

AP Stats  
Anticipating Patterns HW

1. A simple random sample of size  $n$  is taken from a large population whose distribution of the variable under consideration is extremely right-skewed. Which of the following statements is true?
  - A. As  $n$  increases, the sample mean is more likely to be within a given distance of the population mean.
  - B. When  $n > 30$ , the distribution of the sample mean is normal.
  - C. As  $n$  increases, the sample standard deviation decreases.
  - D. As  $n$  increases, the distribution of the sample data becomes more normal.
  - E. The sample standard deviation is equal to:  $\frac{\text{population standard deviation}}{\sqrt{n}}$ .
  
2. John recently scored 113 on a particular standardized achievement test. The scores on the test are distributed with a mean of 100 and a standard deviation of 10. His cousin, Brandon, took a different standardized test and scored 263. The scores on Brandon's test have a mean of 250 and a standard deviation of 25. Which student did relatively better on his particular test?
  - A. John did better on his test.
  - B. Brandon did better on his test.
  - C. They both performed equally as well on their respective tests.
  - D. It is impossible to tell since they did not take the same test.
  - E. It is impossible to tell since the number of students taking the test is unknown.
  
3. A dance club holds a raffle at the end of each dance. Five dancers are selected at random to each draw one numbered tag without replacement. There are 50 tags in the hat numbered from 1 to 50. Drawing a tag from 1 through 5 wins \$20, tags from 6 through 25 win \$10, and tags from 26 through 50 wins \$5. In order to determine the average amount of money paid out, a simulation will be conducted using a random number table. Which of the following assignments of random numbers to tag values is most appropriate for the simulation?
  - A. Using single-digit numbers, assign 0 to represent a \$20 prize, 1-4 to represent a \$10 prize, and 5-9 to represent a \$5 prize.
  - B. Using single-digit numbers, assign 0 to represent a \$20 prize, 1 to represent a \$10 prize, and 2 to represent a \$5 prize. Numbers 3-9 are ignored.
  - C. Using two-digit numbers, assign 20 to represent a \$20 prize, 10 to represent a \$10 prize, and 05 to represent a \$5 prize. Numbers 00-04, 06-09, 11-19, 21-99 are ignored.
  - D. Using two-digit numbers, assign 01-05 to represent a \$20 prize, 06-25 to represent a \$10 prize, and 26-50 to represent a \$5 prize. Numbers 51-99 and 00 are ignored.
  - E. Using two-digit numbers, assign 01-10 to represent a \$20 prize, 11-40 to represent a \$10 prize, and 41-99 to represent a \$5 prize.
  
4. Which of the following is a legitimate probability distribution?
  - A.

$x$	3	4	5	6
$P(x)$	0.1	0.1	0.1	0.1

B.

$x$	0	1	2	3	4	5
$P(x)$	0.2	0.1	0.1	0.2	0.2	0.3

C.

$x$	-5	0	5	10	15
$P(x)$	0.6	0.1	0.2	0.1	0

D.

$x$	1	3	5	7
$P(x)$	0.3	0.2	0.2	0.4

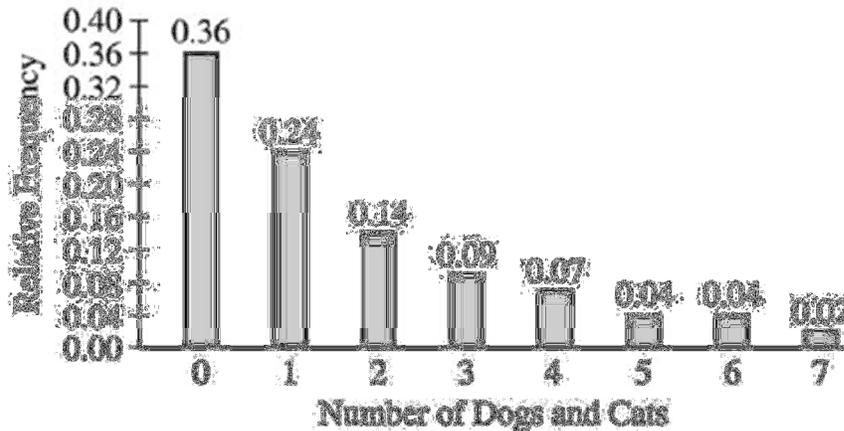
E.

$x$	1	1.5	2	2.5	3	3.5	4	4.5
$P(x)$	0.05	0.08	0.07	0.20	0.30	0.10	0.21	-0.01



AP Free Response Questions

12. The graph below displays the relative frequency distribution for  $X$ , the total number of dogs and cats owned per household, for the households in a large suburban area. For instance, 14 percent of households own 2 of these pets.



- a) According to local law, each household in this area is prohibited from owning more than 3 of these pets. If a household in this area is selected at random, what is the probability that the selected household will be in violation of this law? Show your work.
- b) If 10 households in this area are selected at random, what is the probability that exactly 2 of them will be in violation of this law? Show your work.
- c) The mean and standard deviation of  $X$  are 1.65 and 1.851, respectively. Suppose 150 households in this area are to be selected at random and  $\bar{X}$ , the mean number of dogs and cats per household, is to be computed. Describe the sampling distribution of  $\bar{X}$ , including its shape, center, and spread.
13. Every Monday a local radio station gives coupons away to 50 people who correctly answer a question about news fact from the previous day's newspaper. The coupons given away are numbered from 1 to 50, with the first person receiving a coupon 1, the second person receiving coupon 2, and so on, until all 50 coupons are given away. On the following Saturday, the radio station randomly draws numbers from 1 to 50 and awards cash prizes to the holders of the coupons with these numbers. Numbers continue to be drawn without replacement until the total amount awarded first equals or exceeds \$300. If selected, coupons 1 through 5 each have a cash value of \$200, coupons 6 through 20 each have a cash value of \$100, and coupons 21 through 50 each have a cash value of \$50.
- a) Explain how you would conduct a simulation using the random number table provided below to estimate the distribution of the number of prize winners each week.
- b) Perform your simulation 3 times. (That is, run 3 trials of your simulation.) Start at the leftmost digit in the first row of the table and move across. Make your procedure clear so that someone can follow what you did. You must do this by marking directly on or above the table. Report the number of winners in each of your 3 trials.

72749 13347 65030 26128 49067 02904 49953 74674 94617 13317

81638 36566 42709 33717 59943 12027 46547 61303 46699 76423

38449 46438 91579 01907 72146 05764 22400 94490 49833 09258