

Practice Multiple Choice and Free Response

1. Given two events, E and F, such that  $P(E) = .340$ ,  $P(F) = .450$ , and  $P(E \cup F) = .637$ , then the two events are

- (a) Independent and mutually exclusive
- (b) Neither independent nor mutually exclusive
- (c) Independent, but not mutually exclusive
- (d) Mutually exclusive, but not independent
- (e) There is not enough information to answer question.

2. Suppose that the probabilities that an answer can be found on Google is 0.95, on Answers.com is 0.92, and on both sites is 0.874. Are the possibilities of finding an answer on the two Web sites independent?

- a) Yes, because  $(.95)(.92) = .874$
- b) No, because  $(.95)(.92) = .874$
- c) Yes, because  $.95 > .92 > .874$ .
- d) No, because  $.95 + .92 \neq .874$
- e) There is insufficient information to answer this question.

3. The following is from a particular region's mortality table.

Age	0	20	40	60	80
Number Surviving	10,000	9,700	9,240	7,800	4,300

What is the probability that a 20-year-old will survive to be 60?

- a) .1959
- b) .4419
- c) .7800
- d) .8401
- e) .9700

4. It is estimated that 20 percent of all drivers do not signal when changing lanes. In a random sample of four drivers, what is the probability that at least one driver does not signal when changing lanes?

- a)  $1 - (.2)^4$
- b)  $1 - (.8)^4$
- c)  $4(.2)(.8)^3$
- d)  $4(.2)^3(.8)$
- e)  $.2^4$

5. According to one poll, only 8 percent of the public say they "trust Congress." In a simple random sample of ten people, what is the probability that at least one person "trusts Congress"?

- a) 0.188
- b) 0.378
- c) 0.434
- d) 0.566
- e) 0.622

6. Given the probabilities  $P(A) = 0.3$  and  $P(A \cup B) = 0.7$ , what is the probability  $P(B)$  if A and B are disjoint? If A and B are independent?

- a) 0.4, 0.3
- b) 0.4, 4/7
- c) 4/7, 0.4
- d) 0.7, 4/7
- e) 0.7, 0.4

7. A basketball player makes one out of his first two free throws. From that point on, the probability that he makes the next shot is equal to the proportion of shots made up to that point. If he takes two more shots, what is the probability he ends up making a total of two free throws?

- a)  $\frac{1}{4}$
- b)  $\frac{1}{3}$
- c)  $\frac{1}{2}$
- d)  $\frac{2}{3}$
- e)  $\frac{3}{4}$

8. A company's human resources officer reports a breakdown of employees by job type and sex shown in the table.

	Male	Female
Management	7	6
Supervision	8	12
Production	45	72

- a) What is the probability that a worker selected at random is
- i) female?
  - ii) female or a production worker?
  - iii) female, if the person works in production?
  - iv) a production worker, if the person is female?
- b) Do these data suggest that job type is independent of being male or female? Explain.

9. Safety engineers must determine whether industrial workers can operate a machine's emergency shutoff device. Among a group of test subjects, 66% were successful with their left hands, 82% with their right hands, and 51% with either hand.

- a) What percent of these workers could not operate the switch with either hand?
- b) Are success with right and left hands independent events? Explain.
- c) Are success with right and left hands mutually exclusive? Explain.

10. A local college offers two sections of Statistics 101. From what has been said about the two professors, a student estimates their chances of passing the course are 0.80 if she gets Professor Doolittle and 0.60 if she gets Professor Doolots. The registrar uses a lottery to randomly assign 120 enrolled students based on the number of available seats in each class. There are 70 seats in Professor Doolittle's class and 50 in Professor Doolots' class.

- a) What is the probability that the student will pass Statistics 101?
- b) At the end of the semester, we find out that the student failed. What is the probability that the student got Professor Doolots?

11. Every 5 years the Conference Board of the Mathematical Sciences surveys college math departments. In 2000, the board reported that 51% of all undergraduates taking Calculus I were in classes that used graphing calculators and 31% were in classes that used computer assignments, while 16% used both calculators and computers.

- a) What percent used neither kind?
- b) What percent used calculators but not computers?
- c) What percent of the calculator users had computer assignments?
- d) Based on the survey, do calculator and computer use appear to be independent? Explain.

12) A census by the county dog control officer found that 18% of homes kept one dog as a pet, 4% had two dogs and 1% had three or more. If a salesman visits two homes selected at random, what is the probability he encounters

- a) no dogs?
- b) some dogs?
- c) dogs in each home?
- d) more than one dog in each home?

13) In a car rental company's fleet, 70% of the cars are American brands, 20% are Japanese, and the rest are German. The company notes that manufacturers' recalls seem to affect 2% of the American cars, but only 1% of the others.

- a) What is the probability that a randomly selected chosen car is recalled?
- b) What is the probability that a recalled car is American?

14) Suppose that 70% of the women who suspect they may be pregnant and purchase an in-home pregnancy test are actually pregnant. Further suppose that the test is 98% accurate. What is the probability that a woman whose test indicates that she is pregnant actually is?