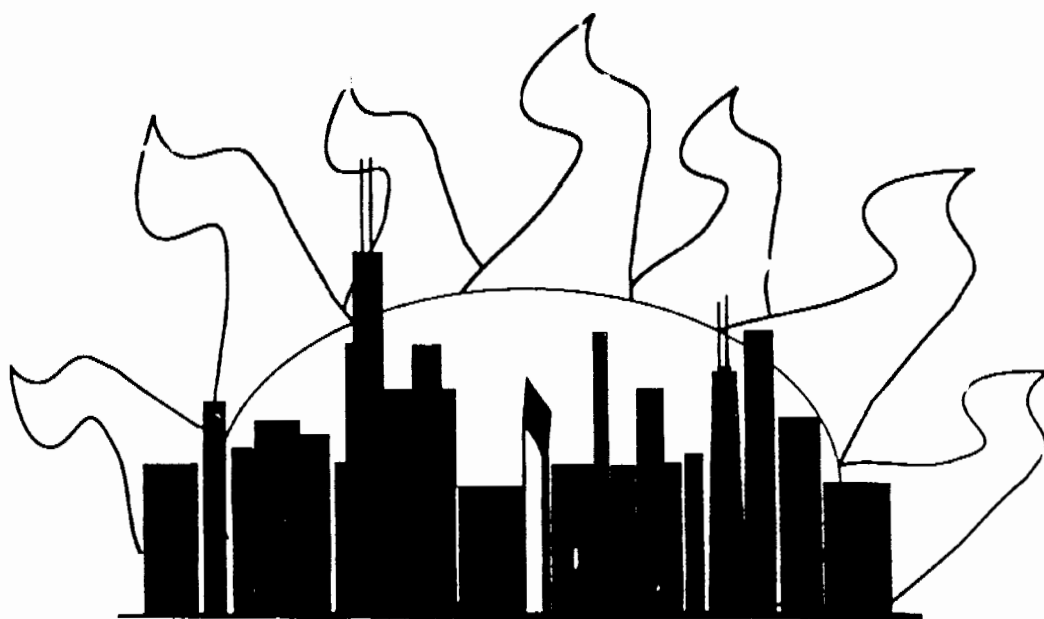


Mu Division

Topic Test 3

Statistics



**Mu Alpha Theta National Convention
Chicago 1998**

General Instructions:

Unless otherwise stated all answers should be written as decimals.

If you are asked to give your answer as a fraction, please give your answer in a/b form where a and b are relatively prime.

Questions

1. If all the values of a data set are the same, what is the difference between the variance and the standard deviation?
2. The number of yards gained rushing by the Red Hawks foot ball team during the first 7 games of the season are 210, 203, 162, 134, 390, 184, and 211. What is the value of the interquartile range?
3. If the Q_3 value for a data set is 50 and the interquartile range is 12, how large would a value need to be before it would be considered an outlier?
4. In the following table, what value for n results in a table showing perfect independence?

40	60
50	n

5. The average cost per ounce of glass cleaner is 7.7 cents with a standard deviation of 2.5 cents. What is the z-score of *Windex* brand glass cleaner with a cost of 10.1 cents per ounce?
6. Joe Di Maggio had a career batting average of .325. What was the probability that he would get at least one hit in five official times at bat? Round your answer to three decimal places.
7. In a particular high school, the ratio of the number of female teachers to male teachers is 11 to 10. If the average (arithmetic mean) age of the women is 34 and the average age of the men is 32, what is the average age of all of the teachers? Write your answer rounded to the nearest hundredth.

The next two problems are related to this data set.

The ages of the U.S. Presidents at the time of their first inauguration are listed below in chronological order (i.e. George Washington was 57 and Bill Clinton was 47).

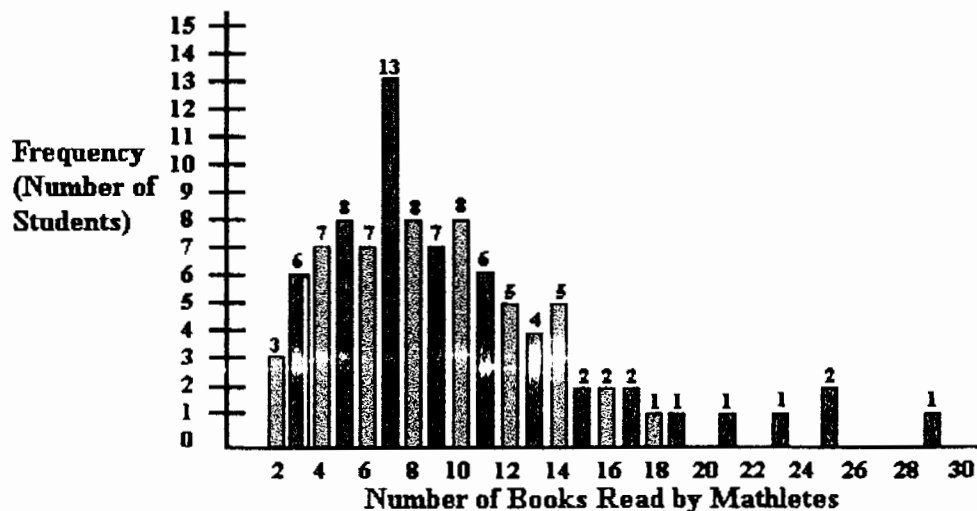
57	61	57	57	58	57	61
54	68	51	49	64	50	48
65	52	56	46	54	49	51
47	55	55	54	42	51	56
55	51	54	51	60	62	43
55	56	61	52	69	64	47

- Determine the mean age. Round your answer to the nearest hundredth.
- Determine the standard deviation of the ages. Round your answer to the nearest hundredth.
- To study the relationship between party affiliation and support for a balanced budget amendment, 500 registered voters were surveyed with the following results:

	For	Against	No Opinion
Democrat	50	150	50
Republican	125	50	25
Independent	15	10	25

What percent of those surveyed voted for the amendment and were Democrats?

