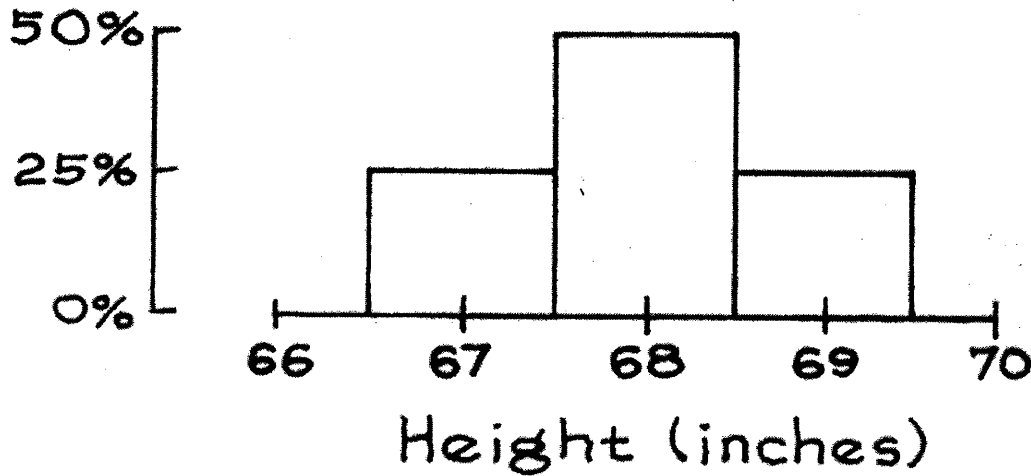


Stat 1040:

Quizzes, Fall 2003

Question 2: Histograms (10 Points)

(Hypothetical) In one study, 100 people had their heights measured to the nearest eighth of an inch. A histogram for the results is shown below. Two of the following lists have this histogram. Which ones, and why? (Explain briefly!)



1. 25 people, 67 inches tall; 50 people, 68 inches tall; 25 people, 69 inches tall.
2. 10 people, $66\frac{3}{4}$ inch tall; 15 people, $67\frac{1}{4}$ inches tall; 50 people, 68 inches tall; 25 people, 69 inches tall.
3. 30 people, 67 inches tall; 40 people, 68 inches tall; 30 people, 69 inches tall.

Statistics 1040, Section 004, Quiz 2 (20 Points)

September 12, 2003

Your Name: _____

Question 1: Measures of Center and Spread (20 Points)

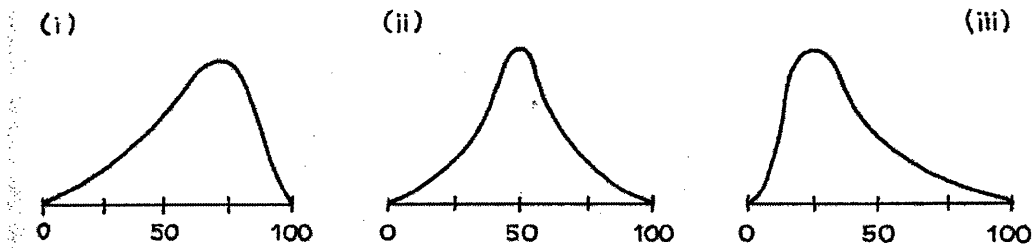
1. **(10 Points)** Find the average and the standard deviation of the following two lists of numbers:

<u>Numbers</u>	<u>Average</u>	<u>Standard deviation</u>
17, 17, 17, 17, 17	_____	_____
15, 16, 17, 18, 19	_____	_____

Show your work! Use formulas provided on the back where necessary.

Please turn over!

2. (10 Points) Below are sketches of histograms for three lists.



(a) In a scrambled order, the averages are 40, 50, 60. Match the histograms with averages:

Histogram (i): average =

Histogram (ii): average =

Histogram (iii): average =

(b) Match the histograms with the description (circle your answer):

- The median is less than the average. Histogram (i), (ii), or (iii).
- The median is about equal to the average. Histogram (i), (ii), or (iii).
- The median is bigger than the average. Histogram (i), (ii), or (iii).

