Unit 4 Test Review

Name: _____

Date: _____

1. Which of the following pairs of events is mutually exclusive?

A. Cards: Aces and Spades NO!

B. Two dice: Odd and even YES!

C. Sit down and stand up Yes!

D. Sit down and scratch your nose NO!

2. Suppose that we draw one card from a deck of 52 playing cards.

a. What is the probability that the card will be either a king or a heart?

$\frac{4}{52} + \frac{13}{52} - \frac{1}{52}$ $\frac{16}{52}$

b. What is the probability the card is a king and a heart?

$\frac{1}{52}$

3. A new superman MasterCard has been issued to 2000 customers. Of these customers, 1500 hold a Visa card, 500 hold an American Express card and 40 hold a Visa card and an American Express card.

a. Fill in the blanks

Event A = Having a Visa Event B = Having Am. Ex. (A & B) = Having Both

b. Find the probabilities (2 points)

P(A)= $\frac{1500}{2000}$ P(B)= $\frac{500}{2000}$ P(A&B)= $\frac{40}{2000}$

c. Find the probability that a customer chosen at random holds a Visa card, **given** that the customer holds an American Express card. (Hint: use the work from above to help you!)

$\frac{40}{500}$

d. Find the probability that a customer chosen at random holds a Visa Card **OR** holds an American Express card.

$\frac{1660}{2000}$

10 TOTAL

4. A bag contains 5 red marbles, 4 green marbles and 1 blue marble.
A marble is chosen at random from the bag and not replaced; then a second marble is chosen. What is the probability both marbles are green?

$\frac{4}{10} \cdot \frac{3}{9} = \frac{12}{90}$ $\frac{12}{90}$

5. Suppose a die is tossed 5 times. What is the probability of getting exactly 2 fours?

binompdf $(5, \frac{1}{6}, 2)$

6. The probability that a student is accepted to a prestigious college is 0.3. If 5 students from the same school apply, what is the probability that at most 2 are accepted?

binomcdf $(5, .3, 2)$

7. What is the expected number of students that will be accepted from the previous scenario?

$n \cdot p = 5(.3) = 1.5$ students

8. Over a very long period of time, it has been noted that on Friday's 25% of the customers at the drive-in window at the bank make deposits. What is the probability that it takes 4 customers at the drive-in window before the first one makes a deposit?

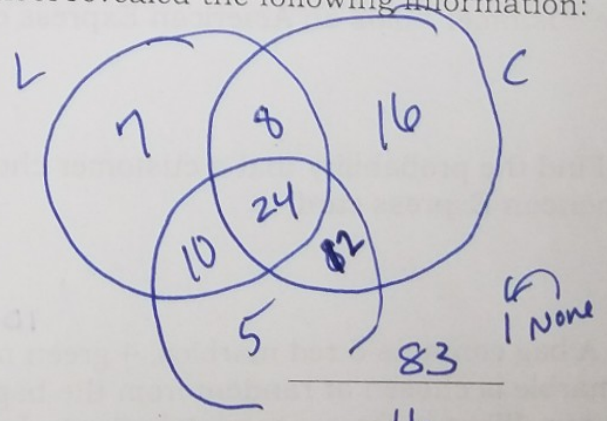
geompdf $(.25, 4)$

9. Russell Wilson (GO SEAHAWKS!) completes 85% of his passes. We asked Russell to throw passes until there is an incomplete pass. What is the probability that he will complete at least 3 passes before he fails? Fails on Fourth! or after.

$P = 0.15$ Failure! $1 - \text{geomcdf}(.85, 3)$

10. A survey of faculty at Holly Springs High School revealed the following information:

51 admire Moe
49 admire Larry
60 admire Curly
34 admire Moe and Larry
32 admire Larry and Curly
36 admire Moe and Curly
24 admire all three of the Stooges
1 admires none of the Three Stooges



a) How many people were surveyed? 83

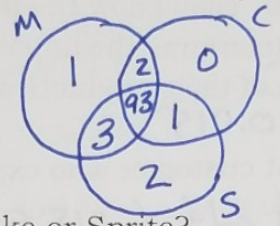
b) How many admire Curly, but not Larry nor Moe? 16

c) How many admire Larry or Curly? 77

11. The following list shows the preferences of 102 people at a football game:

99 like Mountain Dew	96 like Coke	99 like Sprite
94 like Coke & Sprite	95 like Mountain Dew & Coke	96 like Mountain Dew & Sprite
93 like all three		

a. How many people prefer none of the three? (Hint: A Venn Diagram might help!)



NONE → 0

b. How many people prefer Coke or Sprite?

→ 101

12. A student randomly guesses at ten multiple choice questions (each multiple choice question has 4 possible choices). A score of 6 is passing.

a. Find the probability of getting 4 right.

binompdf(10, .25, 4)

b. Find the probability of getting 6 or more correct.

1 − binomcdf(10, .25, 5)

c. Find the probability of getting 7 or less right.

binomcdf(10, .25, 7)

Use Calculator

d. **Given** the student passed, what is the probability the student passed with a minimum grade of 6?

$$\frac{\text{binompdf}(10, .25, 6)}{1 - \text{binomcdf}(10, .25, 5)}$$

e. What is the expected value of the number of questions the student will guess correctly?

$n \cdot p = 10(.25) = 4$

f. A score of 9 or 10 earns an A grade. Find the probability of getting an A grade.

1 − binompdf(10, .25, 8)

g. What is the probability of getting no right answers?

binompdf (10, .25, 0)

13. A company wants to do a random survey of past purchasers of its product to find one who has experienced a particular problem. They know the problem exists with their product and wish to interview people to determine the impact on the customer when the problem occurs. They estimate that 1.5% of their products sold have this problem.

$P = 0.015$

a. What is the probability of finding a first customer who experienced the problem **on** the 5th call?

geometpdf (.015, 5)

b. What is the probability of finding a first customer **by** the 5th call?

geomcdf (.015, 5)

c. What is the probability of not finding any customer with the problem in the first 6 calls?

1 − geometcdf (.015, 6)

d. How many calls can we **expect** to make until the first problem is seen?

$\frac{1}{p} = \frac{1}{0.015} = 66\frac{2}{3}$ calls