

AP Statistics Practice Test  
Unit Five – Randomness and Probability

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

Vocabulary: Define each word and give an example

1. Disjoint
  
2. Complements
  
3. Intersection

Short Answer:

4. Explain the law of large numbers and why the law of large numbers keeps gambling casinos in business.
  
5. If you flip a fair coin and get heads 5 times in a row, what is the chance of getting tails on the next flip? Explain.
  
6. You are planning a picnic for tomorrow. The weatherman says the chance of rain tomorrow is 80%. Explain what the weatherman means by this statement.
  
7. You believe that there is a 20% chance that you will earn an A in your English class, a 10% chance that you will earn an A in your Physics class, and a 5% chance that you will earn an A in both classes. Are “earning an A in English” and “earning an A in Physics” independent events? Explain and show your WORK below.

Consider the following experiment: The letters in the word STATISTICS are printed on square pieces of tagboard (same size squares) with one letter per card. The ten letter cards are then placed in a hat, and one letter card is randomly chosen (without looking) from the hat.

8. List the sample space S of all possible outcomes.  
  
S = {
  
9. Make a table that shows the set of outcomes (X) and the probability P(X) of each outcome:

<u>Outcomes</u>	_____
P(X)	

10. Consider the following events:

- V: the letter chosen is a vowel.  
F: the letter chosen falls in the first half of the alphabet  
(i.e., between A and M).

List the outcomes in each of the following events, and determine their probabilities:

- |                     |                      |
|---------------------|----------------------|
| V = {               | P(V) =               |
| F = {               | P(F) =               |
| V or F = {          | P(V or F) =          |
| complement of F = { | P(F <sup>c</sup> ) = |

May has applied to both Harvard and the University of Florida. She thinks the probability that Harvard will admit her is 0.4, the probability that Florida will admit her is 0.5, and the probability that both will admit her is 0.2.

11. Draw a Venn diagram that shows the relationship between the two events in this problem.

12. What is the probability of the event {A or B} that May will get into at least one of the universities?

12. \_\_\_\_\_

13. What is the probability that neither university admits May?

13. \_\_\_\_\_

14. What is the probability that she gets into Florida, but not Harvard?

14. \_\_\_\_\_

Free Response:

Approximately 40% of the calls to an airline reservation phone line result in a reservation being made. We will assume that the calls are independent of one another.

15. Suppose that an operator handles 10 calls. What is the probability that none of the 10 results in a reservation?

15. \_\_\_\_\_

16. What is the probability that at least one call in the ten results in a reservation being made?

16. \_\_\_\_\_

Suppose that the probability that a light bulb is defective in a shipment is .25.

17. What is the probability that three randomly chosen light bulbs are all defective?

17. \_\_\_\_\_

18. What is the probability that exactly two out of the three light bulbs are defective?

18. \_\_\_\_\_

19. If three dice are rolled, find the probability of getting triples – i.e. 1,1,1 or 2,2,2 or 3,3,3 etc.

19. \_\_\_\_\_

20. Suppose that the probability that you will receive an A in AP Statistics is 0.45, the probability that you will receive an A in AP Biology is 0.35 and the probability that you will receive A's in both courses is 0.15. Use a Venn diagram to find the probability that you will receive no A's in either course.

20. \_\_\_\_\_

Here is the assignment of probabilities that describes the age (in years) and the sex of a randomly selected American student.

Age	14-17	18-24	25-34	$\geq 35$
Male	.01	.30	.12	.04
Female	.01	.30	.13	.09

21. What is the probability that the student is a male?

21. \_\_\_\_\_

22. What is the conditional probability that the student is a male given that the student is at least 35 years old?

22. \_\_\_\_\_

23. What is the probability that the student is either a male or at least 35 years old?

23. \_\_\_\_\_

Here are the counts (in thousands) of earned degrees in the United States in a recent year, classified by level and by the sex of the degree recipient. (You can leave your answers as fractions.)

	Bachelor's	Master's	Professional	Doctorate	Total
Female	616	194	30	16	856
Male	529	171	44	26	770
Total	1145	365	74	42	1626

24. If you choose a degree recipient at random, what is the probability that the person you choose is a woman?

24. \_\_\_\_\_

25. What is the probability that a randomly chosen degree recipient has a Master's degree?

25. \_\_\_\_\_

26. If you choose a degree recipient at random, find the probability that they have a Master's or Doctorate degree.

26. \_\_\_\_\_

27. If you choose a degree recipient at random, find the probability that they are a male or have a Master's degree.

27. \_\_\_\_\_

28. What is the conditional probability that you choose a woman, given that the person chosen received a Doctorate degree?

28. \_\_\_\_\_

29. What is the conditional probability that the person chosen received a bachelor's degree, given that he is a man?

29. \_\_\_\_\_

Heart disease is the #1 killer today. Suppose that 8% of the patients in a small town are known to have heart disease. And suppose that a test is available that is positive in 96% of the patients with heart disease, but is also positive in 7% of patients who do not have heart disease.

30. If a person is selected at random and given the test, what is the probability that the person tests positive? Draw your Tree Diagram below and then answer the question.

30. \_\_\_\_\_

31. What is the probability that the person has heart disease, given that the test comes out positive?

31. \_\_\_\_\_

Review: Please circle the best answer.

32. The bias that occurs because observations were not made of all individuals selected for a sample is

- A) response bias
- B) selection bias
- C) sampling bias
- D) non-response bias
- E) measurement bias

33. By definition, a subset of a population selected for study is a

- A) sample
- B) simple random sample
- C) cluster sample
- D) systematic sample
- E) none of these

34. Suppose I have a set of data with 5 numbers: -6.0, -4.5, 0, 5.0, and an unknown 5th number. For these 5 data points, which of the following statistics can NEVER be greater than zero?

- A) the arithmetic mean
- B) the sample standard deviation
- C) the interquartile range
- D) the median
- E) the 20% trimmed mean

35. Which of the following variables yields data that would be suitable for use in a histogram?

- A) color of hair
- B) brand of stereo
- C) species of trees
- D) gender of an individual
- E) length of a phone call

36. When regressing  $y$  on  $x$ ,  $y$  is referred to as the

- A) response variable
- B) independent variable
- C) predictor variable
- D) explanatory variable
- E) regressor variable