(c) The SD for histogram (i) is a lot smaller than that for histogram (iii). True or false? Circle your answer and explain:

Formulas:

$$\text{avg} = \frac{\text{sum of all numbers}}{\text{how many numbers}}$$

$$\text{SD} = \sqrt{\text{average of } [(\text{deviations from avg})^2]}$$

Statistics 1040, Section 004, Quiz 3 (20 Points)

September 19, 2003

Your Name: _____

Question 1: Normal Approximation for Data (20 Points)

The histogram of resting pulse rates of men follows approximately the normal curve with an average of 70 beats per minute and a standard deviation of 8 beats per minute.

Answer the questions below.

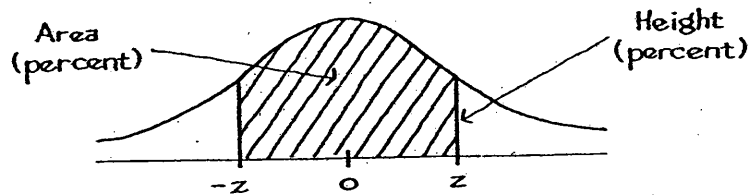
Show all your work & use the Normal Table on the back!

1. (10 Points) About what percentage of men have a resting pulse rate between 60 and 75?

Answer: about _____ %

2. (10 Points) Would it be unusual for a man to have a resting pulse rate less than 40? Yes or No? Explain and support your answer with appropriate calculations.

Tables



A NORMAL TABLE

<i>z</i>	<i>Area</i>	<i>z</i>	<i>Area</i>	<i>z</i>	<i>Area</i>
0.00	0	1.50	86.64	3.00	99.730
0.05	3.99	1.55	87.89	3.05	99.771
0.10	7.97	1.60	89.04	3.10	99.806
0.15	11.92	1.65	90.11	3.15	99.837
0.20	15.85	1.70	91.09	3.20	99.863
0.25	19.74	1.75	91.99	3.25	99.885
0.30	23.58	1.80	92.81	3.30	99.903
0.35	27.37	1.85	93.57	3.35	99.919
0.40	31.08	1.90	94.26	3.40	99.933
0.45	34.73	1.95	94.88	3.45	99.944
0.50	38.29	2.00	95.45	3.50	99.953
0.55	41.77	2.05	95.96	3.55	99.961
0.60	45.15	2.10	96.43	3.60	99.968
0.65	48.43	2.15	96.84	3.65	99.974
0.70	51.61	2.20	97.22	3.70	99.978
0.75	54.67	2.25	97.56	3.75	99.982
0.80	57.63	2.30	97.86	3.80	99.986
0.85	60.47	2.35	98.12	3.85	99.988
0.90	63.19	2.40	98.36	3.90	99.990
0.95	65.79	2.45	98.57	3.95	99.992
1.00	68.27	2.50	98.76	4.00	99.9937
1.05	70.63	2.55	98.92	4.05	99.9949
1.10	72.87	2.60	99.07	4.10	99.9959
1.15	74.99	2.65	99.20	4.15	99.9967
1.20	76.99	2.70	99.31	4.20	99.9973
1.25	78.87	2.75	99.40	4.25	99.9979
1.30	80.64	2.80	99.49	4.30	99.9983
1.35	82.30	2.85	99.56	4.35	99.9986
1.40	83.85	2.90	99.63	4.40	99.9989
1.45	85.29	2.95	99.68	4.45	99.9991

Statistics 1040, Section 004, Quiz 4 (20 Points)

September 26, 2003

Your Name: _____

Question 1: Percentiles and the Normal Curve (12 Points)

The scores of a reference population on a Wechsler Intelligence Scale for Children (WISC) approximately follow the normal curve with an average of 100 and a standard deviation of 15 points. **Show your work!**

1. (6 Points) What percent of this population have WISC scores below 80?

Answer: about _____ %

2. (6 Points) What WISC score is needed to place a child in the top 5% of the population?

