

# AP Statistics

## 100 Essential Questions

All units · Progressive difficulty · Instant feedback

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### Exploring Data

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Q01

EXPLORING DATA

◆ Easy

Which measure of center is most affected by extreme outliers?

A. Median

B. Mean

C. Mode

D. Trimmed mean

Q02

EXPLORING DATA

◆ Easy

A distribution is described as right-skewed. Where does the tail point?

A. Toward lower values

B. Toward higher values

C. Both directions equally

D. It has no tail

Q03 EXPLORING DATA

◆ Easy

The five-number summary consists of: Min, Q1, Median, Q3, and \_\_\_\_.

- A. Mean
- B. Range
- C. Maximum
- D. Standard Deviation

Q04 EXPLORING DATA

◆ Easy

The IQR is defined as:

- A.  $\text{Max} - \text{Min}$
- B.  $\text{Q3} - \text{Q1}$
- C.  $\text{Median} - \text{Mean}$
- D.  $\text{Q2} - \text{Q1}$

Q05 EXPLORING DATA

◆ Easy

A point is considered an outlier using the  $1.5 \times \text{IQR}$  rule if it is below:

- A.  $\text{Q1} - 1.5 \cdot \text{IQR}$
- B.  $\text{Q1} - \text{IQR}$
- C.  $\text{Median} - 1.5 \cdot \text{IQR}$
- D.  $\text{Mean} - 2 \cdot \text{SD}$

Q06

EXPLORING DATA

◆ Easy

Standard deviation measures:

- A. The middle value of a dataset
- B. Average distance of values from the mean
- C. The difference between max and min
- D. The most frequent value

Q07

EXPLORING DATA

◆ Easy

When comparing two distributions with the same shape and spread, a larger mean indicates:

- A. More variability
- B. A shift to the right on the number line
- C. A shift to the left
- D. A different shape

Q08

EXPLORING DATA

◆ Easy

A z-score of  $-2$  means the data value is:

- A. 2 units below the mean
- B. 2 standard deviations below the mean
- C. 2% below average
- D. Below the median by 2

Q09 EXPLORING DATA

◆ Easy

In a perfectly symmetric, bell-shaped distribution, which statement is true?

A. Mean > Median

B. Mean < Median

C. Mean = Median

D. Mode < Mean

Q10 EXPLORING DATA

◆ Easy

Which graphical display is best for showing the distribution of a single quantitative variable?

A. Bar chart

B. Pie chart

C. Histogram

D. Scatterplot

Q11 EXPLORING DATA

◆ Easy

The interquartile range is preferred over the range because:

A. It is always larger

B. It is resistant to outliers

C. It uses all data values

D. It equals the standard deviation

Q12 EXPLORING DATA

◆ Easy

A stemplot (stem-and-leaf plot) is most useful for:

- A. Displaying categorical data
- B. Showing the original data values while revealing distribution shape
- C. Comparing more than 5 groups
- D. Data with more than 200 values

Q13 EXPLORING DATA

◆ Easy

If every value in a dataset is multiplied by 3, what happens to the standard deviation?

- A. It stays the same
- B. It increases by 3
- C. It is multiplied by 3
- D. It is multiplied by 9

Q14 EXPLORING DATA

◆ Easy

Which of the following is a measure of spread?

- A. Mean
- B. Median
- C. Variance
- D. Mode

Q15 EXPLORING DATA

◆ Easy

In a left-skewed distribution, which relationship is typically true?

A. Mean > Median

B. Mean < Median

C. Mean = Median

D. Mode > Mean

Q16 EXPLORING DATA

◆ Easy

A cumulative relative frequency graph (ogive) is used to estimate:

A. The mean of the distribution

B. Percentiles and the proportion of data below a value

C. The standard deviation

D. The mode

Q17 EXPLORING DATA

◆ Easy

The 68-95-99.7 Rule applies to which type of distribution?

