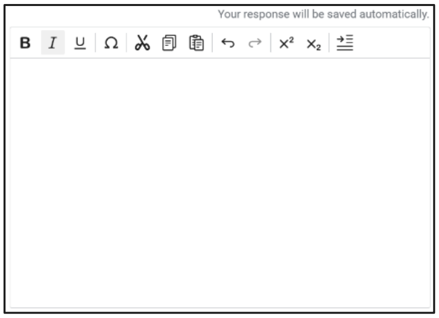
AP

AP® Statistics

Digital Response Guidelines

Beginning with the 2027 AP® Statistics Exam, students will submit responses to free-response questions (FRQs) in the digital Bluebook™ platform. Two methods are available for entering statistical notation and mathematical operations: (1) Bluebook™ toolbar symbols, or (2) a standard (QWERTY) keyboard. This guide offers tips to help teachers and students prepare for the digital entry of equations, expressions, and statistical notation using either method.

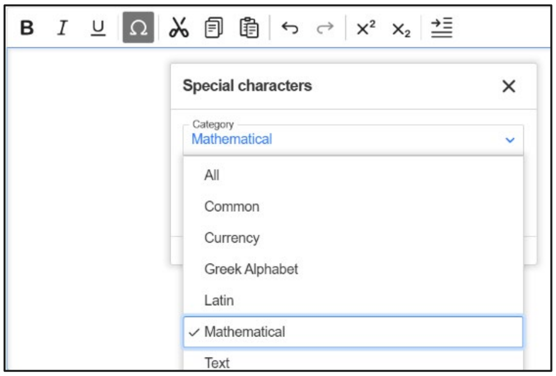
Bluebook™

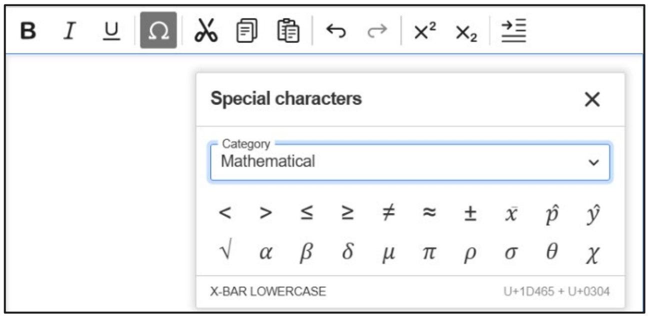


The Bluebook™ platform is digital-ready and comes with options for entering special characters, including statistical notation and mathematical operations. To practice these options, download the Bluebook™ app and work in Test Preview (available in early 2027).

During the FRQ section of the AP Statistics Exam, students will record their responses in an autosaving, blank response box.[1] A toolbar sits directly above the response box and provides options to format text, including bold, italics, underline, cut, copy, paste, undo, redo, superscript, subscript, and indent.

Also in that toolbar is an option for **special characters**, denoted by an omega. To filter on mathematical special characters, select Ω and then click Mathematical in the dropdown menu. This provides access to mathematical characters such as less than or equal to, x-bar, p-hat, square root, commonly used Greek letters, and more.





Student Digital Response Practice

Students can practice digital statistical notation and mathematical entries by

- downloading the Bluebook™ app and entering responses to questions in the AP Statistics Test Preview in Bluebook™ (available in early 2027),
- using quizzes and practice exams in AP Classroom, which closely match the Bluebook™ testing experience,

[1] The Bluebook™ layout shown in these images may change with future platform updates.

- using word processing software, or
- entering expressions and equations into a spreadsheet.

These are just some of the many options available; this should not be considered an exhaustive list of what students may use to practice.

> **NOTE:** Students should turn off the autocorrect feature in word processing software. Turning off autocorrect will prevent automatic capitalization and incorrect symbol insertion. Bluebook™ does not have autocorrect, so there is no need to disable this function when using Bluebook™.

Keyboard Equivalencies

Tables 1–3 offer examples for how to translate symbolic notation to standard keyboard entry in Bluebook™.

