AP Statistics
Schreckengost
Last day of Review.

Name: KEY
Period:

1. A car in DC has a 25% chance of being broken into on a Saturday night. If 20 cars are sampled in DC on a Saturday find the probability of the following:
   a. Exactly 3 cars will be broken into.

   binomialpdf(20, .25, 3) = .1339

   b. At most 5 cars will be broken into.

   binomialcdf(20, .25, 5) = .6172

   c. More than 4 cars will be broken into

   1 − binomialcdf(20, .25, 4) = .5852

2. A final exam has 150 multiple choice questions. Each question has 5 possible answer choices. Use this information to answer the following questions.
   a. What are the mean and standard deviation for the number of questions that a subject can get correct just by guessing?

   $\mu = 150(\frac{1}{5}) = 30$

   $\sigma = \sqrt{150(\frac{1}{5})(\frac{4}{5})} = 4.899$

   $30 \geq 10$
   $120 \geq 10$
   Approx Normal

   b. What is the probability that a student will get more than 35 correct?

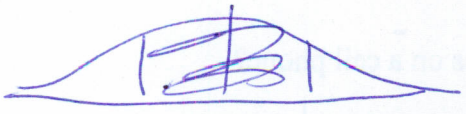
   $z = \frac{35-30}{4.899} = 1.02$ $\quad 1 - .8461 = .1539$

   c. What is the probability that a student will get less than 28 correct?

   $z = \frac{28-30}{4.899} = -.41$ $\quad .3409$

   d. What is the probability that a student will get between 25 and 36 correct?

   $z = \frac{36-30}{4.899} = 1.22$ $\quad .8888$

   $z = \frac{25-30}{4.899} = -1.02$ $\quad .1539$

   $.7349$

3. An automobile manufacture has three factories A, B, and C. The produce 40%, 35% and 25%, respectively, of a specific model of car. Thirty percent of the cars produced in factory A are white, 50% of those produce in factory B are white, and 20% of those produced in factory C are white. If an automobile is selected at random find the probability that it is not white.

   40% A < W 30%, O 70%
   35% B < W 50%, O 50%
   25% C < W 20%, O 80%

   $.4(.3) + .35(.5) + .25(.2)$
   $.345$

   34.5% not white

4. Suppose that 60% of college students at the UMD are from the state of Maryland, 30% are from other states in the US and 10% are from outside the US.

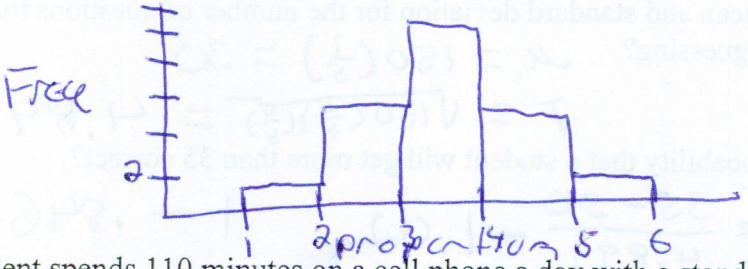
Random Number Assignment	
0, 1, 2, 3, 4, 5	Maryland 60
6, 7, 8	Other US States 30
9	Outside the US 10

Simulate taking 20 trials of 5 people using the numbers provided below

3 2 3 5 3 2 4 4 3 3
15985 77902 85466 11023 00584 98725 33546 03459 75180 46008
3 4 3 3 1 4 4 3 3 3
05684 80235 76225 75208 96286 82651 04602 43189 75661 32984

Create a histogram below ~~of the results~~. for the proportion of people from Maryland

0 0
1 1
2 2
3 11
4 5
5 1



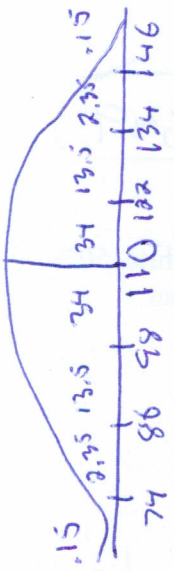
5. The average student spends 110 minutes on a cell phone a day with a standard deviation of 12 minutes. (Use the 68-95-99.7 Rule to solve the following.)

a. What is the probability that a student spends more than 86 minutes on a cell phone?

100 - 2.35 - .15 = 97.5%

b. What is the probability that a student spends less than 122 minutes on a cell phone?

50 + 34 = 84%



c. What is the probability that a student spends less than 80 minutes on a cell phone?

can not do using rule

d. What is the probability that a student spends between 74 and 134 minutes on a cell phone?

2.35 + 13.5 + 34 + 34 + 13.5 =
2.35 + 95 = 97.5%

e. What is the probability that a student spends between 98 and 146 minutes on a cell phone?

68 + 13.5 + 2.35 = 83.85

f. What is the probability that a student spends exactly 115 minutes on a cell phone?

