



AP[®] Statistics
2004 Sample Student Responses
Form B

The materials included in these files are intended for noncommercial use by AP teachers for course and exam preparation; permission for any other use must be sought from the Advanced Placement Program[®]. Teachers may reproduce them, in whole or in part, in limited quantities, for face-to-face teaching purposes but may not mass distribute the materials, electronically or otherwise. This permission does not apply to any third-party copyrights contained herein. These materials and any copies made of them may not be resold, and the copyright notices must be retained as they appear here.

The College Board is a not-for-profit membership association whose mission is to connect students to college success and opportunity. Founded in 1900, the association is composed of more than 4,500 schools, colleges, universities, and other educational organizations. Each year, the College Board serves over three million students and their parents, 23,000 high schools, and 3,500 colleges through major programs and services in college admissions, guidance, assessment, financial aid, enrollment, and teaching and learning. Among its best-known programs are the SAT[®], the PSAT/NMSQT[®], and the Advanced Placement Program[®] (AP[®]). The College Board is committed to the principles of excellence and equity, and that commitment is embodied in all of its programs, services, activities, and concerns.

For further information, visit www.collegeboard.com

Copyright © 2004 College Entrance Examination Board. All rights reserved. College Board, Advanced Placement Program, AP, AP Central, AP Vertical Teams, APCD, Pacesetter, Pre-AP, SAT, Student Search Service, and the acorn logo are registered trademarks of the College Entrance Examination Board. PSAT/NMSQT is a registered trademark of the College Entrance Examination Board and National Merit Scholarship Corporation. Educational Testing Service and ETS are registered trademarks of Educational Testing Service. Other products and services may be trademarks of their respective owners.

For the College Board's online home for AP professionals, visit AP Central at apcentral.collegeboard.com.

2. At a certain university, students who live in the dormitories eat at a common dining hall. Recently, some students have been complaining about the quality of the food served there. The dining hall manager decided to do a survey to estimate the proportion of students living in the dormitories who think that the quality of the food should be improved. One evening, the manager asked the first 100 students entering the dining hall to answer the following question.

Many students believe that the food served in the dining hall needs improvement. Do you think that the quality of food served here needs improvement, even though that would increase the cost of the meal plan?

Yes No No opinion

- (a) In this setting, explain how bias may have been introduced based on the way this convenience sample was selected and suggest how the sample could have been selected differently to avoid that bias.

The first students to enter the dining hall may enjoy the food served more than the student population. Because they may enjoy it more, they arrive earlier. To prevent this bias, each student should be allocated a number and 100 students should be chosen using a random digit generator. This way, every sample of 100 students have an equal chance of being selected.

- (b) In this setting, explain how bias may have been introduced based on the way the question was worded and suggest how it could have been worded differently to avoid that bias.

The question states in the beginning that "many students" believed that the quality of food needed improvement. Through this statement, students may have a greater tendency to agree with the norm and say "yes" rather than voice their opinion. I believe that the first statement needs to be taken out as well as the latter part of the statement. The manager only wants the opinion; there is no need to state the fact that cost will increase. Thus, the question asked should be "Do you think the quality of food served here needs improvement?"

GO ON TO THE NEXT PAGE.

B

2. At a certain university, students who live in the dormitories eat at a common dining hall. Recently, some students have been complaining about the quality of the food served there. The dining hall manager decided to do a survey to estimate the proportion of students living in the dormitories who think that the quality of the food should be improved. One evening, the manager asked the first 100 students entering the dining hall to answer the following question.

Many students believe that the food served in the dining hall needs improvement. Do you think that the quality of food served here needs improvement, even though that would increase the cost of the meal plan?

___ Yes

___ No

___ No opinion

- (a) In this setting, explain how bias may have been introduced based on the way this convenience sample was selected and suggest how the sample could have been selected differently to avoid that bias.

The first 100 students entering the dining hall may not be representative of all students eating at that dining hall because those students arriving early may have different tastes or characteristics from those arriving later. Instead of ^{this} convenience sampling, the manager should label all the students living in the dormitories in alphabetical order, and then use a random digits table to select 100 students, thus using a simple random sample.

- (b) In this setting, explain how bias may have been introduced based on the way the question was worded and suggest how it could have been worded differently to avoid that bias.

The wording of the question provided a ^{preconceived} opinion that many students believe that the food at the dining hall needs improvement, which may affect the survey answers because the students may tend to follow the majority belief and check "yes". To avoid bias, no introductory opinion should be included, letting the students decide without any preconceptions. Therefore, the entire first sentence in the above survey question should be removed.

GO ON TO THE NEXT PAGE.

C

2. At a certain university, students who live in the dormitories eat at a common dining hall. Recently, some students have been complaining about the quality of the food served there. The dining hall manager decided to do a survey to estimate the proportion of students living in the dormitories who think that the quality of the food should be improved. One evening, the manager asked the first 100 students entering the dining hall to answer the following question.

Many students believe that the food served in the dining hall needs improvement. Do you think that the quality of food served here needs improvement, even though that would increase the cost of the meal plan?

Yes

No

No opinion

- (a) In this setting, explain how bias may have been introduced based on the way this convenience sample was selected and suggest how the sample could have been selected differently to avoid that bias:

This survey can be biased because not everybody who live in the dormitories eat at the dining hall. Also, the first 100 students entering the dining hall might not be the people who live in the dormitories. To make better survey, they should give a number to all the people who live in dormitories, then by using random table, choose first 100 people, then ask them these questions.

- (b) In this setting, explain how bias may have been introduced based on the way the question was worded and suggest how it could have been worded differently to avoid that bias.

The word is too biased because the way he explained in the survey question to the side of "yes". He wrote in the survey as if most of the people complains about the food. Therefore, the manager should make the survey saying, "Do you like our food in the dining hall?", instead of saying that many people are already complained about the food in the dining hall.

GO ON TO THE NEXT PAGE.