Algebra 2
CHAPTER 10
Relative Frequency

Name ______________________________

Period ______ Date ____________________

Relative Frequency and Conditional Probability

1. a. You surveyed the members of your school club about the type of end of the year party they would like. Below is a two-way table for the results. Create a two-way table displaying all the relative frequencies.

	Males	Females	Total
Miniature Golf	8	4	12
Skating	3	10	13
Laser Tag	9	6	15
Total	20	20	40

	Males	Females	Total
Miniature Golf			
Skating			
Laser Tag			
Total			

b. Using the above data, find the conditional probability of …..

(i) those wanting laser tag, given that they are female.

$\frac{6}{20} = 0.3$

(ii) those wanting miniature golf, given that they are male.

$\frac{8}{20} = 0.4$

(iii) females, given that they want laser tag.

$\frac{6}{15} = 0.4$

(iv) males, given that they want miniature golf.

$\frac{8}{12} = 0.67$

2. a. While Jim is at the park he observed the activities of fifty people. Below are his data. Complete his table and create a two-way table displaying the relative frequencies.

	Play Tennis	Water Activities	Picnic	Total
Males	9	12	7	28
Females	3	8	11	22
Total	12	20	18	50

	Play Tennis	Water Activities	Picnic	Total
Males				
Females				
Total				

b. Using the above data, find the conditional probability of …..

(i) females, given that they were participating in water activities.

$\frac{8}{20} = 0.4$

(ii) those playing tennis, given that they are male.

$\frac{9}{28} = 0.32$

(iii) those participating in water activities, given that they were females.

$\frac{8}{22} = 0.36$

(iv) males, given that they were playing tennis.

$\frac{9}{12} = 0.75$

SEE OTHER SIDE

3. a. Melanie is on the dance clean-up committee. She collects the empty Dr. Pepper and Sprite cans from the tables. She knows there were four 12-packs of Dr. Pepper and two 12-packs of Sprite at the start of the dance. She finds 30 cans on the tables of which 16 are Dr. Pepper. She realizes that some were thrown into the recycle bin already. Complete a two-way table for the data and then complete a two-way table for the relative frequencies.

	Dr. Pepper	Sprite	Total
Table	16	14	30
Recycle bin	32	34	66
Total	48	48	96

	Dr. Pepper	Sprite	Total
Table			
Recycle bin			
Total			

b. Using the above data, find the conditional relative frequency of .....

(i) the Dr. Pepper cans, given that they were left on the table.

$\frac{16}{30} = 0.53$

(ii) the cans in the recycle bin, given that they are Sprite.

$\frac{34}{48} = 0.71$

(iii) the Sprite cans, given that they were in the recycle bin.

$\frac{34}{66} = 0.52$

(iv) the cans were left on the table, given that they are Dr. Pepper.

$\frac{16}{48} = 0.33$

4. a. How did students get to school today? You should have created a two-way table for this data a few days ago. Copy your two-way table and use it to answer the following questions.

skip!

	Walk	Bus	Car	Other	Total
9th Grade					
10th Grade					
11th Grade					
12th Grade					
Total					

b. Using the above data, find the conditional probability of .....

(i) those who walked to school, given that they are a junior.

(ii) a sophomore, given that they rode the bus.

(iii) a junior , given that they walked to school.

(iv) those who rode the bus to school, given that they are a sophomore.

Sec 6.3– Applications of Probability
Independent Probability

Name:

Two events are said to be **Independent** if the occurrence of the first event does **NOT** affect the probability of the second event and events are independent if **P(A) · P(B) = P(A and B)**

INDEPENDENT PROBABILITY

1. Determine the following probabilities if each of the following are **independent**.

GIVEN:	**P(A) = 0.8**	**P(B) = 0.25**	**P(C) = 0.6**

a. P(A and C) =

$(.8)(.6)$

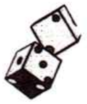
Decimal: 0.48

b. P(A and B and C) =

$(.8)(.25)(.6)$

Decimal: 0.12

c. P(Rolling a 4 on a standard die and B) =



$(\frac{1}{6})(.25)$

Decimal: .04

d. Find P(D) if D is an independent event and P(C and D) = 0.10

$(.6)(D) = 0.10$

Decimal: 0.17

e. P(Rolling a 2 on a standard die and picking a card with a "7" on it from a standard deck of cards) =

$(1/6)(4/52)$

Decimal: .01

f. If your chances of losing the shell game if you randomly pick is 2 in 3. What are the chances that you would lose 5 games in a row?