Answer: a score of about _____

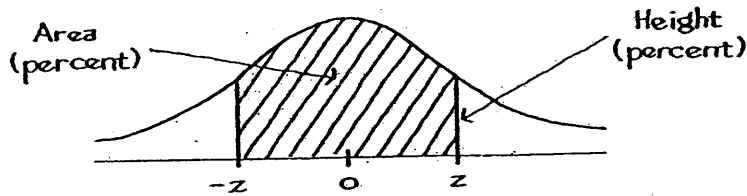
Question 2: Correlation (8 Points)

Investigators are studying registered students at a university. The students fill out questionnaires giving their year of birth, age (in years), age of mother, and so forth. Fill in the blanks, using the options given below, and **explain briefly**.

1. (4 Points) The correlation between student's age and year of birth is _____.
2. (4 Points) The correlation between student's age and mother's age is _____.

Options: (a) -1 (b) nearly -1 (c) somewhat negative (d) 0
(e) somewhat positive (f) nearly 1 (g) 1

Tables



A NORMAL TABLE

z	Area	z	Area	z	Area
0.00	0	1.50	86.64	3.00	99.730
0.05	3.99	1.55	87.89	3.05	99.771
0.10	7.97	1.60	89.04	3.10	99.806
0.15	11.92	1.65	90.11	3.15	99.837
0.20	15.85	1.70	91.09	3.20	99.863
0.25	19.74	1.75	91.99	3.25	99.885
0.30	23.58	1.80	92.81	3.30	99.903
0.35	27.37	1.85	93.57	3.35	99.919
0.40	31.08	1.90	94.26	3.40	99.933
0.45	34.73	1.95	94.88	3.45	99.944
0.50	38.29	2.00	95.45	3.50	99.953
0.55	41.77	2.05	95.96	3.55	99.961
0.60	45.15	2.10	96.43	3.60	99.968
0.65	48.43	2.15	96.84	3.65	99.974
0.70	51.61	2.20	97.22	3.70	99.978
0.75	54.67	2.25	97.56	3.75	99.982
0.80	57.63	2.30	97.86	3.80	99.986
0.85	60.47	2.35	98.12	3.85	99.988
0.90	63.19	2.40	98.36	3.90	99.990
0.95	65.79	2.45	98.57	3.95	99.992
1.00	68.27	2.50	98.76	4.00	99.9937
1.05	70.63	2.55	98.92	4.05	99.9949
1.10	72.87	2.60	99.07	4.10	99.9959
1.15	74.99	2.65	99.20	4.15	99.9967
1.20	76.99	2.70	99.31	4.20	99.9973
1.25	78.87	2.75	99.40	4.25	99.9979
1.30	80.64	2.80	99.49	4.30	99.9983
1.35	82.30	2.85	99.56	4.35	99.9986
1.40	83.85	2.90	99.63	4.40	99.9989
1.45	85.29	2.95	99.68	4.45	99.9991

Formulas:

$$\text{r.m.s. error} = \sqrt{1 - r^2} \times \text{SD}_y$$

$$\text{slope} = r \times \frac{\text{SD}_y}{\text{SD}_x}$$

$$\text{intercept} = \text{avg}_y - \text{slope} \times \text{avg}_x$$

Statistics 1040, Section 004, Quiz 6 (20 Points)

October 17, 2003

Your Name: _____

Question 1: Chance/Probability (16 Points)

A drawer of socks contains 24 socks of which 5 are black, 10 are blue, and 9 are green. In the dark, a child chooses two socks at random to wear to school.

1. (4 Points) What is the chance that the first sock is green?
2. (4 Points) What is the chance that the first sock is green or blue?
3. (4 Points) What is the chance that the first two socks are both green?
4. (4 Points) What is the chance that neither of the two socks is green?

Question 2: Chance/Probability (4 Points)

There is something wrong in each of the following statements. Explain briefly what is wrong:

1. (2 Points) The probability that a randomly selected driver will be wearing a seat belt is .75, whereas the probability that he or she will not be wearing one is .30.
2. (2 Points) The probability that a randomly selected car is red is 1.20.

