

Name \_\_\_\_\_

Date \_\_\_\_\_ Pd. \_\_\_\_\_

**Notes: Theoretical and Experimental Probability**

**Theoretical and Experimental Probability** The probability used to describe events mathematically is called **theoretical probability**. For example, the mathematical probability of rolling a 4 with a number cube is  $\frac{1}{6}$ , or  $P(4) = \frac{1}{6}$ . **Experimental probability** is the ratio of the number of times an outcome occurs in an experiment to the total number of events or trials, known as the **relative frequency**.

Experimental probability	
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**Example 1** Matt recorded that it rained 8 times in November and snowed 3 times. The other days, it was sunny. There are 30 days in November. Suppose Matt uses these results to predict November's weather next year. What is the probability that a day in November will be sunny?

**Example 2** A football team noticed that 9 of the last 20 coin tosses to choose which team would receive the ball first resulted in tails. What is the experimental probability of the coin landing on tails? What is the theoretical probability?

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**Exit Card: Theoretical and Experimental Probability**

A spinner has spaces labeled X, Y, and Z. The spinner was spun 20 times. The results are shown in the table below.

RESULTS OF SPINNER EXPERIMENT

Letter	Number of Times Spinner Landed on Letter
X	4
Y	3
Z	13

According to this data, what is the experimental probability that the spinner will land on Y?

F  $\frac{3}{20}$

G  $\frac{4}{20}$

H  $\frac{13}{20}$

J  $\frac{17}{20}$

A quality-control expert for a key manufacturer examined the keys produced by a particular machine. The table below shows the number of defective keys found in the 8 groups of 100 keys he examined.

GROUPS OF 100 KEYS EXAMINED

Group Number	1	2	3	4	5	6	7	8
Number of Defective Keys	7	2	4	5	7	8	1	0

How many defective keys would be expected in a group of 5,000 keys? Round the answer to the nearest whole number.

A 150

B 170

C 213

D 243

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**Homework: Page 785 (13 – 16)**

13. What could you use to simulate the outcome of guessing on 15 true-false questions?

14. There are 12 cans of cola, 8 cans of diet cola, and 4 cans of root beer in a cooler. What could be used for a simulation determining the probability of randomly picking only one type of soft drink?

Central City Mall is randomly giving each shopper one of 12 different gifts during the holidays.

15. What could be used to perform a simulation of this situation? Explain your choice.

16. How could you use this simulation to model the next 100 gifts handed out?