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**MGT 2250 - Exam #3 April 9, 2010**

PRINT Name \_\_ \_ Z

Section (Circle) TSI-10 AM TS2-11AM ' TS3—12 Noon

A. Please sign the following honor code statement:

On my honor I have neither given nor received illicit aid on this exam.

Signed

BONUS Questions (3 extra credit points, 1 point per blank ﬁlled in!)

1) Alpha is called the level of and is equai to 1 minus the

é; coefﬁcient.

2) The distribution of x is the probability distribution of all possible values of the sample mean x for samples of the same size drawn from a population.

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**Part I Multiple Choice (5 items, 10 points)**

**Please circle your answer clearly and unambiguously.**

1. The central limit theorem is important in statistics because

a. for a large n, it says the population is normal. b. for any population, it says that the sampling distribution of the sample mean is

approximately normal, regardless of the sample size. @or a large n, it says that the sampling distribution of the sample mean is approximately

normal, regardless of the shape of the population. d. a & b

2. A sample mean (x) is known as a(n) of the population mean.

a. approximation b. point error point estimate

d. standard estimate

3. The standard deviation of the sampling distribution ofx is also known as the

a. point estimate of the population mean istandard error of the mean

c. z-score d. a & b

4. Which of the following statements about the normal distribution is NOT true?

a. The mean, median and mode are the same. b. Exactly 68.26% of the observations will fall between plus-one and minus-one standard

deviations from the mean. /gt is a discrete probability distribution.

cl. All of the above statements are true concerning the normal distribution..

5. In its standardized form, the normal distribution

\_@has a mean of zero and a standard deviation of one. b. has a mean of one and a standard deviation of zero. c. has about 95% of its area fall between plus-one and minus—one standard deviations

from the mean.

d. both a and c are correct.

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**Part II Problems (90 points total) Please show work. The more I can tell of what you did, the more chance for partial credit you may get even if your final answer is incorrect. Answers with no work shown will 19; be accepted even if they are correct! Use the back of the test sheets if necessary!**

1) The mean rainfall in Smallville is 52 inches per year. Assume a normal distribution

applies to the rainfall data and the standard deviation is 5 inches.

a) What is the probability it will rain more than 58 inches in Smallville in one year?

(5 Points)

b) What is the probability it will rain between than 40 and 56 inches in Smallville in

one year‘? (S Points)

c) A year is described as extremely dry if the average rainfall is in the lower 10%. How many inches or less must it rain in Smallville in a year for that year to be described as “extremely dry”? (5 Points)

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2) It is assumed that

the population m the United Sta

U \_ ean price for the Sony 42” plasma screen TV sold in LItes is $2000, and the population standard deviation is $175. Suppose that yr J3-:0 this is true and a random sample of S0 electronics stores was selected, and a sample mean U .1 price for these TVs was to be computed from the data collected from these 50 stores. 1'” 17;

- a) What is the probability that that the simple random sample will provide a sample X

mean within $40 of the population mean? (5 Points) (go 1112/ Z -7-? .0910

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La 1 A sample of 50 stores was collected and produced a sample m

can of $1960.

b) From this sample data, provide a 95% conﬁdence interval for the population n , 5,0 mean. (5 Points) F /

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c) From this sample data, provide a 99% conﬁdence interval for the population

mean. (5 Points)

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7 d) hat sample size would be required to provide a margin of error of $25 at a 95%

K conﬁdence level? (5 Points)

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3) The proportion of women in a population of medical students was 59%. If a simple

random sample of 1000 individuals was taken from this population:

a) What is the probability that that the simple random sample will provid

ple will provide a sample proportion within 0.03 of the population proportion? (5 Points)

A sample of 1000 medical students was collected and produced a sample proportion for women of 0.57.

b) From this sample data, provide a 90% conﬁdence interval for the population

proportion of women. (5 points)

c) What sample size would be required to provide a margin of error of 0.03 at a

95% conﬁdence level? (5 points)

Assuming you didn’t know the proportion “women” before collecting th

g me sample, what is the number of students you would need in your sample to ensure

a margin of error of 0.03 (or less) at a conﬁdence level of 95%? (5 points)

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4) The range for a set of data is estimated to be 28.

a) What is the planning value for the population standard deviation? (2 points)

2.3 ,

b) Using a 95% conﬁdence level, how large a sample should be used to provide a

margin of error of 1.5? (S points)

5) A political pollster is conducting a poll in order to make predictions on election night.

Assuming a two-candidate election, if a speciﬁc candidate receives 57% or more of the vote in the sample, then that candidate will be forecast as the winner of the election. If a random sample of I00 voters is selected,

a) What is the probability that a candidate will be forecast the winner if the true

percentage of the vote for that candidate is 48% (and that candidate will actually lose the election)? (5 points)

b) What is the probability that a candidate will NOT be forecast the winner if the

true percentage of the vote for that candidate is 58% (and that candidate will actually win the election)? (5 points)

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6) A simple random sample of 5 months of sales data provided the following information:

Month: 1 2 3 4 5

Units sold: 95 101 86 95 93

a) What is the point estimate of the population mean number of units sold per

month? (3 Points)

b) What is the point estimate of the population standard deviation? (5 Points)

7) Assume that the population mean price per gallon of gasoline sold in the United States is $2.60, and the population standard deviation is $0.20. Suppose that a random sample of 50 gasoline stations was selected, and a sample mean price per gallon was to be computed from the data collected from these 50 stations

a) What is the probability that that the simple random sample will provide a sample

mean within 3 cents (or .03) of the population mean? (5 Points)

b) If the sample size were increased to 100, what would the answer to part “a”

above be? (S Points)

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A Table of Areas under the Standard Normal Curve

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