Table 1: Statistical Notation

Symbolic Notation	Keyboard Options
μ	mu
$\overline{x}$	x-bar
$\hat{p}$	p-hat
σ	sigma
α	alpha
β	beta
r^2	r^2 r-squared
Q3	Q_3 Q3 Q sub 3
μ_{A}	mu_A mu sub A
$\hat{p}_1$	p-hat_1 p-hat sub 1
H_0	H_0 null hypothesis
H_{a}	H_a alternative hypothesis

Table 2: Mathematical Operations

Symbolic Notation	Keyboard Options
$\pm$	+/-
$\leq$	<=
$\geq$	>=
$\neq$	not equal =/= <> !=
$\left(\frac{1}{2}\right)^3$	(1/2)^3
$\frac{5}{\sqrt{30}}$	5/sqrt(30)
$(0.45)^{3-1}(0.55)$	(0.45)^(3-1)*(0.55)
$^\circ\text{C}$	degrees C

Table 3: Inference Method Results

Symbolic Notation	Keyboard Options
$(0.50-0.30)\pm1.96\sqrt{\frac{0.50(1-0.50)}{200}+\frac{0.30(1-0.30)}{250}}$	(0.50-0.30)+/-1.96(sqrt((0.50)(1-0.50)/200+(0.30)(1-0.30)/250))
$t=\frac{(200-150)}{\sqrt{\frac{25^2}{1000}+\frac{30^2}{800}}}$	t=(200-150)/sqrt((25^2/1000)+(30^2/800))
$(2.5,\ 5.5)$	(2.5, 5.5) 2.5 to 5.5

NOTE: Students should not indicate confidence intervals as “x-y” because the hyphen could be interpreted as subtraction. For example, “the 95 percent confidence interval is 2.5-5.5” could be interpreted as meaning the value of the difference 2.5 minus 5.5 instead of “from 2.5 to 5.5”. Instead, students should write, “the 95 percent confidence interval is from 2.5 to 5.5.”

Course and Exam Description (CED) FRQ Digital Answers

The following examples demonstrate how students could use a standard QWERTY keyboard to answer the sample CED FRQs in the Bluebook™ platform. The CED Model Solutions appear in the current CED and use a publishing quality equation editor. The Standard Keyboard versions replace formal equation editor components with standard keyboard alternatives like hyphens, equal signs, plus signs, parentheses, carats, asterisks, and left- and right-angle brackets.

QUESTION 1, PART D

CED Model Solution

The mean (42) is larger than the median (32), which suggests that the distribution of commute times for Area Five is likely right-skewed.

Standard Keyboard

Mean (42) > median (32). This comparison suggests that the distribution of commute times for Area Five is likely right-skewed.

QUESTION 2, PART B (i)

CED Model Solution

For the DES method, $1.5 \times \text{IQR}$ is $1.5(1{,}107 - 226) = 1{,}321.5$. There are no lower outliers because $226 - 1{,}321.5 = -1{,}095.5$ and the minimum number is 1. There are upper outliers because $1{,}107 + 1{,}321.5 = 2{,}428.5$ and the maximum number is 6,950.

Standard Keyboard

For the DES method, there are no upper outliers because the minimum of 1 > 226 - 1.5(1107 - 226), or the minimum of 1 > -1095.5. There are upper outliers because the maximum of 6950 > 1107 + 1.5(1107 - 226), or the maximum of 6950 > 2428.5.

QUESTION 2, PART B (ii)

CED Model Solution

For the AES method, $1.5 \times \text{IQR}$ is $1.5(1{,}091 - 233) = 1{,}287$. There are no lower outliers because $233 - 1{,}287 = -1{,}054$ and the minimum number is 1. There are upper outliers because $1{,}091 + 1{,}287 = 2{,}378$ and the maximum number is 7,190.

Standard Keyboard

For the AES method, 1.5(IQR) is 1.5(858) = 1287. There are no lower outliers because 233 - 1287 = -1054 < 1, the minimum. There are upper outliers because 1091 + 1287 = 2378 < 7190, the maximum.

QUESTION 2, PART C (i)

CED Model Solution

For the DES encryption method, the distance from Q1 to the median (317) is less than the distance from the median to Q3 (564).

Standard Keyboard

DES: The distance from Q1 to the median (317) < the distance from the median to Q3 (564).

QUESTION 2, PART C (ii)

CED Model Solution

For the AES encryption method, the distance from Q1 to the median (561) is greater than the distance from the median to Q3 (297).

Standard Keyboard

AES: The distance from Q1 to the median (561) > the distance from the median to Q3 (297).

QUESTION 3, PART C

CED Model Solution

The null hypothesis is $\mathrm{H}_0: p_\mathrm{A} = p_\mathrm{B}$, and the alternative hypothesis is $\mathrm{H}_\mathrm{a}: p_\mathrm{A} \neq p_\mathrm{B}$. For adults similar to those in the study, let p_A represent the true proportion who will watch version A and text the code for more information, and let p_B represent the true proportion who will watch version B and text the code for more information. The randomization condition for performing a two-sample *z*-test for the difference between two population proportions is satisfied because the volunteers were randomly assigned to Version A or Version B.

