Chapter 4 Quiz

Name:

1. A phone-in poll conducted by a newspaper reported that 73% of those who called in liked business tycoon Donald Trump. The unknown true percentage of American citizens that like Donald Trump is called a:

- A. statistic
- B. sample
- C. parameter
- D. population

2. A simple random sample of 50 undergraduates at Johns Hopkins University found that 60% of those sampled felt that drinking was a problem among college students. A simple random sample of 50 undergraduates at Ohio State University found that 70% felt that drinking was a problem among college students. The number of undergraduates at Johns Hopkins University is approximately 2000, while the number at Ohio State is approximately 40,000.

Which of the following is the best conclusion regarding the above data?

- A. The sample from Johns Hopkins has much less sampling variability than that from Ohio State.
- B. The sample from Johns Hopkins has much more sampling variability than that from Ohio State.
- C. The sample from Johns Hopkins has almost the same sampling variability as that from Ohio State.
- D. It is impossible to make any statements about the sampling variability of the two samples since the students surveyed were different.

3. Using the above data, suppose the actual proportion of undergraduates at Johns Hopkins University who feel drinking is a problem among college students is 70%. The mean of the sampling distribution of the percentage that feel drinking is a problem in repeated simple random samples of 50 Johns Hopkins undergraduates is what?

- A. 50%

○ B. 60%
○ C. 65%
○ D. 70%

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4. The number of undergraduates at Johns Hopkins University is approximately 2000, while the number at Ohio State University is approximately 40,000. At both schools a simple random sample of about 3% of the undergraduates is taken. Which of the following is the best conclusion?

○ A. The sample from Johns Hopkins has less sampling variability than that from Ohio State.
○ B. The sample from Johns Hopkins has more sampling variability than that from Ohio State.
○ C. The sample from Johns Hopkins has almost the same sampling variability as that from Ohio State.
○ D. It is impossible to make any statements about the sampling variability of the two samples since the students surveyed were different.

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5. What is a random variable?

○ A. the particular sample obtained from simple random sampling
○ B. a variable whose value is a numerical outcome of a random phenomenon
○ C. any number that has an unknown and unpredictable value
○ D. the particular variable selected by random sampling from an initial list of possible variables

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6. Which of the following random variables would be considered continuous?

○ A. the number of brothers a randomly chosen person has
○ B. the time it takes for a randomly chosen woman to run 100 yards
○ C. the number of cars owned by a randomly chosen adult male
○ D. number of orders received by a mail order company in a randomly chosen week

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7. The random variable X denotes the time taken for a computer link to be made between the terminal in an executive's office and the computer at a remote factory site. It is known that X has a normal distribution with mean 15 seconds and standard deviation 3 seconds. Choose the option closest to the value of P(X < 20).

- A. 0.548
- B. 0.952
- C. 0.048
- D. 0.452

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8. Let the random variable X represent the profit made on a randomly selected day by a certain store. Assume X is normal with a mean of $360 and standard deviation $50. The probability is approximately 0.6 that on a randomly selected day the store will make less than

- A. $347.40
- B. $0.30
- C. $361.30
- D. $372.60

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9. The normal distribution is a reasonably good approximation to the binomial distribution provided that

- A. $np > 10$ and $n(1 - p) > 10$
- B. $np > 10$ and $n(1 - p) < 10$
- C. $np < 10$ and $n(1 - p) > 10$
- D. $np < 10$ and $n(1 - p) < 10$

(By the way, the reason why our estimates in class were so far off was that I forgot to use the adjustment moving from a descrete distribution (like the number of "heads") to the continuous Normal Distribution. For example, to estimate 6 or more "Heads", I would find the z score of 5.5 and see the area under the Normal Distribution greater than the z-score of 5.5)

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10. Forty-eight percent of the students at a certain state university prefer the semester system over the quarter system. A survey is taken of 200 students (selected at random). Choose the option closest to the probability that more than half of these students prefer semesters.

- A. 0.3300
- B. 0.5000
- C. 0.2843
- D. 0.7157

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11. Let X be the outcome of rolling a carefully made 6-sided die. Assuming the die is fair, the probability distribution for X is as follows:

Value of X	1	2	3	4	5	6
Probability	1/6	1/6	1/6	1/6	1/6	1/6

Value of X	1	2	3	4
Probability	0.2	0.4	0.3	0.1

Using the above data, what is the probability that a randomly chosen subject completes at least 3 puzzles in the 5 minute period while listening to soothing music?

- ○ A. 0.3
- ○ B. 0.4
- ○ C. 0.6
- ○ D. 0.9

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16. Using the above data, P(X < 3) has what value?

- ○ A. 0.3
- ○ B. 0.4
- ○ C. 0.6
- ○ D. 0.9

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17. Using the above data, the mean μ of X is what?

- ○ A. 2.0
- ○ B. 2.3
- ○ C. 2.5
- ○ D. 3.0

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18. Using the above data, the standard deviation σ of X is what?

- ○ A. 0.4

- B. 0.63
- C. 0.81
- D. 0.9

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19. Suppose X is a random variable with mean μ. Suppose we observe X many times and keep track of the average of the observed values. The law of large numbers says what?

- A. this average will get closer and closer to μ as we observe X more and more often
- B. as we observe X more and more, this average will get to be a larger and larger multiple of μ
- C. as we observe X more and more, this average and the value of μ will get larger and larger
- D. the value of μ will get larger and larger as we observe X

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20. A factory produces plate glass with a mean thickness of 4 mm and a standard deviation of 1.1 mm. A simple random sample of 100 sheets of glass is to be measured, and the sample mean thickness of the 100 sheets is to be computed. We know the random variable has approximately a normal distribution because of what?

- A. the law of large numbers
- B. the central limit theorem
- C. the law of proportions
- D. the fact that probability is the long run proportion of times an event occurs

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21. The weights of packets of a certain type of cookie follow a normal distribution with mean 15.2 oz and standard deviation 0.4 oz. If is the average weight of a simple random sample of four packets of cookies then has an

- A. approximate normal distribution with $\mu = 15.2, \sigma = 0.1$
- B. exact normal distribution with $\mu = 15.2, \sigma = 0.1$
- C. exact normal distribution with $\mu = 15.2, \sigma = 0.2$
- D. approximate normal distribution with $\mu = 15.2, \sigma = 0.2$

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22. The probability that a three-year-old battery still works is 0.8. A cassette recorder requires four working batteries to operate. The state of batteries can be regarded as independent, and four three-year-old batteries are selected for the cassette recorder. What is the probability that the cassette recorder operates?

○ A. .9984
○ B. .8
○ C. .4096
○ D. .5904

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23. Which of the following is NOT a property of a binomial setting?

○ A. There are n observations; each one results in either a success of a failure.
○ B. The probability of a success is the same for each observation.
○ C. Observations are independent.
○ D. The number of successes in n observations is constant and independent of the probability of success.

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24. What is the probability of rolling a single, fair, six-sided die 10 times, and getting a three twice?

○ A. 0.2907
○ B. 0.3230
○ C. 0.6137
○ D. 0.1550

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25. What is the probability that at least 26 of 50 mosquitoes will be killed by a new insect spray when the probability is .6 that any one of them will be killed by the spray?

○ A. 0.9022
○ B. 0.4032
○ C. 0.0584
○ D. 0.8438

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