AP Statistics Test C – Probability – Part IV ***Name*** _____

__ 1. Which two events are most likely to be independent?
A) having a flat tire, and being late for school
B) getting an A in math, and getting an A in Physics
C) having a driver's license, and having blue eyes
D) having a car accident, and having 3 inches of snow today
E) being a senior, and leaving campus for lunch

__ 2. Political analysts estimate the probability that Hillary Clinton will run for president in 2008 is 45%, and the probability that NY's Governor George Pataki will run as the Republican candidate is 20%. If their political decisions are independent, then what is the probability that only Hillary runs for president?
A) 9% B) 11% C) 25% D) 36% E) 45%

__ 3. A survey of some AP Stats students recorded gender and whether the student was left or right-handed. Results were summarized in a table like the one shown. If it turned out that handedness was independent of gender, how many of the AP Stat students were lefty girls?

	Lefty	Righty	Total
Boy			66
Girl	?		54
Total	20	100	120

A) 4 B) 7 C) 9 D) 10 E) It cannot be determined.

__ 4. The city council has 6 men and 3 women. If we randomly choose two of them to co-chair a committee, what is the probability these chairpersons are the same gender?
A) 4/9 B) 1/2 C) 5/9 D) 5/8 E) 7/8

__ 5. Which of these random variables has a geometric model?
A) The number of cards of each suit in a 10-card hand.
B) The number of people we check until we find someone with green eyes.
C) The number of cars inspected until we find three with bad mufflers.
D) The number of Democrats among a group of 20 randomly chosen adults.
E) The number of aces among the top 10 cards in a well-shuffled deck.

__ 6. Which of the random variables in #5 is most likely to have a binomial model?

__ 7. An ice cream stand reports that 12% of the cones they sell are "jumbo" size. You want to see what a "jumbo" cone looks like, so you stand and watch the sales for a while. What is the probability that the first jumbo cone is the fourth cone you see them sell?
A) 8% B) 33% C) 40% D) 60% E) 93%

__ 8. What is the probability there is exactly 1 jumbo among the first 6 cones sold by the ice cream stand in #7?
A) 6% B) 12% C) 38% D) 54% E) 84%

__ 9. A friend of yours plans to toss a fair coin 200 times. You watch the first 20 tosses and are surprised that she got 15 heads. But then you get bored and leave. How many heads do you expect her to have when she has finished all 200 tosses?
A) 100 B) 105 C) 110 D) 115 E) 150

__ 10. On a physical fitness test middle school boys are awarded one point for each push-up they can do, and a point for each sit-up. National results showed that boys average 18 pushups with a standard deviation of 4 push-ups, and 34 sit-ups with standard deviation 11. The mean of their combined (total) scores was therefore 18 + 34 = 52 points. What is the standard deviation of their combined scores?

A) 5.3 B) 11.7 C) 15 D) 137 E) It cannot be determined

11. **Traffic accidents** Police reports about the traffic accidents they investigated last year indicated that 40% of the accidents involved speeding, 25% involved alcohol, and 10% involved both risk factors.

a. What is the probability that an accident involved neither alcohol nor speed?

b. Do these two risk factors appear to be independent? Explain.

12. **SAT prep** Surveys indicate that 5% of the students who took the SATs had enrolled in an SAT prep course. 30% of the SAT prep students were admitted to their first choice college, as were 20% of the other students. You overhear a classmate say he got into the college he wanted. What is the probability he didn't take an SAT prep course?

13. **Bowling** A large corporation sponsors bowling leagues for its employees. The mean score for men was 154 pins with a standard deviation of 9 pins, while the women had mean score 144 pins and standard deviation 12 pins. At the end of the season the league holds a tournament that randomly pairs men and women as opponents in the first round.

a. On average, how much do you expect the man to win by?

b. Estimate the standard deviation of the differences in the competitor's scores.

c. What assumption did you make in determining the standard deviation?

14. **Smoking** State public health officials claim that 18% of adults currently smoke cigarettes.
    a. We start selecting a few adults at random, asking each if he or she is a smoker. Explain why these can be considered Bernoulli trials.

    b. How many people do you expect to have to ask in order to find a smoker?

    _____

    c. Let X represent the number of smokers among a randomly chosen sample of 30 adults. What is the probability model for X? Name the model (including its parameters) and specify the mean and standard deviation of X.

    Model _____ Mean _____ SD _____

    d. What is the probability that there are at least 8 smokers among our sample of 30 people?

    _____

15. **Seatbelts** Safety officials hope a public information campaign will increase the use of seatbelts above the current 70% level. Their efforts include running radio and TV ads, putting up billboards, having police officers appear on talk shows, and getting newspapers to indicate whether people injured in accidents were belted in. After several months they check the effectiveness of this campaign with a statewide survey of 560 randomly chosen drivers. 407 of those drivers report that they wear a seatbelt.
    a. Verify that a Normal model is a good approximation for the binomial model in this situation.

    b. Does the survey result suggest that the education/advertising campaign was effective? Explain.

16. **Strange dice** A game is played with 2 strange dice.
    - The six faces of Die A show a 1 and five 3's.
    - Die B has four 2's and two 6's.

    a. Create a probability model for the total you get when you roll both dice.

    b. Find the mean of the total.

    c. Find the standard deviation of the total.

17. **Still strange dice** Suppose you use the two dice from #16 in a competition against another player. You will roll one of the dice and your opponent will roll the other one. The winner is the person who rolls the higher number. You get first choice of dice and want to win. Would you pick Die A or Die B? Explain why.