A. Any symmetric distribution

B. Normal (bell-shaped) distributions only

C. Skewed distributions

D. Uniform distributions

Q18

EXPLORING DATA

◆ Easy

A dotplot of test scores shows most scores between 70–90 with one score at 20. The score of 20 is best described as:

A. The median

B. An outlier

C. The mode

D. The IQR

## Two-Variable Data

Q19

TWO-VARIABLE DATA

◆ Medium

The correlation coefficient  $r$  measures:

A. The slope of the regression line

B. The strength and direction of a linear association

C. Whether two variables are independent

D. Causation between two variables

Q20

TWO-VARIABLE DATA

◆ Medium

If  $r = -0.85$ , this indicates:

- A. A weak negative linear association
- B. A strong negative linear association
- C. A moderate positive association
- D. No association

Q21

TWO-VARIABLE DATA

◆ Medium

The least-squares regression line minimizes:

- A. The sum of residuals
- B. The sum of squared residuals
- C. The correlation coefficient
- D. The sum of absolute residuals

Q22

TWO-VARIABLE DATA

◆ Medium

A residual is calculated as:

- A.  $\hat{y} - y$
- B.  $y - \hat{y}$
- C.  $x - \bar{y}$
- D.  $\bar{y} - \hat{y}$



Q23

TWO-VARIABLE DATA

◆ Medium

The slope of the LSRL,  $b_1 = r \cdot (S_y/S_x)$ , tells us:

- A. The predicted value of  $y$  when  $x = 0$
- B. The predicted change in  $y$  for each one-unit increase in  $x$
- C. The correlation between  $x$  and  $y$
- D. The standard error of the regression

Q24

TWO-VARIABLE DATA

◆ Medium

The  $y$ -intercept of the LSRL is the:

- A. Predicted value of  $y$  when  $x = 0$
- B. Average of all  $y$  values
- C. Correlation coefficient
- D. Residual when  $x = 0$

Q25

TWO-VARIABLE DATA

◆ Medium

The coefficient of determination  $r^2$  represents:

- A. The correlation between  $x$  and  $y$
- B. The fraction of variation in  $y$  explained by the linear relationship with  $x$
- C. The slope of the regression line
- D. The number of outliers

Q26

TWO-VARIABLE DATA

◆ Medium

If a residual plot shows a clear curved pattern, this suggests:

- A. The linear model is appropriate
- B. A non-linear model would fit better
- C. There is no association
- D. The correlation is 0

Q27

TWO-VARIABLE DATA

◆ Medium

An influential point in regression is one that:

- A. Has a large residual
- B. Significantly changes the regression line if removed
- C. Has the largest x value
- D. Is always an outlier in y

Q28

TWO-VARIABLE DATA

◆ Medium

'Correlation does not imply causation' means:

- A. Strong correlations are meaningless
- B. Two variables can be associated without one causing the other
- C. We can never establish cause and effect
- D. Experiments cannot show causation

Q29

TWO-VARIABLE DATA

◆ Medium

A scatterplot shows points tightly clustered around a line going from lower-left to upper-right. The correlation  $r$  is closest to:

A. -0.95

B. 0.0

C. 0.95

D. 2.0

Q30

TWO-VARIABLE DATA

◆ Medium

When comparing groups using side-by-side boxplots, you should comment on:

A. Only the medians

B. Shape, center, spread, and outliers of each group

C. Only the ranges

D. The correlation between the groups

## Collecting Data

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Q31 COLLECTING DATA

◆ Medium

The purpose of randomization in an experiment is to:

- A. Ensure equal group sizes
- B. Equally distribute lurking variables across treatment groups
- C. Eliminate measurement error
- D. Make the experiment double-blind

Q32 COLLECTING DATA

◆ Medium

A simple random sample (SRS) ensures that:

- A. Every individual is selected
- B. Every possible sample of size  $n$  has an equal chance of selection
- C. The sample is stratified by subgroup
- D. No individual is selected twice

Q33 COLLECTING DATA

◆ Medium

Stratified random sampling involves:

- A. Dividing the population into clusters and sampling all members of selected clusters
- B. Dividing the population into subgroups and taking an SRS from each
- C. Selecting every  $k$ th person on a list
- D. Sampling whoever is conveniently available

Q34 COLLECTING DATA

◆ Medium

Which type of sample is most susceptible to voluntary response bias?