Question 2: Law of Averages (4 Points)

A box contains 10,000 tickets: 4,000 $\boxed{0}$'s and 6,000 $\boxed{1}$'s. And 10,000 draws will be made at random with replacement from this box. Which of the following best describes the situation, and why? **Explain briefly.**

1. The number of 1's will be 6,000 exactly.
2. The number of 1's is very likely to equal 6,000, but there is also some small chance that it will not be equal to 6,000.
3. The number of 1's is likely to be different from 6,000, but the difference is likely to be small compared to 10,000.

Formulas:

$$\text{box average} = \frac{\text{sum of all numbers in box}}{\text{how many numbers in box}}$$

$$\text{box SD} = \sqrt{\text{average of } [(\text{deviations from box average})^2]}$$

$$EV_{sum} = \text{number of draws} \times \text{box average}$$

$$SE_{sum} = \sqrt{\text{number of draws}} \times \text{box SD}$$

Formulas:

$$\text{box average} = \frac{\text{sum of all numbers in box}}{\text{how many numbers in box}}$$

$$\text{box SD} = \sqrt{\text{average of } [(\text{deviations from box average})^2]}$$

$$EV_{\text{sum}} = \text{number of draws} \times \text{box average}$$

$$SE_{\text{sum}} = \sqrt{\text{number of draws}} \times \text{box SD}$$

Shortcut formulas for a box that contains only two different numbers:

$$\text{average} = \frac{(\text{smaller} \times \text{how many}) + (\text{bigger} \times \text{how many})}{\text{how many tickets in the box}}$$

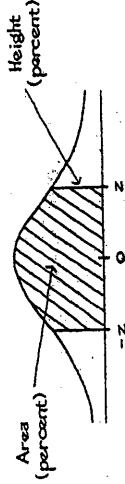
$$\text{SD} = (\text{bigger} - \text{smaller}) \times \sqrt{\frac{\text{fraction of bigger} \times \text{fraction of smaller}}{\text{bigger} \times \text{smaller}}}$$

Shortcut formulas for a box that contains only 0's and 1's:

$$\text{average} = \frac{\text{number of 1's}}{\text{how many tickets in the box}}$$

$$\text{SD} = \sqrt{\frac{\text{fraction of 1's} \times \text{fraction of 0's}}{\text{of 1's} \times \text{of 0's}}}$$

Tables



A NORMAL TABLE

z	Area	z	Area	z	Area
0.00	0	1.50	86.64	3.00	99.730
0.05	3.99	1.55	87.89	3.05	99.771
0.10	7.97	1.60	89.04	3.10	99.806
0.15	11.92	1.65	90.11	3.15	99.837
0.20	15.85	1.70	91.09	3.20	99.863
0.25	19.74	1.75	91.99	3.25	99.885
0.30	23.58	1.80	92.81	3.30	99.903
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0.50	38.29	2.00	95.45	3.50	99.953
0.55	41.77	2.05	95.96	3.55	99.961
0.60	45.15	2.10	96.43	3.60	99.968
0.65	48.43	2.15	96.84	3.65	99.974
0.70	51.61	2.20	97.22	3.70	99.978
0.75	54.67	2.25	97.56	3.75	99.982
0.80	57.63	2.30	97.86	3.80	99.986
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1.15	74.99	2.65	99.20	4.15	99.9967
1.20	76.99	2.70	99.31	4.20	99.9973
1.25	78.87	2.75	99.40	4.25	99.9979
1.30	80.64	2.80	99.49	4.30	99.9983
1.35	82.30	2.85	99.56	4.35	99.9986
1.40	83.85	2.90	99.63	4.40	99.9989
1.45	85.29	2.95	99.68	4.45	99.9991

Statistics 1040, Section 004, Quiz 9 (20 Points)

November 14, 2003

Your Name: _____

Question 1: Confidence Intervals for Percentages (20 Points)

There are approximately 20,000 students at USU. A random sample of 500 students had been asked whether or not they were satisfied with President Kermit Hall. The results of the survey showed that 400 of the 500 students in the sample were satisfied with President Kermit Hall.

1. (14 Points) Find a 99.5% confidence interval for the percentage of all USU students who are satisfied with President Hall.

