

Read these directions carefully. You may pick one multiple choice problem to omit by writing "omit" in the answer space. If you do not, all problems will be graded. Relax and use your time wisely--this is not a race.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

1) a) Find **all** samples of size two, with replacement, from the population { 4, 10, 16 } along with each sample's minimum (the smallest of the two items). (5 points)

b) Find the sampling distribution of the sample minimum. (4 points)

c) Find the mean of this sampling distribution of the minimum (3 points)

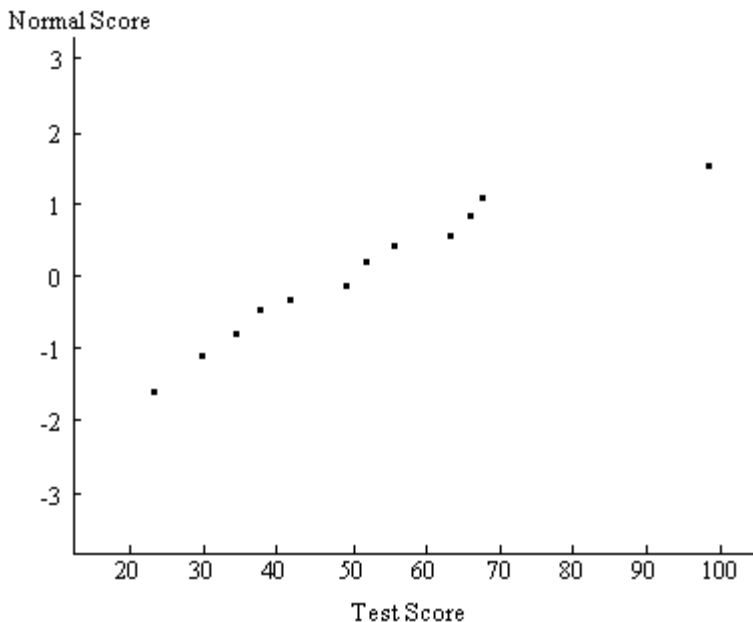
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

2) The ages of ten swimmers at the local mudhole are as follows. Use a normal probability plot to determine if these follow a normal distribution. Explain your decision. 2) _____

5, 8, 9, 12, 14, 48, 81, 88, 92, 98.

- A) Not normal, because the slope is positive.
- B) Normal, because the graph looks approximately linear.
- C) Not normal because the graph does not look approximately linear.
- D) Not normal because the sample size is less than 30.

3) A normal quartile plot is given below for a sample of scores on an aptitude test. Use the plot to assess the normality of scores on this test. Explain your reasoning. 3) _____

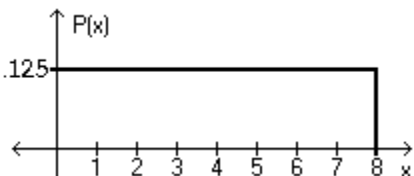


- A) Since the normal quartile plot is roughly linear, it appears that scores are approximately normally distributed.
- B) Since the normal quartile plot is not high in the middle and low on the ends, the scores are not normally distributed.
- C) Since the normal quartile plot is not symmetric, the distribution of test scores is not normal.
- D) Since the numbers on the vertical axis are between -3 and 3, the test scores are approximately normal.

Provide an appropriate response.

- 4) Compare the scores: a score of 75 on a test with a mean of 65 and a standard deviation of 8 and a score of 75 on a test with a mean of 70 and a standard deviation of 4. 4) _____
- A) The two scores are statistically the same.
 - B) A score of 75 with a mean of 70 and a standard deviation of 4 is better.
 - C) A score of 75 with a mean of 65 and a standard deviation of 8 is better.
 - D) You cannot determine which score is better from the given information.

Using the following uniform density curve, answer the question.

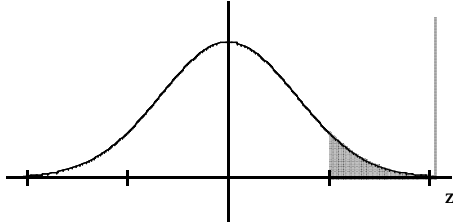


- 5) What is the probability that the random variable has a value between 4.8 and 6.4? 5) _____
- A) 0.2000 B) 0.0750 C) 0.3250 D) 0.4500
- 6) Which of the following is an unbiased statistic? 6) _____
- A) midrange B) median C) std. deviation D) proportion

Find the indicated z score. The graph depicts the standard normal distribution with mean 0 and standard deviation 1.

7) Shaded area is 0.0694.

7) _____



A) 1.45

B) 1.26

C) 1.48

D) 1.39

Find the indicated value.

8) $z_{0.10}$

8) _____

A) 1.17

B) 1.05

C) 1.58

D) 1.28

If z is a standard normal variable, find the probability.

9) The probability that z lies between -1.10 and -0.36

9) _____

A) 0.2239

B) -0.2237

C) 0.2237

D) 0.4951

The Precision Scientific Instrument Company manufactures thermometer. Assume that the readings are normal with a mean of 0°C and a standard deviation of 1.00°C .