A. Simple random sample

B. Stratified sample

C. Online opt-in poll

D. Cluster sample

Q35 COLLECTING DATA

◆ Medium

A study finds that towns with more churches also have higher crime rates. The best explanation is:

A. Churches cause crime

B. Crime causes churches

C. Population size is a lurking variable

D. The correlation must be negative

Q36 COLLECTING DATA

◆ Medium

In a double-blind experiment:

A. Only the subjects don't know their treatment

B. Only the researchers don't know who received which treatment

C. Neither the subjects nor the evaluators know who received which treatment

D. The experiment has no control group

Q37 COLLECTING DATA

◆ Medium

The placebo effect refers to:

- A. A type of sampling bias
- B. Improvement due to believing one received a treatment
- C. The effect of lurking variables
- D. Using no control group

Q38 COLLECTING DATA

◆ Medium

An observational study differs from an experiment because:

- A. It uses a random sample
- B. It does not randomly assign treatments to subjects
- C. It can establish causation
- D. It measures fewer variables

Q39 COLLECTING DATA

◆ Medium

Blocking in an experiment is used to:

- A. Randomly assign subjects to treatments
- B. Control for a known source of variability (a confounding variable)
- C. Eliminate the need for a control group
- D. Increase sample size

Q40 COLLECTING DATA

◆ Medium

**Systematic sampling involves:**

- A. Selecting every kth individual from a list after a random start
- B. Choosing individuals based on availability
- C. Taking an SRS from each subgroup
- D. Selecting entire clusters at random

Q41 COLLECTING DATA

◆ Medium

**Undercoverage bias occurs when:**

- A. The sample is too small
- B. Some members of the population have no chance of being selected
- C. Respondents lie on surveys
- D. The experiment lacks a control group

Q42 COLLECTING DATA

◆ Medium

**Which of the following best establishes a cause-and-effect relationship?**

- A. A strong correlation between two variables
- B. A well-designed randomized controlled experiment
- C. A large observational study
- D. A census of the entire population

Q43 COLLECTING DATA

◆ Medium

Response bias in a survey is caused by:

- A. Having too small a sample
- B. Questions or conditions that lead respondents to give inaccurate answers
- C. Selecting subjects without randomization
- D. Having no control group

Q44 COLLECTING DATA

◆ Medium

A researcher wants to test a new drug. She randomly assigns patients to drug or placebo groups, then evaluates outcomes without knowing which patients got the drug. This study is:

- A. Observational, single-blind
- B. Experimental, double-blind
- C. Observational, double-blind
- D. Experimental, not blinded

## Probability

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Q45 PROBABILITY

◆ Medium

The probability of an event A is defined as:

- A. The number of outcomes in A
- B. The number of outcomes in A divided by total outcomes in sample space
- C. The number of times A occurred
- D. The square root of the relative frequency

Q46 PROBABILITY

◆ Medium

If  $P(A) = 0.4$ , then  $P(A^c)$  — the probability of the complement of A — equals:

- A. 0.4
- B. 0.6
- C. 1.4
- D. 0.16

Q47 PROBABILITY

◆ Medium

Two events A and B are mutually exclusive (disjoint) if:

- A.  $P(A \text{ and } B) = P(A) \cdot P(B)$
- B.  $P(A \text{ and } B) = 0$
- C.  $P(A \text{ or } B) = 0$
- D.  $P(A|B) = P(A)$

Q48 PROBABILITY

◆ Medium

The general addition rule states  $P(A \text{ or } B) =$

A.  $P(A) + P(B)$

B.  $P(A) + P(B) - P(A \text{ and } B)$

C.  $P(A) \cdot P(B)$

D.  $P(A|B) \cdot P(B)$

Q49 PROBABILITY

◆ Medium

Events A and B are independent if and only if:

A.  $P(A \text{ and } B) = 0$

B.  $P(A \text{ and } B) = P(A) + P(B)$

C.  $P(A \text{ and } B) = P(A) \cdot P(B)$

D.  $P(A|B) = P(B)$

Q50 PROBABILITY

◆ Medium

Conditional probability  $P(A|B)$  is read as:

A. The probability of A and B

B. The probability of A given that B has occurred

C. The probability of B given A

D. The probability of A or B

Q51 PROBABILITY

◆ Medium

In a standard deck of 52 cards, what is the probability of drawing a King?

- A.  $1/52$
- B.  $4/52 = 1/13$
- C.  $13/52$
- D.  $1/4$

Q52 PROBABILITY

◆ Medium

The Law of Large Numbers states that:

- A. Larger samples always give exactly the right answer
- B. As the number of trials increases, the relative frequency approaches the true probability
- C. Random events eventually even out in a predictable way
- D. Samples of size  $\geq 30$  are always Normal

Q53 PROBABILITY

◆ Medium

Which of the following describes a probability model?

