AP Stats
Chap 17 Review

Name _____ Pd _____

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

Determine whether the Normal model may be used to describe the distribution of the sample proportions. If the Normal model may be used, list the conditions and explain why each is satisfied. If Normal model may not be used, explain which condition is not satisfied.

1. A candy company claims that 6% of the jelly beans in its spring mix are pink. Suppose that the candies are packaged at random in small bags containing about 70 jelly beans. A class of students opens several bags, counts the various colors of jelly beans, and calculates the proportion that are pink in each bag. Is it appropriate to use a Normal model to describe the distribution of the proportion of pink jelly beans? 1. _____

   A) A Normal model is not appropriate because the 10% condition is not satisfied: the sample size, 70, is larger than 10% of the population of all jelly beans.
   B) A Normal model is not appropriate because the randomization condition is not satisfied: the 70 jelly beans in the bag are not a simple random sample and cannot be considered representative of all jelly beans.
   C) A Normal model is not appropriate because the sample size is not large enough to satisfy the success/failure condition. For this sample size, np = 4.2 which is less than 10.
   D) A Normal model is appropriate:
   Randomization condition is satisfied: the 70 jelly beans in the bag are selected at random and can be considered representative of all jelly beans
   10% condition is satisfied: the sample size, 70, is less than 10% of the population of all jelly beans.
   The success/failure condition is satisfied: n = 70 which is greater than 10
   E) A Normal model is not appropriate because the population distribution is not Normal.

2. In Angie's hometown, only 15% of registered voters approve of the mayor's job performance. The town has roughly 8500 registered voters. A pollster selects a random sample of 3000 registered voters and determines the proportion in the sample that approve of the mayor's job performance. May the Normal model be used to describe the distribution of the proportion in the sample that approve of the mayor? 2. _____

   A) A Normal model is not appropriate because the population distribution is not Normal.
   B) Normal model may not be used to describe distribution of sample proportions.
   10% condition is not satisfied: the 3000 voters in the sample represent more than 10% of the population of 8500.
   C) Normal model may be used to describe distribution of sample proportions.
   Randomization condition is satisfied: The 3000 voters constitute a simple random sample and are representative of all the voters in the town.
   10% condition is satisfied: the 3000 voters in the sample represent more than 10% of the population of 8500.
   Success/failure condition is satisfied: np = 450 and nq = 2550 are both greater than 10
   D) Normal model may not be used to describe distribution of sample proportions.
   Randomization condition is not satisfied: The 3000 voters do not constitute a simple random sample and are not representative of all the voters in the town.
   E) Normal model may not be used to describe distribution of sample proportions.
   Success/failure condition is not satisfied: np = 450 and nq = 2550 neither of which is less than 10

Find the mean of the sample proportion.

3. A candy company claims that its jelly bean mix contains 23% blue jelly beans. Suppose that the candies are packaged at random in small bags containing about 350 jelly beans. Find the mean of the proportion of blue jelly beans in a bag. 3. _____

A) $\mu = 2.2\%$ B) $\mu = 23\%$ C) $\mu = 0.9\%$ D) $\mu = 77\%$ E) $\mu = 0.23\%$

In a large class, the professor has each person toss a coin several times and calculate the proportion of his or her tosses that come up heads. The students then report their results, and the professor plots a histogram of these proportions. Use the 68–95–99.7 Rule to provide the appropriate response.

4. If each student tosses the coin 50 times, about 68% of the sample proportions should be between what two numbers? 4. _____

A) 0.16 and 0.84
B) 0.43 and 0.57
C) 0.07 and 0.14
D) 0.49 and 0.51
E) 0.34 and 0.67

Find the specified probability, from a table of Normal probabilities. Assume that the necessary conditions and assumptions are met.

5. Assume that 25% of students at a university wear contact lenses. We randomly pick 200 students. What is the probability that more than 28% of this sample wear contact lenses? 5. _____

A) 0.673 B) 0.327 C) 0.837 D) 0.980 E) 0.164

6. A summer resort rents rowboats to customers but does not allow more than four people to a boat. Each boat is designed to hold no more than 800 pounds. Suppose the distribution of adult males who rent boats, including their clothes and gear, is normal with a mean of 195 pounds and standard deviation of 10 pounds. If the weights of individual passengers are independent, what is the probability that a group of four adult male passengers will exceed the acceptable weight limit of 800 pounds? 6. _____

A) 0.317 B) 0.023 C) 0.046 D) 0.159 E) 0.977

Answer the question.

7. Information on a packet of seeds claims that the germination rate is 75%. Should you be surprised if 139 of the 150 seeds in the packet germinate? 7. _____

A) You should not be surprised. A germination rate of 92.7% is only 3.00 standard deviations above the mean.
B) You should be very surprised. A germination rate of 92.7% is 7.50 standard deviations above the mean.
C) You should be very surprised. A germination rate of 92.7% is 6.25 standard deviations above the mean.
D) You should be very surprised. A germination rate of 92.7% is 5.00 standard deviations above the mean.
E) You should not be surprised. A germination rate of 92.7% is only 5.00 standard deviations above the mean.

Describe the indicated sampling distribution.

8. Let x represent the number which shows up when a balanced die is rolled. Then x is a random variable with a mean of 3.5 and a standard deviation of 1.71. Let $\bar{x}$ denote the mean of the numbers obtained when the die is rolled 36 times. Determine the sampling distribution of $\bar{x}$. In particular, state whether the distribution of the sample mean is normal or approximately normal and give its mean and standard deviation. 8. _____

A) Approximately normal, mean = 3.5, standard deviation = 1.71
B) Approximately normal, mean = 3.5, standard deviation = 0.29
C) Normal, mean = 3.5, standard deviation = 0.29
D) Approximately normal, mean = 3.5, standard deviation = 0.05
E) Normal, mean = 3.5, standard deviation = 0.05

Find the indicated probability.

9. A museum offers several levels of membership, as shown in the table. 9. _____

Member Category	Amount of Donation ($)	Percent of Members
Individual	$50	43
Family	$80	28
Family Plus	$120	16
Sponsor	$200	9
Patron	$500	4

During a membership drive, a volunteer enrolls 20 new members. If these 20 new members can be considered a random sample of all the museum's members, what is the probability that the mean donation from the new members is at least $150?

A) 0.2981 B) 0.0126 C) 0.0090 D) 0.1056 E) 0.0054

Provide an appropriate response.

10. Which of the following describe how the sampling distribution model for the sample mean changes as the sample size is increased? 10. _____

A: The sampling distribution model becomes more Normal in shape
B: The standard deviation of the sampling distribution gets smaller
C: The mean of the sampling distribution gets smaller

A) A only
B) A and B
C) B and C
D) A, B, and C
E) B only

Answer Key
Testname: REVIEW QUESTIONS

1. C
2. B
3. B
4. B
5. E
6. B
7. D
8. B
9. C
10. B