The values of the sample proportions are $\hat{p}_\mathrm{A} = \frac{83}{250} = 0.332$, $\hat{p}_\mathrm{B} = \frac{54}{250} = 0.216$. The combined proportion is $\hat{p}_\mathrm{c} = \frac{250(0.332) + 250(0.216)}{250 + 250} = 0.274$. The normality condition is met because the expected number of successes and failures for both samples are at least 10.

Version A: $250(0.274) = 68.5$, $250(1 - 0.274) = 181.5$

Version B: $250(0.274) = 68.5$, $250(1 - 0.274) = 181.5$

The value of the test statistic is $z = \frac{0.332 - 0.216}{\sqrt{0.274(1 - 0.274)}\sqrt{\frac{1}{250} + \frac{1}{250}}} = 2.91$, and the *p*-value is 0.0036.

Standard Keyboard Version #1

H0: pA = pB, and Ha: pA =/= pB. For adults similar to those in the study, let pA represent the true proportion who will watch version A and text the code for more information, and let pB represent the true proportion who will watch version B and text the code for more information. The randomization condition for performing a two-sample z-test for the difference between two population proportions is satisfied because the volunteers were randomly assigned to Version A or Version B.

The values of the sample proportions are p-hatA = 83/250 = 0.332, p-hatB = 54/250 = 0.216. The combined proportion is p-hatC is 250(0.332) + 250(0.216) divided by 250 + 250, which equals 0.274.

The normality condition is met because the expected number of successes and failure for both samples >= 10.

A: 250(0.274) = 68.5, 250(1 - 0.274) = 181.5

B: 250(0.274) = 68.5, 250(1 - 0.274) = 181.5

The value of the test statistic is z = 2.91, and the p value is 0.0036.

Standard Keyboard Version #2

H0: p_A=p_B, and the alternative hypothesis is Ha: p_A not equal p_B. For adults similar to those in the study, let p_A represent the true proportion who will watch version A and text the code for more information, and let p_B represent the true proportion who will watch version B and text the code for more information. The randomization condition for performing a two-sample z-test for the difference between two population proportions is satisfied because the volunteers were randomly assigned to Version A or Version B.

The values of the sample proportions are p-hat_A = 83/250 = 0.332, p-hat_B = 54/250 = 0.216. The combined proportion is p-hat_C equals 250(0.332) + 250(0.216) divided by 250 + 250, which equals 0.274.

The normality condition is met because the expected number of successes and failures for both samples are at least 10.

Version A: 250(0.274) = 68.5, 250(1 - 0.274) = 181.5

Version B: 250(0.274) = 68.5, 250(1 - 0.274) = 181.5

The value of the test statistic is z = (0.332 - 0.216)/(sqrt(0.274(1 - 0.274)) times sqrt(1/250 + 1/250))= 2.91, and the p-value is 0.0036.

QUESTION 3, PART D

CED Model Solution

Because this *p*-value of 0.0036 is less than $\alpha = 0.05$ significance level, the null hypothesis should be rejected. There is convincing statistical evidence to conclude that there is a difference in the proportion of adults similar to those in the study who will watch version A and text the code for more information and the proportion of adults similar to those in the study who will watch version B and text the code for more information.

Standard Keyboard

p-value 0.0036 < alpha (0.05), reject H0. There is convincing statistical evidence to conclude that there is a difference in the proportion of adults similar to those in the study who will watch version A and text the code for more information and the proportion of adults similar to those in the study who will watch version B and text the code for more information.

QUESTION 4, PART A (i)

CED Model Solution

$$P\left(X \geq 3\right) = 0.35 + 0.19 + 0.05 + 0.03 = 0.62$$

Standard Keyboard

P(X >= 3) = .35 + .19 + .05 + .03 = .62

QUESTION 4, PART A (ii)

CED Model Solution

$E(X) = (0 \cdot 0.04) + (1 \cdot 0.13) + (2 \cdot 0.21) + (3 \cdot 0.35) + (4 \cdot 0.19) + (5 \cdot 0.05) + (6 \cdot 0.03) = 2.79$ refilling stations

Standard Keyboard

E(X) = (0*0.04) + (1*0.13) + (2*0.21) + (3*0.35) + (4*0.19) + (5*0.05) + (6*0.03) = 2.79 refilling stations