- A. A list of outcomes with non-negative probabilities summing to more than 1
- B. A list of all possible outcomes, each assigned a probability, where all probabilities sum to 1
- C. A sample of observed frequencies from an experiment
- D. Any set of outcomes

Q54 PROBABILITY

◆ Medium

A bag has 3 red and 5 blue marbles. You draw two marbles without replacement. The draws are:

- A. Independent
- B. Mutually exclusive
- C. Dependent
- D. Equally likely

Q55 PROBABILITY

◆ Medium

If a die is rolled, what is the probability of getting an even number or a number greater than 4?

- A.  $4/6$
- B.  $5/6$
- C.  $3/6$
- D.  $2/6$

Q56 PROBABILITY

◆ Medium

A tree diagram is most useful for:

- A. Displaying the distribution of one variable
- B. Computing probabilities of multi-stage outcomes
- C. Showing linear associations
- D. Summarizing categorical data

Q57 PROBABILITY

◆ Medium

Using the multiplication rule,  $P(A \text{ and } B)$  for independent events equals:

A.  $P(A) + P(B)$

B.  $P(A) \cdot P(B|A)$

C.  $P(A) \cdot P(B)$

D.  $P(A) / P(B)$

Q58 PROBABILITY

◆ Medium

A 'rare event' in statistics typically refers to an event with probability:

A. Greater than 0.5

B. Less than 0.05

C. Exactly 0.10

D. Between 0.25 and 0.75

## Random Variables

Q59 RANDOM VARIABLES

◆ Medium

The expected value (mean) of a discrete random variable  $X$  is calculated as:

A. The most frequent value of  $X$

B.  $\sum x \cdot P(x)$  for all values  $x$

C. The median of the distribution

D.  $(\text{Max} + \text{Min}) / 2$

Q60

RANDOM VARIABLES

◆ Medium

The variance of a discrete random variable X is calculated as:

A.  $\sum [x \cdot P(x)]$

B.  $\sum [(x - \mu)^2 \cdot P(x)]$

C.  $(\text{Max} - \text{Min})^2$

D.  $\text{SD}(X) / E(X)$

Q61

RANDOM VARIABLES

◆ Medium

If X and Y are independent random variables, then  $\text{Var}(X + Y) =$

A.  $\text{Var}(X) + \text{Var}(Y)$  only if they are positively correlated

B.  $\text{Var}(X) + \text{Var}(Y)$

C.  $\text{Var}(X) - \text{Var}(Y)$

D.  $\text{Var}(X) \cdot \text{Var}(Y)$

Q62

RANDOM VARIABLES

◆ Medium

A binomial random variable requires all of these EXCEPT:

A. A fixed number of trials n

B. Each trial is independent

C. Exactly two outcomes per trial (success/failure)

D. The probability of success must be 0.5

Q63 RANDOM VARIABLES

◆ Medium

For a binomial distribution with  $n = 10$  and  $p = 0.3$ , the mean is:

A. 3

B. 0.3

C. 7

D. 1.45

Q64 RANDOM VARIABLES

◆ Medium

A geometric random variable counts:

A. The number of successes in  $n$  trials

B. The number of trials until the first success

C. The number of failures before success  $n$

D. The total number of outcomes

Q65 RANDOM VARIABLES

◆ Medium

If a fair coin is flipped 4 times, what is the probability of getting exactly 2 heads?

A.  $1/4$

B.  $6/16 = 3/8$

C.  $1/2$

D.  $4/16$

Q66 RANDOM VARIABLES

◆ Medium

The standard deviation of a linear combination  $aX + b$  (where  $a$  and  $b$  are constants) is:

A.  $|a| \cdot \sigma_x + b$

B.  $|a| \cdot \sigma_x$

C.  $a^2 \cdot \sigma_x$

D.  $\sigma_x + b$

Q67 RANDOM VARIABLES

◆ Medium

The Normal distribution is the appropriate model when:

A. The sample size is always exactly 30

B. The data is bell-shaped, symmetric, and follows the 68-95-99.7 rule

C. There are exactly two outcomes

D. All values are positive

Q68 RANDOM VARIABLES

◆ Medium

What does  $P(Z < 1.5)$  represent on the standard Normal curve?

