

AP Statistics - Significance Tests for a Proportion - Quiz

Common Core AP STAT 6.4, AP STAT 6.5, AP STAT 6.6, AP STAT 6.7, HSS-IC.A.2, HSS-IC.B.5 · maths-pdf.fr/en/

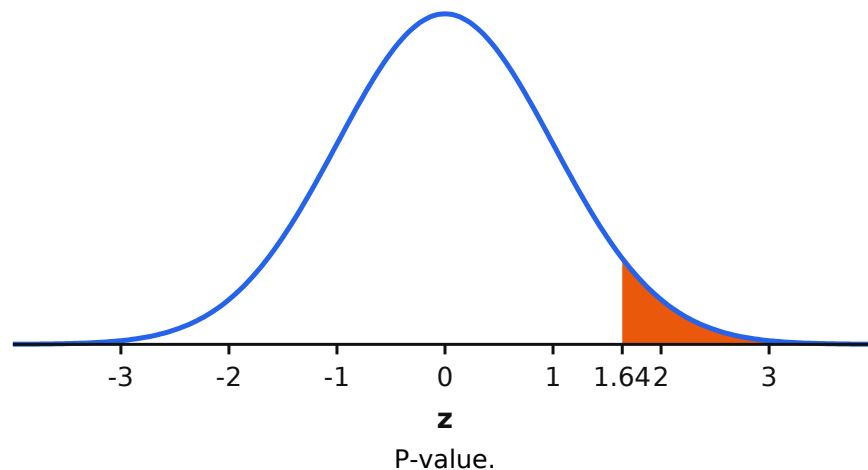
Name: _____ Class: _____ Date: ____/____/____

Ten multiple-choice questions test hypotheses, p-values, and errors. Read the explanations, since misinterpreting a p-value is the most common error on the AP exam.

AP Statistics · Common Core State Standards: **AP STAT 6.4, AP STAT 6.5, AP STAT 6.6, AP STAT 6.7, HSS-IC.A.2, HSS-IC.B.5**

Questions

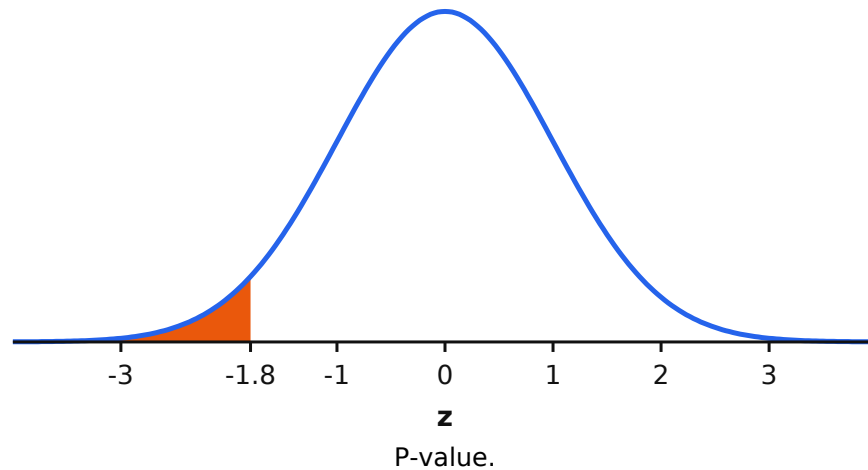
Question 1



The shaded area is closest to:

- A. 0.95
- B. 0.05
- C. 0.10
- D. 0.50

Question 2



For $H_a: p < p_0$ with $z = -1.8$, the p-value is about:

- A. 0.072
- B. 0.964
- C. 0.018
- D. 0.036

Question 3

	H0 true	H0 false
Reject H0	Type I	Correct
Fail to reject	Correct	Type II

Errors.

A Type I error occurs when:

- A. H_0 is true and we reject it
- B. H_0 is false and we reject it
- C. H_0 is false and we fail to reject it
- D. H_0 is true and we fail to reject it

Question 4

A p-value of 0.02 means:

- A. The probability that H_0 is true is 2%
- B. If H_0 is true, there is a 2% chance of a result this extreme or more
- C. H_0 is false with 98% probability
- D. 2% of the data are outliers

Question 5

Which is the correct conclusion for $p\text{-value} = 0.20$, $\alpha = 0.05$?

- A. Fail to reject H_0 ; not convincing evidence for H_a
- B. Accept H_0 as true
- C. Reject H_0
- D. Prove H_a false

Question 6

The null hypothesis always contains:

- A. a strict inequality
- B. the sample proportion
- C. the p -value
- D. equality

Question 7

Increasing the sample size (everything else equal) will:

- A. decrease the power
- B. increase α
- C. increase the power
- D. change p_0

Question 8

The large counts condition for a test of $H_0: p = 0.4$ with $n = 50$ uses:

- A. $n\hat{p}$ only
- B. $np_0 = 0.4$
- C. $np_0 = 20$ and $n(1 - p_0) = 30$
- D. $n = 30$

Question 9

$\alpha = 0.01$ compared with $\alpha = 0.05$ makes it:

- A. harder to reject H_0
- B. easier to reject H_0
- C. impossible to reject H_0
- D. no different

Question 10

A confidence interval for p of $(0.45, 0.55)$ and $H_0: p = 0.60$ (two-sided, $\alpha = 0.05$) lead to:

- A. failing to reject H_0
- B. rejecting H_0

- C. accepting H_0
- D. no conclusion

Answers

1. **B** - The right-tail area beyond $z = 1.64$ is about 0.05.
2. **D** - The left-tail area below -1.8 is 0.0359. Doubling is for two-sided tests only.
3. **A** - Rejecting a true null is a Type I error.
4. **B** - The p-value is computed assuming H_0 is true; it is not the probability that H_0 is true.
5. **A** - A large p-value means the data are consistent with H_0 but do not prove it.
6. **D** - H_0 states $p = p_0$.
7. **C** - Larger samples reduce the standard error, making true differences easier to detect.
8. **C** - Large counts are checked with the hypothesized proportion p_0 .
9. **A** - A smaller alpha demands stronger evidence.
10. **B** - 0.60 is outside the interval, so it is not plausible.

Remember

- H_0 states no effect ($p = p_0$); H_a is $p > p_0$, $p < p_0$, or p not equal to p_0 .
- $z = (\hat{p} - p_0) / \sqrt{p_0(1 - p_0)/n}$; check random, 10%, and large counts with p_0 .
- p-value: probability of a result at least as extreme as observed, assuming H_0 is true.
- p-value < alpha: reject H_0 (convincing evidence); otherwise fail to reject; never 'accept H_0 '.
- Type I error: reject true H_0 (probability alpha). Type II: fail to reject false H_0 ; power = $1 - P(\text{Type II})$.