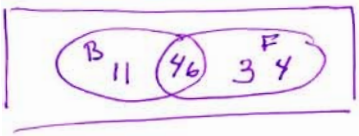
AP Statistics – Chapter 6Test Name_____

(TOTAL 90 POINTS)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question. (3 points each)

Use the following information for questions 1-2:
In an AP* Stats class, 57% of students eat breakfast in the morning and 80% of students floss their teeth. Forty-six percent of students eat breakfast and also floss their teeth.

1) What is the probability that a student from this class eats breakfast but does not floss their teeth?
A) 11% B) 9% C) 34% D) 57% E) 91%



2) What is the probability that a student from this class eats breakfast or flosses their teeth?
A) 57% B) 11% C) 34% D) 9% E) 91%

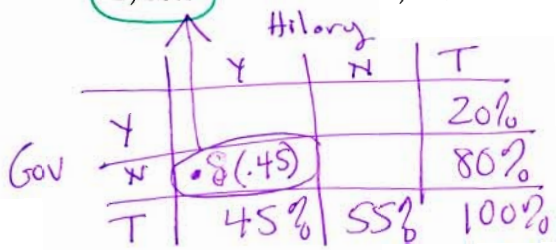
11+46+34 = 91

3) Five juniors and four seniors have applied for two open student council positions. School administrators have decided to pick the two new members randomly. What is the probability they are both juniors or both seniors?
A) 0.444 B) 0.506 C) 0.722 D) 0.569 E) 0.395

P(J) = 5/9 (4/8)
P(S) = 4/9 (3/8)
32/72 = .44

4) Which two events are most likely to be independent?
A) registering to vote; being left-handed
B) having a car accident; having a junior license
C) being a senior; going to homeroom
D) having 3 inches of snow in the morning; being on time for school
E) doing the Statistics homework; getting an A on the test

5) 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) 25% B) 36% C) 11% D) 45% E) 9%



6) A fair coin has come up "heads" 10 times in a row. The probability that the coin will come up heads on the next flip is
A) greater than 50%, since it appears that we are in a streak of "heads."
B) 50%.
C) It cannot be determined.
D) less than 50%, since "tails" is due to come up.

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) 33% B) 8% C) 40% D) 93% E) 60%

$(.88)^3(.12) = .081$

8) 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* Stats students were lefty girls?

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

$54/120 = .45$

$20/120 = .166$

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

$1/6 \cdot .45 = .075 * 120 = 9$

9) What is the probability there is exactly 1 jumbo among the first 6 cones sold by the ice cream stand in #7?

A) 12% B) 6% C) 38% D) 84% E) 54%

6 outcomes: J — — — — —; — J — — — —; ⋮; — — — — — J

$P(\text{Jumbo}) \cdot P(\text{Jumbo}^c)^5 = (.12)(.88)^5 = .063 \times 6 = .3799$

10) According to the National Telecommunication and Information Administration, 50.5% of U.S. households had Internet access in 2001. What is the probability that four randomly selected U.S. households all had Internet access in 2001?

A) 50.5% B) 49.5% C) 6.5% D) 12.6% E) 93.5%

$(.505)^4 = .06504$

11) A basketball player has a 70% free throw percentage. Which plan could be used to simulate the number of free throws she will make in her next five free throw attempts? 7/10

I. Let 0,1 represent making the first shot, 2, 3 represent making the second shot,…, 8, 9 represent making the fifth shot. Generate five random numbers 0–9, ignoring repeats.

II. Let 0, 1, 2 represent missing a shot and 3, 4,…, 9 represent making a shot. Generate five random numbers 0–9 and count how many numbers are in 3–9.

III. Let 0, 1, 2 represent missing a shot and 3, 4,…, 9 represent making a shot. Generate five random numbers 0–9 and count how many numbers are in 3–9, ignoring repeats.

A) III only B) I only C) I, II, and III D) II only E) II and III

SHORT ANSWER. Clearly show your work to receive full credit. (3 POINTS EACH SUB-QUESTION, UNLESS OTHERWISE STATED)

A new clothing store advertises that during its Grand Opening every customer that enters the store can throw a bouncy rubber cube onto a table that has squares labeled with discount amounts. The table is divided into ten regions. Five regions award a 10% discount, two regions award a 20% discount, two regions award a 30% discount, and the remaining region awards a 50% discount. Show your work.

10	30	10	30	10
20	10	50	10	20

DISCOUNT

%	#	
10	5 →	50%
20	2 →	20%
30	2 →	20%
50	1 →	10%
	10	100%

12) What is the probability that a customer gets more than a 20% discount?

P(more than 20%) = 20% + 10% = 30% OR .3

13) What is the probability that a customer gets less than a 20% discount?

P(Less than 20%) = .5 OR 50%

14) What is the probability that the first two customers both get a 50% discount?

$P(.5 \cap .5) = \left(\frac{1}{10}\right)^2 =$ .01 OR 1%

15) What is the probability that none of the first three customers gets more than a 30% discount?

P(MORE THAN 30%) = .10

$P(\text{NOT } 30\%+) = 1 - .10 = (.9)^3 =$ .729 OR 72.9%

16) What is the probability that the first customer to win a 30% discount is the sixth customer that enters the store?