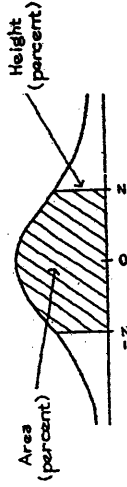
Show your work!

2. (6 Points) Would it still be possible to construct a 99.5% confidence interval for the percentage of all USU students who are satisfied with President Hall if the survey showed that 498 (out of 500) students in the sample were satisfied with President Hall? Yes or No? And explain why or why not?

You do not have to construct the actual confidence interval, but you do have to show calculations necessary to support your answer.

Please turn over!

Tables



A NORMAL TABLE

z	Area	z	Area	z	Area
0.00	0	1.50	86.64	3.00	99.730
0.05	3.99	1.55	87.89	3.05	99.771
0.10	7.97	1.60	89.04	3.10	99.806
0.15	11.92	1.65	90.11	3.15	99.837
0.20	15.85	1.70	91.09	3.20	99.863
0.25	19.74	1.75	91.99	3.25	99.885
0.30	23.58	1.80	92.81	3.30	99.903
0.35	27.37	1.85	93.57	3.35	99.919
0.40	31.08	1.90	94.26	3.40	99.933
0.45	34.73	1.95	94.88	3.45	99.944
0.50	38.29	2.00	95.45	3.50	99.953
0.55	41.77	2.05	95.96	3.55	99.961
0.60	45.15	2.10	96.43	3.60	99.968
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0.80	57.63	2.30	97.86	3.80	99.986
0.85	60.47	2.35	98.12	3.85	99.988
0.90	63.19	2.40	98.36	3.90	99.990
0.95	65.79	2.45	98.57	3.95	99.992
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1.05	70.63	2.55	98.92	4.05	99.9949
1.10	72.87	2.60	99.07	4.10	99.9959
1.15	74.99	2.65	99.20	4.15	99.9967
1.20	76.99	2.70	99.31	4.20	99.9973
1.25	78.87	2.75	99.40	4.25	99.9979
1.30	80.64	2.80	99.49	4.30	99.9983
1.35	82.30	2.85	99.56	4.35	99.9986
1.40	83.85	2.90	99.63	4.40	99.9989
1.45	85.29	2.95	99.68	4.45	99.9991

Formulas:

$$\text{box average} = \frac{\text{sum of all numbers in box}}{\text{how many numbers in box}}$$

$$\text{box SD} = \sqrt{\text{average of } \{(\text{deviations from box average})^2\}}$$

$$EV_{sum} = \text{number of draws} \times \text{box average}$$

$$SE_{sum} = \sqrt{\text{number of draws} \times \text{box SD}}$$

Shortcut formulas for a box that contains only two different numbers:

$$\text{average} = \frac{(\text{smaller} \times \text{how many}) + (\text{bigger} \times \text{how many})}{\text{how many tickets in the box}}$$

$$SD = (\text{bigger} - \text{smaller}) \times \sqrt{\frac{\text{fraction of bigger} \times \text{fraction of smaller}}{\text{bigger} \times \text{smaller}}}$$

Shortcut formulas for a box that contains only 0's and 1's:

$$\text{average} = \frac{\text{number of 1's}}{\text{how many tickets in the box}}$$

$$SD = \sqrt{\frac{\text{fraction of 1's} \times \text{fraction of 0's}}{\text{of 1's} \times \text{of 0's}}}$$

$$EV\% = \% \text{ of 1's in the box}$$

$$SE\% = \frac{SE_{sum}}{\#draws} \times 100\%$$

Statistics 1040, Section 004, Quiz 10 (20 Points)

November 19, 2003

Your Name: _____

Question 1: The Accuracy of Averages (20 Points)

A real estate office wants to make a survey in a certain town, which has 50,000 households, to determine how far the head of household has to commute to work. A simple random sample of 1,000 households is chosen, the occupants are interviewed, and it is found that, on average, the heads of the sample households commuted 8.7 miles to work; the SD of the distances was 9.0 miles. (All distances are one-way; if someone isn't working, the commute distance is defined to be 0.)

