

AP Statistics Free Response

Name:

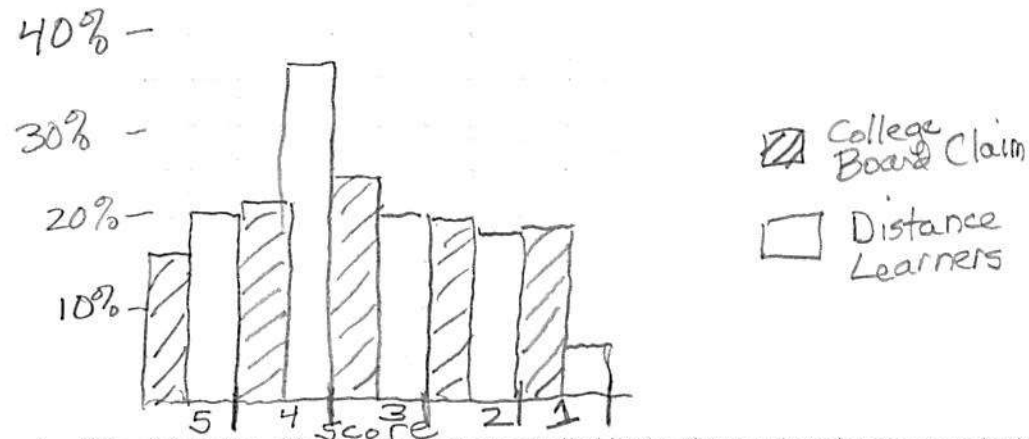
1. Students' papers on the Advanced Placement (AP) Statistics are graded on a scale of 1 to 5, with 5 being the highest score. The College Board claims the distribution of scores is as follows.

Score	5	4	3	2	1
Percent	15.3	22.0	24.8	19.8	18.1

A distance learning class that took AP Statistics via satellite television had the following distribution of grades:

Score	5	4	3	2	1	Total
Frequency	7	13	7	6	2	35
	20%	37.1%	20%	17.1%	5.7%	

a. Calculate marginal percents and make a bar graph of the College Board distribution and the sample score distribution on the same axes. The two distributions can be compared visually.



b. Carry out an appropriate test to determine if the distribution of scores for students enrolled in the distance-learning program is significantly different from the distribution claimed by the College Board.

Chi Square Goodness of Fit test

$H_0$ : There is no difference in the AP Statistics scores for distance learners and the claim by the college Board

$H_A$ : There is a difference in score distributions for distance learners and the college Board claim.

Let  $\alpha = .05$

Check conditions: Random: Data come from a random sample of AP Stats distance learners

10% Rule: We will assume  $35 < 10\%$  (All AP Stat distance learners)

Large Counts: All expected counts  $\geq 5$  (See below)

Expected Counts	Score: 5	4	3	2	1
	$(.153)(35) = 5.36$	$(.22)(35) = 7.7$	$.248(35) = 8.68$	$.198(35) = 6.93$	$(.181)(35) = 6.34$

$$\text{Test statistic} = \frac{(7-5.36)^2}{5.36} + \dots + \frac{(2-6.34)^2}{6.34} = 7.5698$$

$$df = 5 - 1 = 4$$

From technology:  
p-value = .1087

From table; p-value is between .10 and .15

CONCLUDE: Because the p-value, between .10 and .15, is less than  $\alpha = .05$ , we reject the null hypothesis. We have convincing evidence to support that the distribution of scores of distance learners in AP Statistics is different from the claimed distribution of scores.