A. The area to the right of  $z = 1.5$

B. The area to the left of  $z = 1.5$

C. The height of the curve at  $z = 1.5$

D. The probability of exactly  $z = 1.5$



Q69 SAMPLING DISTRIBUTIONS

◆ Hard

The sampling distribution of  $\bar{x}$  describes:

- A. The distribution of data in one sample
- B. The distribution of sample means from all possible samples of size  $n$
- C. The mean of the population
- D. How the standard deviation changes with  $n$

Q70 SAMPLING DISTRIBUTIONS

◆ Hard

The Central Limit Theorem (CLT) states that for large  $n$ , the sampling distribution of  $\bar{x}$  is approximately:

- A. The same as the population distribution
- B. Normal, regardless of the population's shape
- C. Uniform
- D. Chi-squared

Q71 SAMPLING DISTRIBUTIONS

◆ Hard

The standard deviation of the sampling distribution of  $\bar{x}$  is called the standard error and equals:

- A.  $\sigma$
- B.  $\sigma/n$
- C.  $\sigma/\sqrt{n}$
- D.  $\sigma \cdot \sqrt{n}$

Q72 SAMPLING DISTRIBUTIONS

◆ Hard

As the sample size  $n$  increases, the standard error of  $\bar{x}$ :

- A. Increases
- B. Stays the same
- C. Decreases
- D. Becomes equal to  $\sigma$

Q73 SAMPLING DISTRIBUTIONS

◆ Hard

For the sampling distribution of  $\hat{p}$  (sample proportion), the mean equals:

- A.  $\hat{p}$
- B.  $p$  (the population proportion)
- C.  $n \cdot p$
- D.  $1 - p$

Q74 SAMPLING DISTRIBUTIONS

◆ Hard

The condition  $np \geq 10$  and  $n(1-p) \geq 10$  ensures that:

- A. The sample is large enough to use the t-distribution
- B. The sampling distribution of  $\hat{p}$  is approximately Normal
- C. The sample is an SRS
- D.  $\hat{p}$  equals  $p$  exactly

Q75 SAMPLING DISTRIBUTIONS

◆ Hard

Which is NOT a condition for the CLT to apply to  $\bar{x}$ ?

- A. The sample is an SRS
- B.  $n \geq 30$  (or population is Normal)
- C. The population is finite
- D. Observations are independent

Q76 SAMPLING DISTRIBUTIONS

◆ Hard

Bias in a statistic refers to:

- A. High variability in the statistic
- B. A statistic that consistently over- or underestimates the parameter
- C. Using a small sample
- D. A statistic that always equals the parameter

Q77 SAMPLING DISTRIBUTIONS

◆ Hard

The 10% Condition for independence states that the sample size  $n$  should be:

- A. At least 10
- B. No more than 10% of the population
- C. Exactly 10% of the population
- D. At least 10 times larger than the population

Q78

SAMPLING DISTRIBUTIONS

◆ Hard

A sampling distribution with low variability and centered on the parameter is described as:

- A. Biased and imprecise
- B. Unbiased and precise
- C. Biased and precise
- D. Unbiased and imprecise

## Confidence Intervals

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Q79

CONFIDENCE INTERVALS

◆ Hard

A 95% confidence interval for a mean can be interpreted as:

- A. There is a 95% probability that  $\mu$  is in this specific interval
- B. If we repeated this procedure many times, 95% of such intervals would contain  $\mu$
- C. 95% of the data falls within this interval
- D. The sample mean is within 95% of  $\mu$

Q80 CONFIDENCE INTERVALS

◆ Hard

The margin of error in a confidence interval is:

- A. The sample mean
- B. The critical value times the standard error
- C. The width of the interval
- D. The population standard deviation

Q81 CONFIDENCE INTERVALS

◆ Hard

To reduce the margin of error while keeping confidence level constant, you should:

- A. Decrease the sample size
- B. Increase the sample size
- C. Increase the confidence level
- D. Decrease the standard deviation by guessing

Q82 CONFIDENCE INTERVALS

◆ Hard

A t-interval is used instead of a z-interval when:

- A. The sample is very large
- B. The population standard deviation  $\sigma$  is unknown and must be estimated by  $s$
- C. The data is not symmetric
- D. The confidence level is below 90%

Q83 CONFIDENCE INTERVALS

◆ Hard

Degrees of freedom for a one-sample t-interval equals:

A.  $n$

B.  $n - 1$

C.  $n - 2$

D.  $n/2$

Q84 CONFIDENCE INTERVALS

◆ Hard

A 99% confidence interval is \_\_\_\_ a 95% confidence interval (all else equal).

