

**AP Stats MOCK Chapter 7 Test MC**

**Multiple Choice-13 questions** *Identify the choice that best completes the statement or answers the question.*

- \_\_\_\_\_ 1. A survey conducted by Black Flag asked whether or not the action of a certain type of roach disk was effective in killing roaches. 79% of the respondents agreed that the roach disk was effective. The number 79% is a
- parameter.
  - population.
  - statistic.
  - sample.
  - sampling distribution.
- \_\_\_\_\_ 2. In the 2008 New Hampshire Democratic primary, 30% of voter in a CNN poll said they would vote for Hillary Clinton. Surprisingly, in the primary itself, 39% voted for Clinton. The number 39% is a
- parameter.
  - population.
  - statistic.
  - sample.
  - sampling distribution.
- \_\_\_\_\_ 3. The distribution of the value of a variable for all members of a population is
- the distribution of sample data.
  - random allocation.
  - the population distribution of the variable.
  - the parameter.
  - the sampling distribution.
- \_\_\_\_\_ 4. The distribution of values from a single sample of size  $n$  from a population is
- the distribution of sample data.
  - random allocation.
  - the population distribution of the variable.
  - the parameter.
  - the sampling distribution.
- \_\_\_\_\_ 5. Which of the following best describes a sampling distribution?
- The distribution of all values of a statistic found in a large number of simulated samples of size  $n$ .
  - The set of all values of a variable in a sample of size  $n$ .
  - The set of all values of a variable in a large number of samples of size  $n$ .
  - The distribution of parameter values in all possible samples of size  $n$ .
  - A probability distribution that describes the relative likelihood of all possible values of a statistic.

**Scenario 7-1**

A CBS News/New York Times opinion poll asked 1,190 adults whether they would prefer balancing the Federal budget over cutting taxes; 59% of those asked said "Yes." Suppose that in fact 62% of all adults favor balancing the budget over cutting taxes.

- \_\_\_\_\_ 6. Use Scenario 7-1. If you take a large number of SRSs of size 1,190, the sample proportions who favor balancing the budget will vary. Some will be lower than 62% and some will be higher, but the average sample result will be very close to 62%. This fact is called
- low bias.
  - small margin of error.
  - high variability.
  - large bias.
  - low variability.
- \_\_\_\_\_ 7. To reduce the variability of estimates from a simple random sample, you should
- use a smaller sample.
  - increase the bias.
  - use a count, not a percent.
  - use a larger sample.
  - use a percent, not a count.

**Scenario 7-3**

A 2010 study of 240 randomly-selected residents of a subtropical resort city with 82,000 residents found that 5.4% of them had been exposed to the mosquito-borne virus that causes Dengue fever. Suppose the *actual* percentage of people in the city who have been exposed to the virus is 3%. Let  $p$  = the proportion of residents who have been exposed in a random sample of 240,

- \_\_\_\_\_ 8. Use Scenario 7-3. The mean  $\mu_p$  of  $p$  is
- 0.03.
  - 0.054.
  - 7.2.
  - 13.
  - 240.
- \_\_\_\_\_ 9. Use Scenario 7-3. The standard deviation  $\sigma_p$  of  $p$  is approximately
- 0.000121.
  - 0.00187.
  - 0.0110.
  - 2.643.
  - 2.683.

- \_\_\_\_\_ 10. Use Scenario 7-3. Which of the following conditions had to be met in order for us to use the formula for  $\sigma_{\hat{p}}$  that we used in the previous question?
- a.  $n \geq 30$
  - b.  $\sqrt{np(1-p)} \geq 10$
  - c.  $np \geq 10$  and  $n(1-p) \geq 10$
  - d.  $n < 0.10N$
  - e. The population distribution is approximately Normal.

**Scenario 7-7**

An automobile insurer has found that repair claims have a mean of \$920 and a standard deviation of \$870. Suppose that the next 100 claims can be regarded as a random sample from the long-run claims process.

- \_\_\_\_\_ 11. Use Scenario 7-7. The mean and standard deviation of the mean of the next 100 claims is
- a. mean = \$920 and standard deviation = \$87.
  - b. mean = \$920 and standard deviation = \$8.70.
  - c. mean = \$92 and standard deviation = \$87.
  - d. mean = \$92 and standard deviation = \$870.
  - e. none of these.
- \_\_\_\_\_ 12. The central limit theorem says that when a simple random sample of size  $n$  is drawn from any population with mean  $\mu$  and standard deviation  $\sigma$ , then when  $n$  is sufficiently large, the
- a. standard deviation of the sample mean is  $\sigma^2/n$ .
  - b. distribution of the population is exactly normal.
  - c. distribution of the sample mean is approximately normal.
  - d. distribution of the sample mean is exactly normal.
  - e. mean of the sampling distribution of  $J$  is  $\mu$ .

- \_\_\_\_\_ 13. Interpupillary distance (IPD) is the distance between the centers of the pupils of a person's left and right eyes. In adult males IPD is approximately Normally distributed with a mean of 62.5 mm and a standard deviation of 6 mm. Suppose you randomly select 5 adult males. What is the probability that their mean IPD is greater than 60 mm?

a.  $P\left(z > \frac{60 - 62.5}{6}\right)$

d.  $P\left(z < \frac{60 - 62.5}{\frac{6}{\sqrt{5}}}\right)$

b.  $P\left(z > \frac{62.5 - 60}{6}\right)$

e.  $P\left(z > \frac{62.5 - 60}{\frac{6}{\sqrt{5}}}\right)$

c.  $P\left(z > \frac{60 - 62.5}{\frac{6}{\sqrt{5}}}\right)$

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## Answer Section

### MULTIPLE CHOICE

- |           |         |                                      |
|-----------|---------|--------------------------------------|
| 1. ANS: C | PTS: 10 | TOP: Parameter vs. Statistic         |
| 2. ANS: A | PTS: 10 | TOP: Parameter vs. Statistic         |
| 3. ANS: C | PTS: 4  | TOP: Idea of a sampling distribution |
| 4. ANS: A | PTS: 4  | TOP: Idea of a sampling distribution |
| 5. ANS: E |         |                                      |

/E/Correct! A sampling distribution is values of a statistic from all possible samples of a given size from the population. If we think of the statistic as a random variable, this is its probability distribution.

- |            |              |                                                                 |
|------------|--------------|-----------------------------------------------------------------|
| PTS: 4     | REF: Test 7C |                                                                 |
| 6. ANS: A  | PTS: 10      | TOP: Bias and variability                                       |
| 7. ANS: D  | PTS: 10      | TOP: Variability and sample size                                |
| 8. ANS: A  | PTS: 10      | TOP: Mean of sampling distribution of proportions               |
| 9. ANS: C  | PTS: 10      | TOP: Standard deviation of sampling distribution of proportions |
| 10. ANS: D | PTS: 10      | TOP: 10% condition                                              |
| 11. ANS: A | PTS: 10      | TOP: Mean and Std. Dev. of sampling distribution of means       |
| 12. ANS: C | PTS: 10      | TOP: Central limit theorem                                      |
| 13. ANS: C |              |                                                                 |

/C/Correct! 
$$P(\bar{x} > 60) = P\left(z > \frac{60 - \mu_x}{\sigma_x}\right) = P\left(z > \frac{60 - \mu}{\frac{\sigma}{\sqrt{n}}}\right) = P\left(z > \frac{60 - 62.5}{\frac{6}{\sqrt{5}}}\right)$$

- |        |              |
|--------|--------------|
| PTS: 4 | REF: Test 7B |
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