Answer the questions below and **show your work!**

1. (8 Points) The average commute distance of all 50,000 heads of households in the town is estimated as _____ miles, and this estimate is likely to be off by _____ miles or so.

2. (12 Points) If possible, find a 95%-confidence interval for the average commute distance of all heads of households in the town. If this isn't possible, explain why not.

Please turn over!

Formulas:

$$\text{box average} = \frac{\text{sum of all numbers in box}}{\text{how many numbers in box}}$$

$$\text{box SD} = \sqrt{\text{average of } [(\text{deviations from box average})^2]}$$

$$EV_{sum} = \text{number of draws} \times \text{box average}$$

$$SE_{sum} = \sqrt{\text{number of draws}} \times \text{box SD}$$

$$EV_{avg} = \text{box average} \qquad SE_{avg} = \frac{SE_{sum}}{\text{number of draws}}$$

Shortcut formulas for a box that contains only *two* different numbers:

$$\text{average} = \frac{(\text{smaller} \times \text{how many}) + (\text{bigger} \times \text{how many})}{\text{how many tickets in the box}}$$

$$\text{SD} = (\text{bigger} - \text{smaller}) \times \sqrt{\frac{\text{fraction}}{\text{bigger}} \times \frac{\text{fraction}}{\text{smaller}}}$$

Shortcut formulas for a box that contains only $\boxed{0}$'s and $\boxed{1}$'s:

$$\text{average} = \frac{\text{number of } \boxed{1} \text{'s}}{\text{how many tickets in the box}}$$

$$\text{SD} = \sqrt{\frac{\text{fraction}}{\text{of } \boxed{1} \text{'s}} \times \frac{\text{fraction}}{\text{of } \boxed{0} \text{'s}}}$$

$$EV_{\%} = \% \text{ of } \boxed{1} \text{'s in the box}$$

$$SE_{\%} = \frac{SE_{sum}}{\text{number of draws}} \times 100\%$$

Statistics 1040, Section 004, Quiz 11 (20 Points)

November 24, 2003

Your Name: _____

Question 1: Tests of Significance (20 Points)

A journal article claims that 60% of North American adults are too sedentary. Suppose you think a lower percentage of Cache Valley adults are too sedentary. To test your belief, you take a simple random sample of 120 Cache Valley adults and find that only 68 of them are too sedentary. Test to see if your belief is correct. (You may assume that everybody is using the same definition of "too sedentary", although in practice this would be contentious). **Show your work!**

1. (5 Points) State the null and the alternative hypothesis for this problem, in words and in terms of the box model.
2. (5 Points) Calculate the appropriate test statistic.
3. (5 Points) Obtain the P-value (use the normal table on the back).
4. (5 Points) State conclusions in terms of rejecting the null hypothesis and in your own words.

Please turn over!

Formulas:

$$\text{box average} = \frac{\text{sum of all numbers in box}}{\text{how many numbers in box}}$$

$$\text{box SD} = \sqrt{\text{average of [(deviations from box average)]}^2}$$

$$EV_{sum} = \text{number of draws} \times \text{box average}$$

$$SE_{sum} = \sqrt{\text{number of draws} \times \text{box SD}}$$

$$EV_{avg} = \text{box average} \quad SE_{avg} = \frac{SE_{sum}}{\text{number of draws}}$$

Shortcut formulas for a box that contains only two different numbers:

$$\text{average} = \frac{(\text{smaller} \times \text{how many}) + (\text{bigger} \times \text{how many})}{\text{how many tickets in the box}}$$

$$SD = (\text{bigger} - \text{smaller}) \times \sqrt{\frac{\text{fraction} \times \text{fraction}}{\text{bigger} \times \text{smaller}}}$$

Shortcut formulas for a box that contains only 0's and 1's:

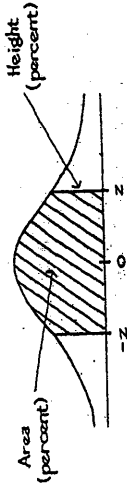
$$\text{average} = \frac{\text{number of 1's}}{\text{how many tickets in the box}}$$

$$SD = \sqrt{\frac{\text{fraction of 1's} \times \text{fraction of 0's}}{\text{of 1's} \times \text{of 0's}}}$$

$$EV_{\%} = \% \text{ of 1's in the box}$$

$$SE_{\%} = \frac{SE_{sum}}{\text{number of draws}} \times 100\%$$

Tables



A NORMAL TABLE

z	Area	z	Area	z	Area
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0.35	27.37	1.85	93.57	3.35	99.919
0.40	31.08	1.90	94.26	3.40	99.933
0.45	34.73	1.95	94.88	3.45	99.944
0.50	38.29	2.00	95.45	3.50	99.953
0.55	41.77	2.05	95.96	3.55	99.961
0.60	45.15	2.10	96.43	3.60	99.968
0.65	48.43	2.15	96.84	3.65	99.974
0.70	51.61	2.20	97.22	3.70	99.978
0.75	54.67	2.25	97.56	3.75	99.982
0.80	57.63	2.30	97.86	3.80	99.986
0.85	60.47	2.35	98.12	3.85	99.988
0.90	63.19	2.40	98.36	3.90	99.990
0.95	65.79	2.45	98.57	3.95	99.992
1.00	68.27	2.50	98.76	4.00	99.9937
1.05	70.63	2.55	98.92	4.05	99.9949
1.10	72.87	2.60	99.07	4.10	99.9959
1.15	74.99	2.65	99.20	4.15	99.9967
1.20	76.99	2.70	99.31	4.20	99.9973
1.25	78.87	2.75	99.40	4.25	99.9979
1.30	80.64	2.80	99.49	4.30	99.9983
1.35	82.30	2.85	99.56	4.35	99.9986
1.40	83.85	2.90	99.63	4.40	99.9989
1.45	85.29	2.95	99.68	4.45	99.9991

Statistics 1040, Section 004, Quiz 12 (20+ Points)

December 3–5, 2003

Your Name: _____

This is a take-home quiz. You may work on it at your own pace but you have to complete it and turn it in at the beginning of class on Friday, 12/05/03. If you cannot attend class on Friday, please FAX your answers to (435) 797-1822 **before** class starts. Solutions will be provided in class on Friday and will also be posted to the course Web site on Friday afternoon. Late turn-ins will not be accepted.

This quiz contains three questions, formulated as they may appear in the Final Exam. The first question is worth 20 points. The second and the third questions are extra-credit questions that are optional. These questions are worth 10 extra-points each.

Please work on this quiz independently, using as little help as possible from your friends, books, and notes. To get used to the formula sheet provided in the final, you should look at this sheet only and not at any of our previously used formula sheets. A copy of the formula sheet used in the final has been included on the Study Guide.

Question 1:

(20 Points) The drug Viagra has become quite well known, and it has had a substantial economic impact on its producer, Pfizer Pharmaceuticals. In preliminary tests for adverse reactions, it was found that when 734 men were treated with Viagra, 117 of them experienced headache. Among 725 men in a placebo group, 29 of them experienced headache.

Is there sufficient evidence to say that men who take Viagra have headache in a higher proportion than men who do not take Viagra? Clearly state the null and the alternative hypotheses, conduct an appropriate statistical test, and state your conclusions.

Question 2:

(10 Points) A machine is supposed to mix peanuts, hazelnuts, cashews, and pecans in the ratio 5:2:2:1. A can containing 500 of these mixed nuts was found to have 269 peanuts, 112 hazelnuts, 74 cashews, and 45 pecans.

Use an appropriate statistical procedure to test the hypothesis that the machine is mixing the nuts in the ratio 5:2:2:1.

Question 3:

(10 Points) Past experience indicates that the time for high school seniors to complete a standardized test follows a normal distribution with a mean of 35 minutes. A simple random sample of 20 high school seniors was taken and it was found that on average, it took them 33.1 minutes to complete this test, with a standard deviation of 4.3 minutes.

Make an appropriate test to see whether or not these data suggest that the mean time needed by high school seniors to complete this test is **different from 35 minutes**.