

## 5. Sampling Distributions

### Starter Quiz · 课前小测

AP Statistics

Name: \_\_\_\_\_ Score: \_\_\_\_\_

1. Which is a parameter (not a statistic)?
  - ☐ the true population mean  $\mu$
  - ☐ the sample mean  $\bar{x}$
  - ☐ the sample proportion  $\hat{p}$
  - ☐ the sample standard deviation  $s$
2. A statistic is normal with mean 50 and SD 4. Find the z-score of the value 58.  
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3. The Central Limit Theorem says that for a large sample, the sampling distribution of  $\bar{x}$  is...
  - ☐ approximately normal
  - ☐ always skewed like the population
  - ☐ uniform
  - ☐ exactly the population shape
4. An estimator is unbiased when the center of its sampling distribution...
  - ☐ equals the true parameter
  - ☐ equals zero
  - ☐ is as small as possible
  - ☐ equals the sample size
5.  $p = 0.4$ ,  $n = 100$ . Find  $\sigma$  of  $\hat{p} = \sqrt{p(1-p)/n}$ . Round to two decimals.  
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6.  $p_1 = 0.5$ ,  $p_2 = 0.4$ . Find the center (mean) of  $\hat{p}_1 - \hat{p}_2$ .  
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7. Population  $\sigma = 20$ ,  $n = 25$ . Find the SD of  $\bar{x}$ ,  $\sigma/\sqrt{n}$ .  
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8.  $\mu_1 = 50$ ,  $\mu_2 = 45$ . Find the center of  $\bar{x}_1 - \bar{x}_2$ .  
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9. Two random samples from the same population will usually give slightly different statistics.
  - ☐ True    ☐ False

10. The standard normal distribution has...

- ☐ mean 0 and standard deviation 1
- ☐ mean 1 and SD 0
- ☐ mean 50 and SD 10
- ☐ no fixed mean

AP Statistics

1. **the true population mean  $\mu$**

$\mu$  is a fixed population value — a parameter. The others come from samples.

2. **2**

$$z = (58 - 50)/4 = 2.$$

3. **approximately normal**

The CLT delivers approximate normality of  $\bar{x}$  for large  $n$ .

4. **equals the true parameter**

Unbiased = centered on the parameter.

5. **0.05**

$$\sqrt{(0.4 \cdot 0.6/100)} = \sqrt{0.0024} \approx 0.049 \approx 0.05.$$

6. **0.1**

$$\text{Mean} = p1 - p2 = 0.5 - 0.4 = 0.1.$$

7. **4**

$$20/\sqrt{25} = 20/5 = 4.$$

8. **5**

$$\mu1 - \mu2 = 50 - 45 = 5.$$

9. **True**

That's sampling variability — expected, not an error.

10. **mean 0 and standard deviation 1**

By definition, mean 0 and SD 1.