Test 5A AP Statistics Name:

Part 1: Multiple Choice. *Circle the letter corresponding to the best answer.*

1. The probability that you will be ticketed for illegal parking on campus is about 1/3. During the last nine days, you have illegally parked every day and have NOT been ticketed (you lucky person!). Today, on the 10th day, you again decide to park illegally. Assuming the outcomes are independent from day to day, the probability that you will be caught is

(a) $\frac{1}{3}$ (b) $\frac{1}{3}+\left(\frac{1}{3}\right)^9$ (c) $\frac{1}{3}-\left(\frac{1}{3}\right)^9$ (d) $\frac{1}{10}$ (e) $\frac{9}{10}$

2. A friend has placed a large number of plastic disks in a hat and invited you to select one at random. He informs you that they have numbers on them, and that one of the following is the probability model for the number on the disk you have chosen. Which one is it?

(a)

No.	Prob.
1	1/4
2	1/4
3	1/4
4	1/4
5	1/4

(b)

No.	Prob.
1	1
2	2
3	3
4	4
5	5

(c)

No.	Prob.
1	.1
2	.2
3	0
4	.3
5	.4

(d)

No.	Prob
1	.10
2	.11
3	.25
4	.05
5	.26

(e)

No.	Prob.
1	1
2	0
3	–1
4	0
5	1

Use the following for questions 3 – 5.

The two-way table below gives information on seniors and juniors at a high school and by which means they typically get to school.

	Car	Bus	Walk	Totals
Juniors	146	106	48	300
Seniors	146	64	40	250
Totals	292	170	88	550

3. You select one student from this group at random. What is the probability that this student typically takes a bus to school?
(a) 0.256 (b) 0.309 (c) 0.353 (d) 0.455 (e) 0.604

4. You select one student from this group at random. If the student says he is a junior, what is the probability that he walks to school?
(a) 0.073 (b) 0.160 (c) 0.455 (d) 0.600 (e) 0.833

5. You select one student from this group at random. Which of the following statement is true about the events "Typically walks to school" and "Junior?"
(a) The events are mutually exclusive and independent.
(b) The events are not mutually exclusive but they are independent.
(c) The events are mutually exclusive, but they are not independent.
(d) The events are not mutually exclusive, nor are they independent.
(e) The events are independent, but we do not have enough information to determine if they are mutually exclusive.

6. Event A occurs with probability 0.2. Event B occurs with probability 0.8. If A and B are disjoint (mutually exclusive), then
(a) P(A or B) = 1.0.
(b) P(A and B) = 0.16.
(c) P(A and B) = 1.0.
(d) P(A or B) = 0.16.
(e) both (a) and (b) are true.

7. If P(A) = 0.24 and P(B) = 0.52 and A and B are independent, what is P(A or B)?
(a) 0.1248
(b) 0.28
(c) 0.6352
(d) 0.76
(e) The answer cannot be determined from the information given.

8. People with type O-negative blood are universal donors. That is, any patient can receive a transfusion of O-negative blood. Only 7.2% of the American population has O-negative blood. If 10 people appear at random to give blood, what is the probability that at least 1 of them is a universal donor?
(a) 0
(b) 0.280
(c) 0.526
(d) 0.720
(e) 1

9. Of people who died in the United States in a recent year, 86% were white, 12% were black, and 2% were Asian. (We will ignore the small number of deaths among other races.) Diabetes caused 2.8% of deaths among whites, 4.4% among blacks, and 3.5% among Asians. The probability that a randomly chosen death was due to diabetes is about
(a) 0.96.
(b) 0.107.
(c) 0.042.
(d) 0.038.
(e) 0.030.

10. In your top dresser drawer are 6 blue socks and 10 grey socks, unpaired and mixed up. One dark morning you pull two socks from the drawer (without replacement, of course!). What is the probability that the two socks match?
(a) 0.075 (b) 0.375 (c) 0.450 (d) 0.500 (e) 0.550

Part 2: Free Response

Show all your work. Indicate clearly the methods you use, because you will be graded on the correctness of your methods as well as on the accuracy and completeness of your results and explanations.

11. 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 0.81. This can be expressed as P(call is for medical assistance) = 0.81. <u>Assume each call is independent of other calls.</u>

(a) Describe what the Law of Large Numbers says in the context of this probability.

(b) What is the probability that none of the next four calls are for medical assistance?

(c) You want to estimate the probability that exactly three of the next four calls are for medical assistance. Describe the design of a simulation to estimate this probability. Explain clearly how you will use the partial table of random digits below to carry out your simulation.

(d) Carry out 5 trials of your simulation. Mark on or above each line of the table so that someone can clearly follow your method.

177	70348	72871	63419	57363	29685	43090	18763	31714
178	24005	52114	26224	39078	80798	15220	43186	00976
179	85063	55810	10470	08029	30025	29734	61181	72090
180	11532	73186	92541	06915	72954	10167	12142	26492
181	59618	03914	05208	84088	20426	39004	84582	87317

12. Meadowbrook School surveys the families of its students and determines the following: if a family is chosen at random, the probability that they own a dog is 0.38, the probability they own a cat is 0.23, and the probability they own both a dog and a cat is 0.12.

(a) Let D = randomly-chosen family owns a dog, and C = randomly-chosen family owns a cat. Sketch a Venn diagram or two-way table that summarizes the probabilities above.

(b) Find each of the following.

i. The probability that a randomly-selected family owns a dog or a cat.

ii. The probability that a randomly-selected family owns a dog or doesn't own a cat.

ii. The probability that a randomly-selected family doesn't own a dog and doesn't own a cat.

13. Suppose your school is in the midst of a flu epidemic. The probability that a randomly-selected student has the flu is 0.35, and the probability that a student who has the flu also has a high fever is 0.90. But there are other illnesses making the rounds, and the probability that a student who doesn't have the flu does have a high fever (as a result of some other ailment) is 0.12. Suppose a student walks into the nurse's office with a high fever. What is the probability that she has the flu?

