

## 2002 AP<sup>®</sup> STATISTICS FREE-RESPONSE QUESTIONS (Form B)

- (b) The value for the correlation coefficient for these data is 0.85. Interpret this value.
- (c) Based on the scatterplot in part (a) and the value of the correlation coefficient in part (b), does it appear that the amount of atmospheric ammonia is linearly related to the swine population size?

Explain.

- (d) What percent of the variability in atmospheric ammonia can be explained by swine population size?

2. Airlines routinely overbook flights because they expect a certain number of no-shows. An airline runs a 5 P.M. commuter flight from Washington, D.C., to New York City on a plane that holds 38 passengers. Past experience has shown that if 41 tickets are sold for the flight, then the probability distribution for the number who actually show up for the flight is as shown in the table below.

Number who actually show up	36	37	38	39	40	41
Probability	0.46	0.30	0.16	0.05	0.02	0.01

Assume that 41 tickets are sold for each flight.

- (a) There are 38 passenger seats on the flight. What is the probability that all passengers who show up for this flight will get a seat?
- (b) What is the expected number of no-shows for this flight?
- (c) Given that not all passenger seats are filled on a flight, what is the probability that only 36 passengers showed up for the flight?

3. A preliminary study conducted at a medical center in St. Louis has shown that treatment with small, low-intensity magnets reduces the self-reported level of pain in polio patients. During each session, a patient rested on an examining table in the doctor's office while the magnets, embedded in soft pads, were strapped to the body at the site of pain. Sessions continued for several weeks, after which pain reduction was measured.

A new study is being designed to investigate whether magnets also reduce pain in patients suffering from herniated disks in the lower back. One hundred male patients are available for the new study.

- (a) Describe an appropriate design for the new study. Your discussion should briefly address treatments used, methods of treatment assignment, and what variables would be measured. Do not describe how the data would be analyzed.
- (b) Would you modify the design above if, instead of 100 male patients, there were 50 male and 50 female patients available for the study? If so, how would you modify your design? If not, why not?