A. Narrower than

B. Wider than

C. The same width as

D. Unrelated to

Q85 CONFIDENCE INTERVALS

◆ Hard

For a confidence interval for a proportion  $p$ , the conditions that must be checked include:

A. The population is Normal

B.  $n\hat{p} \geq 10$  and  $n(1-\hat{p}) \geq 10$ , and a random sample

C. The sample size is exactly 30

D. The population standard deviation is known

Q86

CONFIDENCE INTERVALS

◆ Hard

'We are 95% confident that the true proportion of voters who support the candidate is between 0.48 and 0.56.' The margin of error is:

A. 0.48

B. 0.04

C. 0.08

D. 0.52

Q87

CONFIDENCE INTERVALS

◆ Hard

Which statement correctly describes what it means to 'check conditions' before a confidence interval?

A. It guarantees the interval is exactly 95% accurate

B. It verifies that the interval procedure's assumptions are reasonably met

C. It confirms the sample mean equals the population mean

D. It eliminates sampling variability

## Significance Tests

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Q88

SIGNIFICANCE TESTS

◆ Hard

The null hypothesis ( $H_0$ ) in a significance test typically states:

- A. There is a significant difference
- B. No effect or no difference; the parameter equals a specific value
- C. The alternative is true
- D. The sample statistic equals the population parameter

Q89

SIGNIFICANCE TESTS

◆ Hard

The p-value is defined as:

- A. The probability that  $H_0$  is true
- B. The probability of observing a result as extreme as or more extreme than the data, assuming  $H_0$  is true
- C. The probability that  $H_a$  is true
- D. The significance level  $\alpha$

Q90

SIGNIFICANCE TESTS

◆ Hard

If the p-value is 0.03 and  $\alpha = 0.05$ , you should:

- A. Fail to reject  $H_0$
- B. Reject  $H_0$
- C. Accept  $H_0$
- D. Accept  $H_a$



Q91

SIGNIFICANCE TESTS

◆ Hard

A Type I error is:

- A. Failing to reject a false null hypothesis
- B. Rejecting a true null hypothesis
- C. Using too small a sample
- D. Incorrectly computing the test statistic

Q92

SIGNIFICANCE TESTS

◆ Hard

A Type II error is:

- A. Rejecting a true  $H_0$
- B. Failing to reject a false  $H_0$
- C. Computing the wrong p-value
- D. Using  $\alpha = 0.05$  instead of 0.01

Q93

SIGNIFICANCE TESTS

◆ Hard

The test statistic for a one-sample mean test (z-test) is:

- A.  $\bar{x} - \mu_0$
- B.  $(\bar{x} - \mu_0) / (\sigma/\sqrt{n})$
- C.  $(\bar{x} - \mu_0) / s$
- D.  $\hat{p} - p_0$

Q94

SIGNIFICANCE TESTS

◆ Hard

Statistical significance means:

- A. The result is practically important
- B. The result is unlikely to have occurred by chance if  $H_0$  is true
- C. The null hypothesis is definitely false
- D. The sample size was adequate

Q95

SIGNIFICANCE TESTS

◆ Hard

The power of a test increases when:

- A.  $\alpha$  decreases
- B. Sample size increases
- C. The true effect is smaller
- D. The standard deviation increases

Q96

SIGNIFICANCE TESTS

◆ Hard

For a two-sided test with  $H_a: \mu \neq \mu_0$ , the p-value is:

- A. The probability in one tail only
- B. Double the probability in one tail
- C. Equal to  $\alpha$
- D. The area between  $-z$  and  $+z$

Q97

SIGNIFICANCE TESTS

◆ Hard

A chi-square test for goodness of fit tests whether:

- A. The population mean equals a specified value
- B. The observed categorical frequencies match expected frequencies from a hypothesized distribution
- C. Two quantitative variables are linearly related
- D. The sample is representative of the population