P(30%) = .2

$P(6^{TH} \text{ Customer}) = (.8)^5(.2) =$ .065536 OR .07 OR 7% OR 6.5%

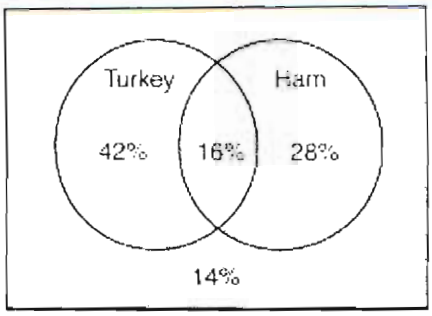
17) What is the probability that there is at least one customer to win a 50% discount among the first five customers that enter the store?

P(50%) = .1

P(at least 1 50% in five) $= 1 - (.9)^5 = .40951$

.41 OR 41%

18) A survey of families revealed that 58% of all families eat turkey at holiday meals, 44% eat ham, and 16% have both turkey and ham to eat at holiday meals.



a. What is the probability that a family selected at random had neither turkey nor ham at their holiday meal?

P(NEITHER) = .14 Venn Diagram or $1-[.44+.58-.16]=.14$

b. What is the probability that a family selected at random had only ham without having turkey at their holiday meal?

P(HAM ONLY) = .28 VENN DIAGRAM OR $.44-.16=.28$

c. What is the probability that a randomly selected family having turkey had ham at their holiday meal?

$P(\text{ham} \mid \text{Turkey}) = \frac{.16}{.58} = .2759$ About 27%

d. Are having turkey and having ham disjoint events? Explain.

NO. 16% HAVE BOTH HAM AND TURKEY.

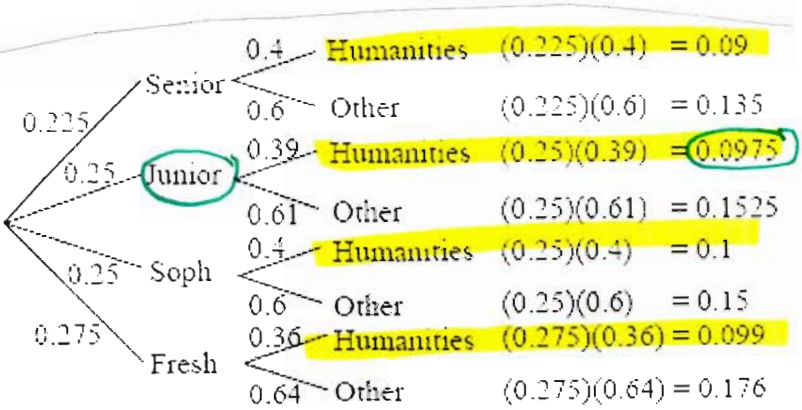
OPTION 1: $P(\text{PROMOTION} \mid \text{RAISE}) = \frac{.20}{.40} = .5 \neq P(\text{PROMOTION})$

OPTION 2: $P(\text{RAISE}) = .40$

$P(\text{RAISE} \mid \text{PROMOTION}) = \frac{.20}{.30} = .67 \neq P(\text{RAISE})$

20) For purposes of making budget plans for staffing, a college reviewed student's year in school and area of study. Of the students, 22.5% are seniors, 25% are juniors, 25% are sophomores, and the rest are freshmen. Also, 40% of the seniors major in the area of humanities, as did 39% of the juniors, 40% of the sophomores, and 36% of the freshmen. What is the probability that a randomly selected humanities major is a junior? Show your work. (4 POINTS)

4pts for Tree



3pts for answer

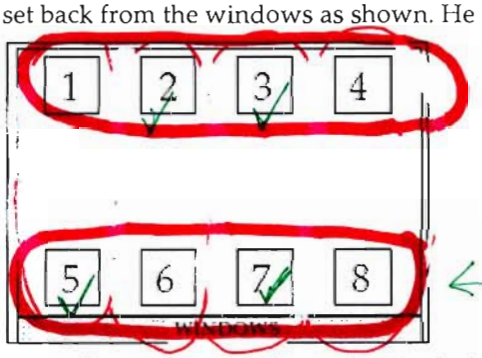
$P(\text{humanities major}) = 0.09 + 0.0975 + 0.1 + 0.099 = 0.3865$

$P(\text{junior} \mid \text{humanities major}) = \frac{P(J \cap H)}{P(H)} = \frac{0.0975}{0.3865} = 0.2523$

About 25% probability randomly selected humanities major is a junior

P(A) = .325

22) **Preservative** Leather furniture used in public places can fade, crack, and deteriorate rapidly. An airport manager wants to see if a leather preservative spray can make the furniture look good longer. He buys eight new leather chairs and places them in the waiting area, four near the south-facing windows and the other four set back from the windows as shown. He assigned the chairs randomly to these spots.



2+3 from this row

5+7 from this row

a. Use the random numbers given to decide which chairs to spray. Explain your method clearly.

32719 80597 86374

(1) BLOCK THE CHAIRS. TWO CHAIRS FROM EACH ROW

(2) USE 1 DIGIT AT A TIME. IGNORING 0, 9, AND ANY REPEATED NUMBERS.

(3) Random select Chairs 2+3 from Row 1 and 5+7 from ROW 2.

b. Briefly explain why your assignment strategy is important in helping the manager assess the effectiveness of the leather preservative.

WINDOWS MAY PLAY A ROLE IN THE LEATHER'S LIFE (SUN, heat, etc).

BLOCKING CAN REDUCE VARIABILITY FROM THAT SOURCE