

1. Consider the following investigative question:

Is there convincing statistical evidence that AP Statistics students who study in short, frequent sessions score higher, on average, on the AP exam than AP Statistics students who study in one long session?

- a. Identify and classify the variable(s) of interest.
- b. Is the inference goal to estimate a parameter or to test a claim about a parameter? Define the parameter.
- c. Identify the population. Can a cause-and-effect conclusion be made?

2. Consider the following investigative question:

What is the proportion of all adults over age 50 who get daily exercise?

- a. Identify and classify the variable(s) of interest.
- b. Is the inference goal to estimate a parameter or test a claim about a parameter? Define the parameter.
- c. Identify the population. Can a cause-and-effect conclusion be made?

3. Determine the missing component from each investigative question. Then rewrite the question to correct the error.
 - a. Does the amount of daily screen time decrease average sleep duration on weeknights?
 - b. In what ways can we improve student performance for AP Statistics students?
 - c. Do college students in Michigan exercise regularly?
4. Rachel believes that one-bedroom apartments are more expensive in New York City compared to Los Angeles. Using a popular rental listing website, she selects a random sample of 50 one-bedroom apartments in New York City and a separate random sample of 50 one-bedroom apartments in Los Angeles and records the monthly rent for each. Determine a valid investigative question for this study. Be sure that all three components of a valid investigative question are included.
5. At the end of the school year, a high school administrator puts together a student survey. One of the questions asks "Did you participate in a varsity sport while in high school?". The survey is given to a random sample of 80 seniors from the school. Determine a valid investigative question for this study. Be sure that all three components of a valid investigative question are included.

6. A sports drink company has developed a new formula that will help athletes recover. For 100 volunteer athletes, the company randomly assigns half to drink the new formula after working out and the other half to drink the old formula after working out. After two hours, the athletes will be asked “Do you feel recovered?” and they must respond with “yes” or “no”. Which of the following is the most appropriate investigative question for the study?
- A) For all athletes, is there convincing statistical evidence that the new formula has a greater proportion who respond “yes” compared to the old formula.
 - B) For all athletes, is there convincing statistical evidence that the new formula causes an increase in the proportion who respond “yes” compared to the old formula.
 - C) For athletes similar to the ones in the study, is there convincing statistical evidence that the new formula has a greater proportion who respond “yes” compared to the old formula.
 - D) For athletes similar to the ones in the study, is there convincing statistical evidence that the new formula causes an increase in the proportion who respond “yes” compared to the old formula.
7. An automotive parts company is producing axles for a specific vehicle. The goal for the production line is to produce axles with a mean length of 23.1 inches. A quality control manager is concerned that the production line is producing axles that don’t meet this goal and wants to create a study to test his belief. An investigative question will be created before the study is conducted. Which of the following would be the appropriate components of the quality control manager’s investigative question?
- A) The parameter is the axle length for all axles produced on this production line, and the direction of the alternative hypothesis is not equal to 23.1.
 - B) The parameter is the axle length for all axles produced on this production line, and the direction of the alternative hypothesis is greater than 23.1.
 - C) The parameter is the mean axle length for all axles produced on this production line, and the direction of the alternative hypothesis is not equal to 23.1.
 - D) The parameter is the mean axle length for all axles produced on this production line, and the direction of the alternative hypothesis is greater than 23.1.