Name _____

1. In the fall of her senior year in high school, Carrie has begun to submit her college applications. Based on her research, she estimates the probability of her being admitted to the University of Georgia at 0.45, the probability of her being admitted to both the University of Georgia and Auburn University at 0.25 and the probability of her not being admitted to both at 0.10. What is her probability of being admitted to Auburn University?

a. 0.90 b. 0.45 c. 0.70 d. 0.20 e. 0.65

2. The grade level breakdown at Bryans High School is as follows: Freshman – 32%, Sophomores – 27%, Juniors – 23% and Seniors – 18%.

If a student is randomly chosen from the school, what is the probability they are either a junior or a senior?

a. 0.05 b. 0.41 c. 0.45 d. 0.50 e. 0 59

3. If P(A) = 0.3, P(B) = 0.4, P(not A $\cap$ not B) = 0.42, are events A and B disjoint? Are events A and B independent? (Hint: disjoint is the same as mutually exclusive)

a. disjoint, independent
b. not disjoint, dependent
c. disjoint, dependent
d. not disjoint, independent
e. cannot be determined

4. Each Saturday morning, Beau practices throwing pitches to his dad. His dad estimates the probability of each pitch being a strike is 0.6. If each pitch is independent, what is the probability that neither of Beau's next two pitches will be strikes?

a. 1.20 b. 0.48 c. 0.36 d. 0. 16 e. 0

Questions 5 – 7 refer to the following information.
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.

5. What is the probability that a person has heart disease and test positive?
   a. 0.0672 b. 0.0736 c. 0.0768 d. 0.08 e. 0.96

6. What is the probability that a person test positive for heart disease?
   a. 0.0768 b. 0.08 c. 0.1412 d. 0.144 e. 0.1536

7. If a person is selected at random and given the test and it comes out positive, what is the probability that the person actually has heart disease?
   a. 0.0037 b. 0.0672 c. 0.0768 d. 0.1412 e. 0.5439

Questions 8 – 10 refer to the following information.
Students at a local university received 10,000 course grades last semester.

	A	B	C & Below	Total
Math	2142	1890	2268	6300
Science	368	432	800	1600
History	882	630	588	2100
Total	3392	2952	3656	10,000

8. What is the probability that one randomly selected student made a B given that he was not enrolled in a science class?
   a. 0.0432 b. 0.0514 c. 0.27 d. 0.3 e. 1.092

9. What is the probability that one randomly selected student was in History and made an A?
   a. 0.0882 b. 0.1606 c. 0.26 d. 0.42 e. 0.5492

10. What is the probability that one randomly selected student made an A or was in a Math class?
   a. 0.2142 b. 0.34 c. 0.6315 d. 0.755 e. 0.9692

Question 11 – 12 refer to the following information.
Many fire stations handle emergency calls for medical assistance as well as those requesting firefighting equipment. A particular station says that the probability that an incoming call is for medical assistance is 0.85.

11. What is the probability that a call is not for medical assistance?

a. 0.85 b. 0.15 c. 0 d. 1 e. 0.1275

12. Assuming independence, calculate the probability that exactly one of the next two calls will be for medical assistance.

a. 0 045 b. 0.255 c. 0.85 d. 0.7225 e. 0.9775

13. I toss a penny and observe whether it lands heads up or tails up. Suppose the penny is fair. This means

a. that every occurrence of a head must be balanced by a tail in one of the next two or three tosses.
b. that if I flip the coin many, many times, the proportion of heads will be approximately one half, and this proportion will tend to get closer and closer to one half as the number of tosses increases.
c. that regardless of the number of flips, half will be heads and half will be tails.
d. generally, the flips will alternate between heads and tails
e. about half of the number of tosses will be heads.

14. Each year, Air America Airways (AAA) tracks the number of delays per day for its jet fleet due to maintenance issues at a major airport. The probability distribution for these delays is shown in the table.

x	0	1	2	3	4	5
P(x)	0.42	0.31	0.12	0.08	0.04	0.03

What is the probability that the airline has fewer than three delays in a day due to maintenance at this airport?

a. 0.08 b. 0.12 c. 0.15 d. 0.85 e. 0.93

15. A store carries one brand of women's shoes in the following sizes and quantities based on customer demand.

x	5	6	7	8	9
P(x)	0.10	0.15	0.45	0.25	0.05

What is the probability of finding a shoe more than a size 7?

a. 0.45 b. 0.25 c. 0.15 d. 0.70 e. 0.30

Free Response:

16. Approximately 30% of the calls to an airline reservation phone line result in a reservation being made.

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

(b) What assumptions did you make in order to calculate the probability in (a)?

(c) What is the probability that at least one call results in a reservation being made?

17. 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.

(a) Make a Venn diagram with the probabilities given marked.

(b) What is the probability that neither university admits May?

(c) What is the probability that she gets into Florida but not Harvard?

18. A company has seven mathematicians on its staff, two of whom are women. The president of the company is concerned about the small number of women mathematicians. The president learns that about 40% of the mathematicians in the United States are women and asks you to investigate whether or not the number of women mathematicians in the company is consistent with the national pool. Using the random digits below, simulate this situation five times (be sure to include an explanation of what you did) and comment to the president your findings.

88565 42628 17797 48376 51762 16953 88604 12724

62964 88145 83083 69453 46109 50505 69680 00900

19. Officials at Stats College are interested in the relationship between participation in interscholastic sports and graduation rate. The following table summarizes the probabilities of several events when a male Stats student is randomly selected.

Event	Probability
Student participates in sports	0.20
Student participates in sports and graduates	0.18
Student graduates, given no participation in sports	0.82

(a) Find the probability that a student graduates, given that he participates in sports.

(b) Find the probability that the individual does not graduate, given that he participates in sports.

(c) Draw a tree diagram to summarize the given probabilities and those you determined above.

(d) Find the probability that the individual does not participate in sports, given that he graduates.