$(2/3)^5$

Decimal: 0.13

g. If the Atlanta Hawks free throw percentage is 82%, what is the probability that a player for the Hawks will make 2 free shots in a row?

$(.82)^2$

.67

Percentage: 67%

h. The chance of rain on a random day in May in Gwinnett is about 30%. Using this empirical probability, what would you estimate the probably of having NO rain for an entire week (7 days)?

$(.7)^7$

.08

Percentage: 8%

i. (BONUS) Nancy estimates that the probability that a tornado will strike with in the city limits on any given year is 0.75%. What is the probability of at least one tornado touching down in the next 5 years? *(must use complements)*

$1 - P(\text{no tornado}) = 1 - (.25)^5$

.999

Percentage: 99.9%

2.

GIVEN:	**P(M) = 0.8**	**P(N) = 0.25**	**P(R) = 0.6**

a. If the probability of **P(M and N) = 0.2,** are M and N independent?

$(.8)(.25) = .2$ ✓

Yes

b. If the probability of **P(N and R) = 0.3,** are N and R independent?

$(.25)(.6) = .15$ ×

No

DEPENDENT PROBABILITIES

3. Consider that 3 consecutive cards are drawn **without replacement** from a shuffled deck of cards

   A. What is the probability that the first two cards drawn are face cards?

   $(\frac{12}{52})(\frac{11}{51})$

   Decimal: .05

   B. What is the probability that the all three cards are hearts?

   $(\frac{13}{52})(\frac{12}{51})(\frac{11}{50})$

   Decimal: .01

   C. What is the probability that all three cards are a King?

   $(\frac{4}{52})(\frac{3}{51})(\frac{2}{50})$

   Decimal: .00018

   D. What is the probability that all three cards are the same ?

   $(\frac{1}{52})(\frac{0}{51})(\frac{0}{50})$

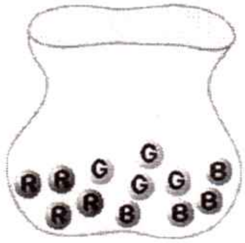
   Decimal: 0

4. A bag contains 4 blue marbles, 4 red marbles, and 4 green marbles:

   A. What is the probability of drawing 2 green marbles **without replacement**?

   $(\frac{4}{12})(\frac{3}{11})$

   Decimal: .09



   B. What is the probability of drawing 3 marbles without replacement in a row of the same color **without replacement**?

   B $(\frac{4}{12})(\frac{3}{10})(\frac{2}{9})$

   R $(\frac{4}{12})(\frac{3}{10})(\frac{2}{9})$

   G $(\frac{4}{12})(\frac{3}{10})(\frac{2}{9})$

   Decimal: .06

5. James has 3 dimes, 4 pennies, and 2 quarters in his pocket. If each coin is equally likely to be pulled out of his pocket in order **without replacement**, what is the probability that he will pull out the 2 quarters in a row first?

   $(\frac{2}{9})(\frac{1}{8})$

   .03

   Reduced Fraction: $\frac{1}{36}$

6. In a cookie jar there are 10 chocolate chip cookies and 8 peanut butter cookies left. The cookies are randomly mixed together in the jar. What is the probability of pulling two of the same types of cookies out of the cookie jar in a row **without replacement**?

   $(\frac{10}{18})(\frac{9}{17}) + (\frac{8}{18})(\frac{7}{17})$

   DECIMAL: 0.48

7. In a classroom there are 7 male students and 11 female students that are taking a test. If each student is equally likely to turn in their test at any given time at the end of class, what is the probability that the first 3 students to turn in their test are female students?

   $(\frac{11}{18})(\frac{10}{17})(\frac{9}{16})$

   DECIMAL: .2