Q98

SIGNIFICANCE TESTS

◆ Hard

When performing a two-sample t-test for means, the null hypothesis is typically:

- A.  $H_0: \mu_1 = 0$
- B.  $H_0: \mu_1 - \mu_2 = 0$  (i.e.,  $\mu_1 = \mu_2$ )
- C.  $H_0: \sigma_1 = \sigma_2$
- D.  $H_0: \bar{X}_1 = \bar{X}_2$

Q99

SIGNIFICANCE TESTS

◆ Hard

The chi-square test for independence tests whether:

- A. The means of two groups are equal
- B. Two categorical variables are associated in the population
- C. A proportion equals a specified value
- D. The data follow a Normal distribution

Q100

SIGNIFICANCE TESTS

◆ Hard

'Failing to reject  $H_0$ ' means:

- A.  $H_0$  is definitely true
- B. We have proven  $H_0$
- C. The data do not provide sufficient evidence to reject  $H_0$
- D. The experiment failed

# Answer Key

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|              |              |              |              |               |
|--------------|--------------|--------------|--------------|---------------|
| Q01 <b>B</b> | Q02 <b>B</b> | Q03 <b>C</b> | Q04 <b>B</b> | Q05 <b>A</b>  |
| Q06 <b>B</b> | Q07 <b>B</b> | Q08 <b>B</b> | Q09 <b>C</b> | Q10 <b>C</b>  |
| Q11 <b>B</b> | Q12 <b>B</b> | Q13 <b>C</b> | Q14 <b>C</b> | Q15 <b>B</b>  |
| Q16 <b>B</b> | Q17 <b>B</b> | Q18 <b>B</b> | Q19 <b>B</b> | Q20 <b>B</b>  |
| Q21 <b>B</b> | Q22 <b>B</b> | Q23 <b>B</b> | Q24 <b>A</b> | Q25 <b>B</b>  |
| Q26 <b>B</b> | Q27 <b>B</b> | Q28 <b>B</b> | Q29 <b>C</b> | Q30 <b>B</b>  |
| Q31 <b>B</b> | Q32 <b>B</b> | Q33 <b>B</b> | Q34 <b>C</b> | Q35 <b>C</b>  |
| Q36 <b>C</b> | Q37 <b>B</b> | Q38 <b>B</b> | Q39 <b>B</b> | Q40 <b>A</b>  |
| Q41 <b>B</b> | Q42 <b>B</b> | Q43 <b>B</b> | Q44 <b>B</b> | Q45 <b>B</b>  |
| Q46 <b>B</b> | Q47 <b>B</b> | Q48 <b>B</b> | Q49 <b>C</b> | Q50 <b>B</b>  |
| Q51 <b>B</b> | Q52 <b>B</b> | Q53 <b>B</b> | Q54 <b>C</b> | Q55 <b>B</b>  |
| Q56 <b>B</b> | Q57 <b>C</b> | Q58 <b>B</b> | Q59 <b>B</b> | Q60 <b>B</b>  |
| Q61 <b>B</b> | Q62 <b>D</b> | Q63 <b>A</b> | Q64 <b>B</b> | Q65 <b>B</b>  |
| Q66 <b>B</b> | Q67 <b>B</b> | Q68 <b>B</b> | Q69 <b>B</b> | Q70 <b>B</b>  |
| Q71 <b>C</b> | Q72 <b>C</b> | Q73 <b>B</b> | Q74 <b>B</b> | Q75 <b>C</b>  |
| Q76 <b>B</b> | Q77 <b>B</b> | Q78 <b>B</b> | Q79 <b>B</b> | Q80 <b>B</b>  |
| Q81 <b>B</b> | Q82 <b>B</b> | Q83 <b>B</b> | Q84 <b>B</b> | Q85 <b>B</b>  |
| Q86 <b>B</b> | Q87 <b>B</b> | Q88 <b>B</b> | Q89 <b>B</b> | Q90 <b>B</b>  |
| Q91 <b>B</b> | Q92 <b>B</b> | Q93 <b>B</b> | Q94 <b>B</b> | Q95 <b>B</b>  |
| Q96 <b>B</b> | Q97 <b>B</b> | Q98 <b>B</b> | Q99 <b>B</b> | Q100 <b>C</b> |