1. The times for untrained rats to run a standard maze have an N (65, 15) distribution where the times are measured in seconds. The researchers hope to show that training improves the times, and they will do so by testing statistical hypotheses. The appropriate alternative hypothesis is

- A. $H_a: \mu > 65$
- B. $H_a: \bar{x} > 65$
- C. $H_a: \mu < 65$

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2. A social psychologist reports that "in our sample, ethnocentrism was significantly higher ($P < 0.05$) among church attendees than among nonattendees." This means

- A. ethnocentrism was at least 5% higher among church attendees than among nonattendees.
- B. the observed differences between church attendees and nonattendees account for all but 5% of those sampled. These results are quite meaningful and should be investigated further.
- C. if there is actually no difference in ethnocentrism between church attendees and nonattendees, the chance that we would observe a difference as large or larger than we did is less than 5%.

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3. The distribution of times that a company's service technicians take to respond to trouble calls is normal with mean μ and the standard deviation σ = 0.25 hours. The company advertises that its service technicians take an average of no more than 2 hours to respond to trouble calls from customers. From a random sample of twenty-five trouble calls to the company, you find that the average time service technicians took to respond to these calls was 2.10 hours. How strong is the evidence against the company's claim? To make this determination you decide to test the hypotheses $H_0: \mu = 2$ against $H_a: \mu > 2$ . Based on these data, the P-value of the appropriate test is

- A. less than 0.0002.
- B. 0.0228.
- C. 0.0456.

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4. Suppose we are testing the null hypothesis $H_0: \mu = 50$ and the alternative $H_a: \mu \neq 50$ for a normal population with σ = 6. The 95% confidence interval for the mean is (51.3, 54.7). Therefore

- A. the P-value for the test is greater than 0.05.
- B. the P-value for the test is less than 0.05.
- C. the P-value for the test could be greater or less than 0.05. It cannot be determined without knowing the sample size.

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5. What is the P-value for a test of the hypotheses $H_0$: μ = 10 against $H_A$: μ ≠ 10 if the calculated statistic is z = 2.56?

- A. 0.0052
- B. 0.0104
- C. 0.9948

6. I have computed a 95% confidence interval for the mean, μ, of a population as (13, 20). Based on this interval, we can say

- A. A null hypothesis that μ = 14 is not rejected at α = 5%.
- B. A null hypothesis that μ = 24 is rejected at α = 5%.
- C. Both A and B are true.

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7. A researcher wants to know if tougher sentencing laws have had the desired impact in terms of deterring crime. He plans to select a sample of states which have enacted a "3 strikes" law and compare violent crime rates before the law was enacted and two years later. The correct set of hypotheses to test is

- A. $H_0$: $\mu_{before} = \mu_{after}$ and $H_A$: $\mu_{before} > \mu_{after}$ .
- B. $H_0$: $\mu_{before} = \mu_{after}$ and $H_A$: $\mu_{before} \neq \mu_{after}$ .
- C. $H_0$: $\bar{x}_{before} = \bar{x}_{after}$ and $H_A$: $\bar{x}_{before} > \bar{x}_{after}$ .

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8. A researcher wants to know if the average time in jail for robbery has increased from what it was several years ago when the average sentence was 7 years. He obtains data on 400 more recent robberies and finds an average time served of 7.5 years. If we assume the standard deviation is 3 years, what is the P-value of the test?

- A. 0.0004
- B. 0.0008
- C. 0.9996

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9. In comparing students who have transferred to my university from a junior college in the area, I want to know if the transfer students do as well as those who enter the university straight from high school. My alternate hypothesis is $H_a: \mu_{transfer} < \mu_{others}$ . I took a random sample of 100 students of each type and computed the z-statistic as -2.38. At α = 0.01, what decision do I make?

- A. Reject $H_0$ — transfer students do not do as well as those admitted from high school.
- B. Fail to reject $H_0$ — transfer students do just as well as those admitted from high school.
- C. Accept $H_0$ — transfer students do not do as well as those admitted from high school.

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10. Many times the results of a statistical test will be reported as "P < 5%." If your favorite α level is 1% (remember, the researcher gets to set α), what decision would be made if that's all we know?

- A. You would say the test was significant.
- B. You would say the test was not significant.
- C. You couldn't tell without more information.