

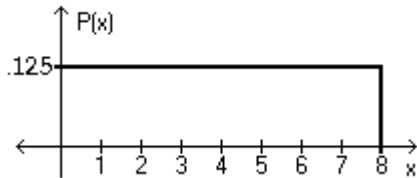
Name _____ Course Number: _____ Section Number: _____

Directions: Answer the questions in the spaces provided, or attach paper. Circle the correct choice for each response set. If required, show calculations in the blank spaces near the problems.

Provide an appropriate response.

- 1) If selecting samples of size $n \leq 30$ from a population with a known mean and standard deviation, what requirement, if any, must be satisfied in order to assume that the distribution of the sample means is a normal distribution?
- A) The population must have a normal distribution.
 - B) The population must have a mean of 0.
 - C) None; the distribution of sample means will be approximately normal.
 - D) The population must have a standard deviation of 1.

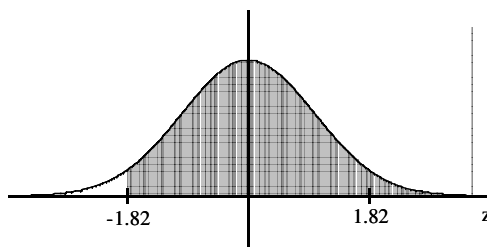
Using the following uniform density curve, answer the question.



- 2) What is the probability that the random variable has a value less than 2.1?
- A) 0.2625
 - B) 0.0125
 - C) 0.1375
 - D) 0.3875

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

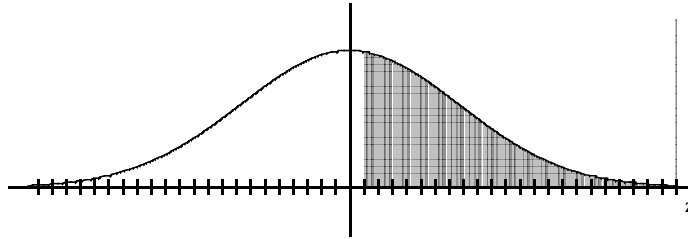
3)



- A) -0.0344
- B) 0.4656
- C) 0.9656
- D) 0.0344

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

4) Shaded area is 0.4483.



- A) -0.13 B) -0.45 C) 0.45 D) 0.13

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

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

- A) 0.2237 B) 0.2239 C) -0.2237 D) 0.4951

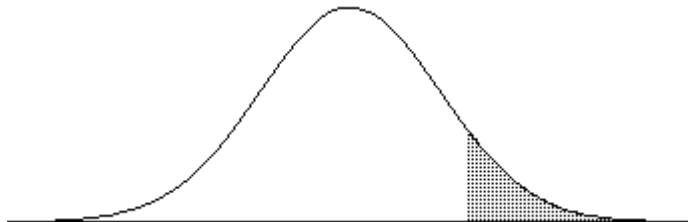
Solve the problem.

6) For a standard normal distribution, find the percentage of data that are more than 2 standard deviations below the mean or more than 3 standard deviations above the mean.

- A) 0.26% B) 2.41% C) 97.59% D) 4.56%

Provide an appropriate response.

7) Find the indicated IQ score. The graph depicts IQ scores of adults, and those scores are normally distributed with a mean of 100 and a standard deviation of 15 (as on the Wechsler test).



The shaded area under the curve is 0.10.

- A) 119.2 B) 80.8 C) 100.5 D) 108.1

Solve the problem. Round to the nearest tenth unless indicated otherwise.

8) A bank's loan officer rates applicants for credit. The ratings are normally distributed with a mean of 200 and a standard deviation of 50. Find P_{60} , the score which separates the lower 60% from the top 40%.

- A) 207.8 B) 211.3 C) 187.5 D) 212.5

Find the indicated probability.

- 9) 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?

A) 0.3821 B) 0.4013 C) 0.5987 D) 0.0987

Provide an appropriate response.

- 10) A poll of 1300 randomly selected students in grades 6 through 8 was conducted and found that 36% enjoy playing sports. What is the sampling distribution suggested by the given data?

Solve the problem.

- 11) The scores on a certain test are normally distributed with a mean score of 51 and a standard deviation of 2. What is the probability that a sample of 90 students will have a mean score of at least 51.2108?

A) 0.1587 B) 0.3174 C) 0.3413 D) 0.8413

- 12) Suppose that replacement times for washing machines are normally distributed with a mean of 9.3 years and a standard deviation of 1.1 years. Find the probability that 70 randomly selected washing machines will have a mean replacement time less than 9.1 years.