0

6. Use the table below to find the probabilities

X	1	2	3	4	5	6	7	8	9
P(X)	.2	.03	.13	.07	.31	.06	.07	.08	.05

P(A) = P(Even numbers) = .03+.07+.06+.08 = .24
P(B) = P(Multiples of 3) = .13+.06+.05 = .24
P(C) = P(Numbers less than 4) = .2+.03+.13 = .36
P(D) = P(Numbers greater than 7) = .08+.05 = .13

$P(A \cap C) = .03$ $P(B \cap C) = .13$ $P(C \cap A^C) = .2+.13 = .33$ $P(A \cup B) = .24+.24 = .$

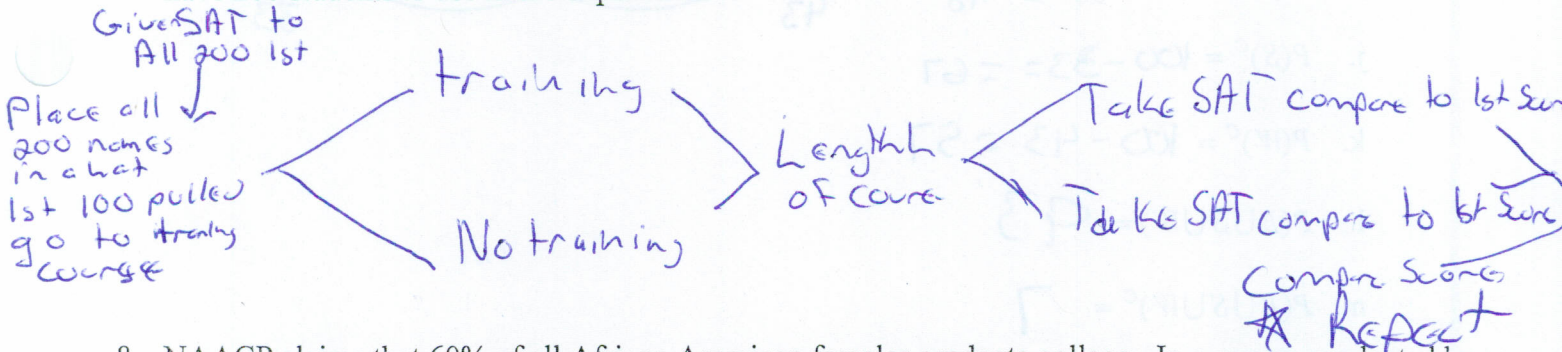
$P(A^C) = 1-.24 = .76$ $P(D^C) = 1-.13 = .87$ $P(D \cap A)^C = 1-.08 = .92$ $P(C \cup A) = .57$ .24+.36−.03

$P(B \cap D) = .05$ $P(A \cap C^C) = .07+.06+.08 = .21$ $P(B \cap C)^C = 1-.13 = .87$

$(C^C) = 1-.36 = .64$ $P(A \cap D^C) = .16$ .03+.07+.06

$P(A \cap B)^C = 1$

7. An advertisement claims that taking a particular training course significantly increases in SAT scores result. Outline the design of an experiment that you would use to examine this claim. Assume you have 200 students to use in the experiment



8. NAACP claims that 60% of all African American females graduate college. In a survey conducted by UMCP, they found that in a sample of 40, 65% graduated.
   a. Find the mean and standard deviation for the situation.

$\mu = 40(.6) = 24$

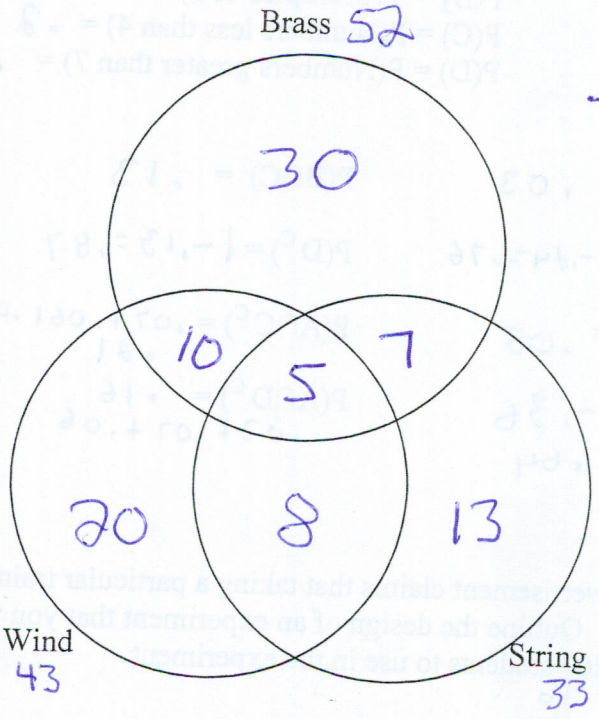
$\sigma = \sqrt{40(.6)(.4)} = 3.098$

   b. What is the probability that in a sample of 40 African American females more than 65% will graduate?

$Z = \frac{.65-.60}{3.098} = .02$

$1-.5080 = .4920$

9. A survey of band student found that 52% of students play a brass instrument, 43% play a wind instrument and 33% play a string instrument. It was also found that 5% play all three, 15% play brass and wind, 12% play brass and string, and 13% play string only. Fill in the Venn diagram and answer the following question.



a. $P(B \cap S^C) =$ 40

b. $P(B \cap W^C) =$ 37

c. $P(W \cap S^C) =$ 30

d. $P(W \cap S) =$ 13

e. $P(B \cap S)^C =$ 100 − 12 = 88

f. $P(B \cup S) =$ 73

g. $P(W \cup S) =$ 63

h. $P(B \cap W)^C =$ 100 − 15 = 85

i. $P(B)^C =$ 100 − 52 = 48

j. $P(S)^C =$ 100 − 33 = 67

k. $P(W)^C =$ 100 − 43 = 57

l. $P(B \cup S \cup W) =$ 93

m. $P(B \cup S \cup W)^C =$ 7