Unit 8 Progress Check: FRQ

1. Show all your work. Indicate clearly the methods you use, because you will be scored on the correctness of your methods as well as on the accuracy and completeness of your results and explanations.

A marketing director for a beverage company conducted a study to investigate people's soda preferences in two regions of the country. The director selected a random sample of 100 people from the east coast and a random sample of 100 people from the west coast to survey. The responses are summarized in the following table.

	East Coast	West Coast
Regular soda	44	37
Diet soda	39	42
No preference	17	21
Total	100	100

Do the data provide convincing statistical evidence, at the level of $\alpha = 0.05$, that the preferences are different between the two regions of the country? Complete the appropriate inference procedure to support your answer.

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2. Show all your work. Indicate clearly the methods you use, because you will be scored on the correctness of your methods as well as on the accuracy and completeness of your results and explanations.

Fingerprint analysis and blood grouping are features that do not change through the lifetime of an individual. Fingerprint features appear early in the development of a fetus, and blood types are determined by genetics. Therefore, each is considered an effective tool for identification of individuals. These characteristics are also of interest in the discipline of biological anthropology—a scientific discipline concerned with the biological and behavioral aspects of human beings.

The relationship between these characteristics was the subject of a study conducted by biological anthropologists with a simple random sample of male students from a certain region with a large student population. Fingerprint patterns are generally classified as loops, whorls, and arches. The four principal blood types are designated as A, B, AB, and O. The table shows the distribution of fingerprint patterns and blood types for the sample. Expected counts are listed in parentheses. The anthropologists were interested in the possible association between the variables.

	Blood Type				
	A	B	AB	O	Total
Loops	66 (71.69)	99 (112.19)	35 (32.29)	101 (84.83)	301
Whorls	51 (47.16)	91 (73.80)	15 (21.24)	41 (55.80)	198
Arches	14 (12.15)	15 (19.01)	9 (5.47)	13 (14.37)	51
Total	131	205	59	155	550

(a) Is the test for an association in this case a chi-square test of independence, or a chi-square test of homogeneity? Justify your choice.

(b) Identify the conditions for the chi-square inference procedure selected in part (a), and indicate whether the conditions are met.

(c) The resulting chi-square test statistic from the appropriate test is approximately 18.930. What are the degrees of freedom and p-value of the test?

(d) Biological anthropology is concerned with the comparative study of human origin, evolution and diversity. Considering the sampling design in this study, to what population is it reasonable for the researchers to generalize their results?