10) Find Q_3 , the third quartile.

10) _____

A) -1.3°

B) 0.82°

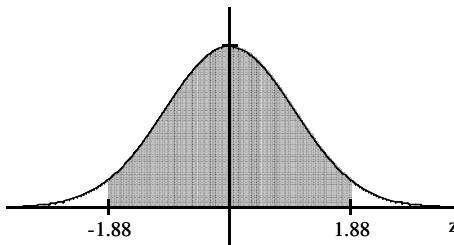
C) 0.67°

D) 0.53°

Find the area of the shaded region. The graph depicts the standard normal distribution with mean 0 and standard deviation 1.

11)

11) _____



A) 0.9699

B) 0.0301

C) 0.9398

D) 0.0602

Find the indicated probability.

12) The volumes of soda in quart soda bottles are normally distributed with a mean of 32.3 oz and a standard deviation of 1.2 oz. What is the probability that the volume of soda in a randomly selected bottle will be less than 32 oz?

12) _____

A) 0.3821

B) 0.4013

C) 0.0987

D) 0.5987

Solve the problem.

13) A final exam in Math 160 has a mean of 73 with standard deviation 7.8. If 24 students are randomly selected, find the probability that the mean of their test scores is greater than 78.

13) _____

A) 0.8962

B) 0.0103

C) 0.0036

D) 0.0008

Solve the problem. Round the point estimate to the nearest thousandth.

- 14) Find the point estimate of the proportion of people who wear hearing aids if, in a random sample of 898 people, 46 people had hearing aids. 14) _____
A) 0.949 B) 0.051 C) 0.049 D) 0.050

Use the given degree of confidence and sample data to construct a confidence interval for the population proportion p .

- 15) $n = 155$, $x = 118$; 95% confidence 15) _____
A) $0.707 < p < 0.816$ B) $0.694 < p < 0.828$
C) $0.693 < p < 0.830$ D) $0.708 < p < 0.815$

Solve the problem.

- 16) The following confidence interval is obtained for a population proportion, p : $0.724 < p < 0.752$. Use these confidence interval limits to find the margin of error, E . 16) _____
A) 0.738 B) 0.014 C) 0.028 D) 0.015

Use the given degree of confidence and sample data to construct a confidence interval for the population mean μ .

Assume that the population has a normal distribution.

- 17) The principal randomly selected six students to take an aptitude test. Their scores were: 17) _____
85.3 70.3 70.1 86.5 74.0 78.9
Determine a 90% confidence interval for the mean score for all students. Assume the distribution is normal.
A) $71.55 < \mu < 83.48$ B) $83.48 < \mu < 71.55$
C) $71.45 < \mu < 83.58$ D) $83.58 < \mu < 71.45$

- 18) $n = 12$, $\bar{x} = 18.8$, $s = 4.2$, 99% confidence 18) _____
A) $15.50 < \mu < 22.10$ B) $15.03 < \mu < 22.57$
C) $14.96 < \mu < 22.64$ D) $15.05 < \mu < 22.55$

Do one of the following, as appropriate: (a) Find the critical value $z_{\alpha/2}$, (b) find the critical value $t_{\alpha/2}$, (c) state that neither the normal nor the t distribution applies.

- 19) 99%; $n = 17$; σ is unknown; population appears to be normally distributed. 19) _____
A) $z_{\alpha/2} = 2.567$ B) $z_{\alpha/2} = 2.583$ C) $t_{\alpha/2} = 2.921$ D) $t_{\alpha/2} = 2.898$

Use the given information to find the minimum sample size required to estimate an unknown population mean μ .

- 20) How many women must be randomly selected to estimate the mean weight of women in one age group. We want 90% confidence that the sample mean is within 3.4 lbs of the population mean, and the population standard deviation is known to be 20 lbs. 20) _____
A) 94 B) 92 C) 95 D) 133

Use the given data to find the minimum sample size required to estimate the population proportion.

- 21) Margin of error: 0.044; confidence level: 95%; \hat{p} and \hat{q} unknown 21) _____
A) 352 B) 497 C) 405 D) 635

- 22) Margin of error: 0.04; confidence level: 95%; from a prior study, \hat{p} is estimated by the decimal equivalent of 60%. 22) _____
A) 1441 B) 577 C) 996 D) 519

Answer Key

Testname: 2016 SPRING TEST 3

1)	sample	min	min	p(min)
	4, 4	4	4	5/9
	4, 10	4	10	3/9
	4, 16	4	16	1/9
	10, 4	4		
	10, 10	10		mean is 22/3
	10, 16	10		
	16, 4	4		
	16, 10	10		
	16, 16	16		

- 2) C
- 3) A
- 4) A
- 5) A
- 6) D
- 7) C
- 8) D
- 9) C
- 10) C
- 11) C
- 12) B
- 13) D
- 14) B
- 15) B
- 16) B
- 17) A
- 18) B
- 19) C
- 20) A
- 21) B
- 22) B