

## AP Statistics – Chapter 10 Practice Free Response Test: Comparing Two Populations

1. A study of iron deficiency among infants compared samples of infants following different feeding regimens. One group contained breast-fed infants, while the children in another group were fed a standard baby formula without any iron supplements. Here are the results on blood hemoglobin levels at 12 months of age.

Group	$n$	$\bar{x}$	$s$
Breast-fed	23	13.3	1.7
Formula	19	12.4	1.8

- (a) Is there significant evidence that the mean hemoglobin level is higher among breast-fed babies? Give appropriate statistical evidence to support your conclusion.

Do all of the following:

- a. Identify the parameters of interest. Then state the appropriate hypotheses.
  - b. Verify conditions for carrying out a significance test.
  - c. Calculate the test statistic and the  $P$ -value.
  - d. What conclusion would you draw?
2. An association of Christmas tree growers in Indiana sponsored a sample survey of 500 randomly selected Indiana households to help improve the marketing of Christmas trees. One question the researchers asked was “Did you have a Christmas tree this year?”

Respondents who had a tree during the holiday season were asked whether the tree was natural or artificial. Respondents were also asked if they lived in an urban area or in a rural area. Of the 421 households displaying a Christmas tree, 160 lived in rural areas and 261 were urban residents. Here are the data:

Population	$n$	$X(\text{natural})$
1 (rural)	160	64
2 (urban)	261	89

Do these data provide evidence of a significant difference in the proportion of rural and urban Indiana residents who had a natural Christmas tree this year? Perform an appropriate test to answer this question.

- a. Identify the parameters of interest. Then state the appropriate hypotheses.
  - b. Verify conditions for carrying out a significance test.
  - c. Calculate the test statistic and the  $P$ -value.
  - d. What conclusion would you draw?
3. In the 2001 regular baseball season, the World Series Champion Arizona Diamondbacks played 81 games at home and 81 games away. They won 48 of their home games and 44 of the games played away. We can consider these games as samples from potentially large populations of games played at home and away.
    - a. Identify the populations and parameters of interest.
    - b. Construct and interpret a 90% confidence interval for the difference between the proportion of games that the Diamondbacks win at home and the proportion that they win when on the road.
    - c. Most people think that it is easier to win at home than away. Use the confidence interval from part b to determine whether this is true for the Arizona Diamondbacks.