

AP Statistics - Significance Tests for a Proportion - Test

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: ____/____/____

This 45-minute test covers hypotheses, one-proportion z tests, p-values, errors, and power. Follow the four-step process and write every conclusion in context.

About this test

- Grade: AP Statistics
- Chapter: Significance Tests for a Proportion
- 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
- Time: 45 minutes
- Total: 20 points

Question 1 - One-proportion z test [5 pts]

A company says that at most 30% of its customers return products. A random sample of 200 of its many customers finds that 70 returned a product. Test whether the return rate is greater than 30% at $\alpha = 0.05$. (*State 1, Plan 1, Do 2, Conclude 1*)

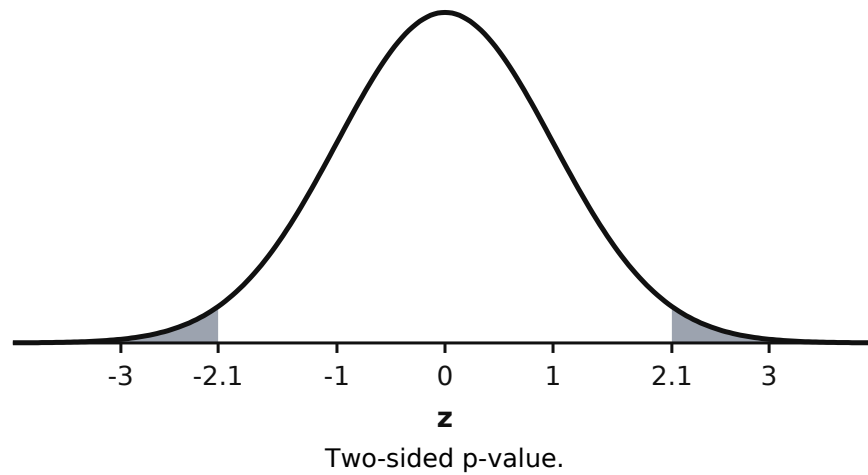
Question 2 - Interpret the p-value [2 pts]

In the previous test, interpret the p-value in context.

Question 3 - Errors [3 pts]

A farmer tests H_0 : a fertilizer has no effect on yield, against H_a : it increases yield. (a) Describe a Type I error in context. (*1 point*) (b) Describe a Type II error in context. (*1 point*) (c) What is the probability of a Type I error when $\alpha = 0.05$? (*1 point*)

Question 4 - Two-sided p-value [2 pts]

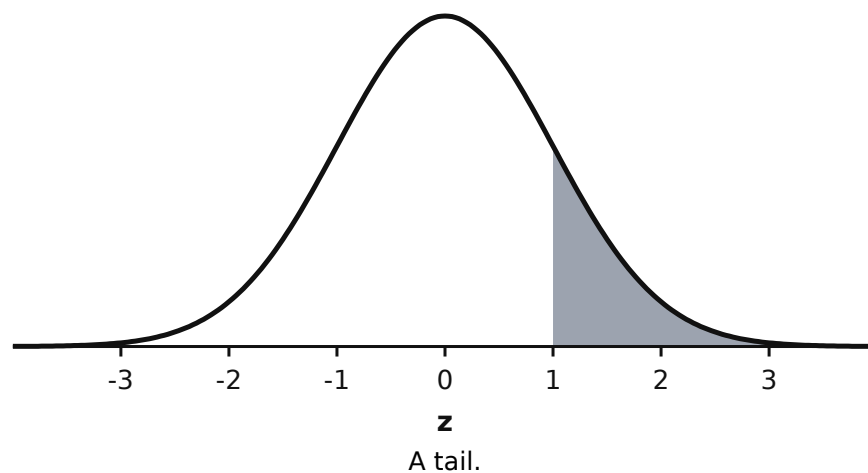


For a two-sided test, $z = 2.10$. Find the p-value and state a conclusion at $\alpha = 0.05$.

Question 5 - Conclusion language [2 pts]

A test yields a p-value of 0.27 ($\alpha = 0.05$). Write a correct conclusion for a study of whether a new app increases the proportion of users who finish a lesson.

Question 6 - Alternative hypothesis [1 pt]

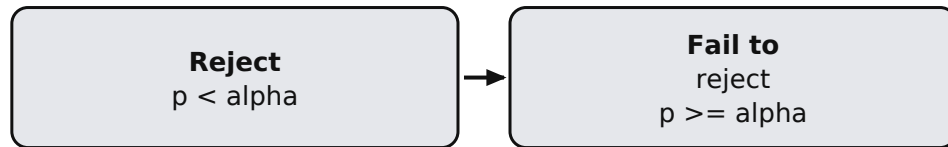


A test statistic is $z = 1.0$ with a right tail shaded. Which alternative hypothesis matches the shading: $p > p_0$, $p < p_0$, or p not equal to p_0 ?

Question 7 - Conditions [2 pts]

For $H_0: p = 0.02$ and $n = 150$, check the large counts condition. Is a z test appropriate?

Question 8 - Decision [3 pts]



Decision rule.

A test of $H_0: p = 0.25$ gives $z = 1.40$ for $H_a: p > 0.25$. (a) Find the p-value. (1 point) (b) State the decision at $\alpha = 0.10$. (1 point) (c) State the decision at $\alpha = 0.05$. (1 point)