- What is the absolute value difference between the mean and the median of the distribution represented by this graph?

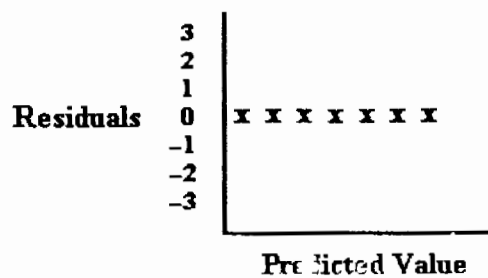


12. Following are the distances from the sun and the times of revolution for the nine planets in our solar system.

Planet	Avg. Distance from Sun (millions of miles)	Time for Revolution (days)
Mercury	36	88
Venus	97	275
Earth	93	365
Mars	141	687
Jupiter	484	4,332
Saturn	888	10,826
Uranus	1,764	30,676
Neptune	2,790	59,911
Pluto	3,654	90,824

Calculate the correlation coefficient of $\log y$ in terms of $\log x$. Give your answer correct to four decimal places.

13. Given that 10% of the nails made using a certain manufacturing process have a length less than 2.48 inches, while 5% have a length greater than 2.54 inches, what is the mean of the lengths of the nails? Assume that the lengths have a normal distribution. Round your answer to the nearest hundredth.
14. Following is a plot of residuals as the dependent variable and the predicted value as the independent variable. If the slope of the regression line is non-negative, what is the value of the coefficient of correlation?



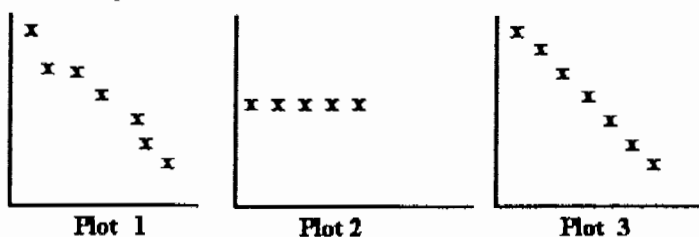
15. Following are parts of the probability distributions for the random variables X and Y .

x	$P(x)$
1	.25
2	?
3	.35
4	???

y	$P(y)$
1	.3
2	.5
3	??

If X and Y are independent and the joint probability $P(X = 2, Y = 3) = .03$, what is the value of $P(X = 4)$?

16. Consider the three scatterplots below.



What is the relationship of the coefficients of correlation associated with each of the plots? Indicate your answer by using each of the symbols in an inequality as shown below:

plot # < plot # < plot #

17. Assuming all other things being equal, by what percent does the interval increase when changing from a 90% confidence interval estimate to a 99% confidence interval estimate? Assume that the distribution is normal. Round your answer to the nearest percent.
18. In a random sample of 100 high school students, the average number of hours they slept last night was normally distributed at 7.4 hours with a standard deviation of 1.3 hours. The 99% confidence interval was reported as $7.4 \pm x$. What is the value of x ? Round your answer to the nearest thousandth.
19. Suppose that 60% of students taking the AP Statistics exam score 4 or 5, 25% score 3, and the rest score 1 or 2. Suppose also that 95% of those receiving a 4 or 5 receive college credit, 50% of those scoring 3 receive college credit, and 4% of those scoring 1 or 2 receive college credit. If a student is chosen at random from among those taking the exam receives college credit, what is the probability that the student received a score of 3 on the exam? Round your answer to three decimal places.

20. Below is a computer printout of data relating the number of teaspoons of weed killer per gallon of water and the percent of weeds killed in a field.

Source	Sum of Squares	df	Mean Square	F-ratio
Regression	8330.16	1	8330.16	410
Residual	243.589	12	20.2990	

Variable	Coefficient	s.e. of coeff	t-ratio	Prob
Constant	-20.5893	3.242	-6.35	≤ 0.0001
No. Teaspoons	24.3929	1.204	20.3	≤ 0.0001

What is the predicted percent of weeds killed if 2.5 teaspoons of weed killer per gallon of water is used? Round your answer to two decimal places.

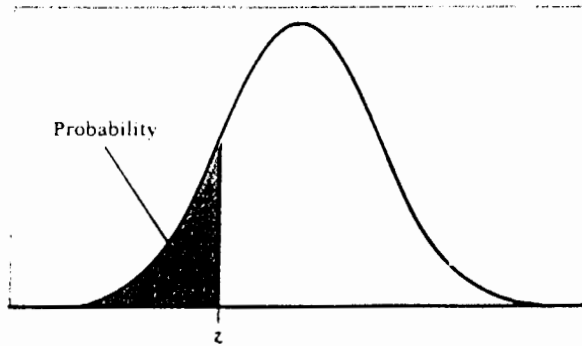


Table entry is probability at or below z .

Table A Standard normal probabilities

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-3.4	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002
-3.3	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003
-3.2	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005
-3.1	.0010	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0007	.0007
-3.0	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0010	.0010
-2.9	.0019	.0018	.0018	.0017	.0016	.0016	.0015	.0015	.0014	.0014
-2.8	.0026	.0025	.0024	.0023	.0023	.0022	.0021	.0021	.0020	.0019
-2.7	.0035	.0034	.0033	.0032	.0031	.0030	.0029	.0028	.0027	.0026
-2.6	.0047	.0045	.0044	.0043	.0041	.0040	.0039	.0038	.0037	.0036
-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