A) 0.4357 B) 0.0714 C) 0.4286 D) 0.0643

- 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.

A) 0.0008 B) 0.8962 C) 0.0036 D) 0.0103

The given values are discrete. Use the continuity correction and describe the region of the normal distribution that corresponds to the indicated probability.

- 14) The probability of fewer than 43 democrats

A) The area to the left of 43.5 B) The area to the left of 42.5
C) The area to the right of 43.5 D) The area to the left of 43

- 15) The probability that the number of correct answers is between 16 and 38 inclusive

A) The area between 16 and 38 B) The area between 15.5 and 38.5
C) The area between 16.5 and 37.5 D) The area between 15.5 and 37.5

For the binomial distribution with the given values for n and p , state whether or not it is suitable to use the normal distribution as an approximation.

- 16) $n = 53$ and $p = 0.7$
- A) Normal approximation is not suitable.
 - B) Normal approximation is suitable.

Estimate the indicated probability by using the normal distribution as an approximation to the binomial distribution.

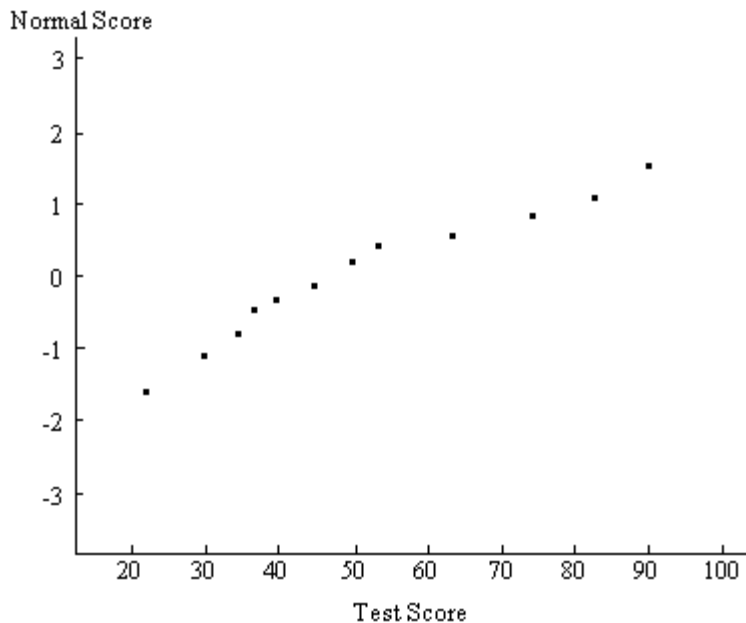
- 17) In one county, the conviction rate for speeding is 85%. Estimate the probability that of the next 100 speeding summonses issued, there will be at least 90 convictions.
- A) 0.3962
 - B) 0.8962
 - C) 0.0420
 - D) 0.1038

Use the normal distribution to approximate the desired probability.

- 18) A coin is tossed 20 times. A person, who claims to have extrasensory perception, is asked to predict the outcome of each flip in advance. She predicts correctly on 11 tosses. What is the probability of being correct 11 or more times by guessing? Does this probability seem to verify her claim?
- A) 0.0871, no
 - B) 0.0871, yes
 - C) 0.4129, yes
 - D) 0.4129, no

Solve the problem.

- 19) 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.



Examine the given data set and determine whether the requirement of a normal distribution is satisfied. Assume that the requirement for a normal distribution is loose in the sense that the population distribution need not be exactly normal, but it must have a distribution which is basically symmetric with only one mode. Explain why you do or do not think that the requirement is satisfied.

- 20) The ages of 30 students selected randomly from one college are given below.
(Hint: Use computer assistance.)

21 23 20 24 20
19 20 19 22 32
20 24 26 21 37
23 18 34 25 30
22 24 23 19 28
20 29 21 35 25
20 21 28 22 32

Answer Key

Testname: CHAPTER 6 FORM C

- 1) A
- 2) A
- 3) C
- 4) D
- 5) A
- 6) B
- 7) A
- 8) D
- 9) B
- 10) It is the probability distribution of all sample proportions found for all possible samples of size 1300. It consists of all sample proportions along with their corresponding probabilities.
- 11) A
- 12) D
- 13) A
- 14) B
- 15) B
- 16) B
- 17) D
- 18) D
- 19) Since the normal quartile plot is roughly linear, it appears that scores on this test are approximately normally distributed.
- 20) The requirement for normality is not satisfied since a histogram of the data is not bell-shaped. The data does have a single mode, however the histogram is not symmetric but is skewed to the right. Further, STATDISK's Ryan-Joiner test confirms that normality is not evident.