Name _____ Class _____ Date _____

12-7 Reteaching
Theoretical and Experimental Probability

You can find **theoretical probability** by using the following formula.

$$P(\text{event}) = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

Experimental probability relies on data from repeated trials. You can find experimental probability by using the following formula.

$$P(\text{event}) = \frac{\text{number of times the event occurs}}{\text{number of times the experiment is done}}$$

Problem

You choose a crayon at random from a bag containing 4 green crayons, 1 red crayon, 2 blue crayons, and 5 yellow crayons. What is the probability that your crayon will be blue?

There are $4 + 1 + 2 + 5$, or 12 crayons. Two crayons are blue.

$$P(\text{blue}) = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

$$= \frac{2}{12} \text{ or } \frac{1}{6}$$

Exercises

You spin a spinner that has 12 equal-sized sections numbered 1 to 12. Find the theoretical probability of landing on the given section(s) of the spinner.

1. $P(6)$ $\frac{1}{12}$

2. $P(\text{odd number})$ $\frac{1}{2}$

3. $P(\text{greater than 8})$ $\frac{1}{3}$

4. $P(\text{less than 9})$ $\frac{2}{3}$

5. $P(\text{multiple of 3})$ $\frac{1}{3}$

6. $P(\text{multiple of 5})$ $\frac{1}{6}$

7. $P(\text{greater than 10})$ $\frac{1}{6}$

8. $P(\text{less than 4})$ $\frac{1}{4}$

9. $P(\text{not 1})$ $\frac{11}{12}$

12-7 **Reteaching** (continued)

Theoretical and Experimental Probability

Kisha is memorizing vocabulary words. She has learned 35 out of 80 words. What is the probability that she knows one word selected at random from 80?

$$P(\text{event}) = \frac{\text{number of times the event occurs}}{\text{number of times the experiment is done}}$$

$$= \frac{35}{80} \text{ or } \frac{7}{16}$$

Exercises

10. The manufacturer of video games checks 2000 games for defects. They find 12 defective games. What is the probability that a game selected at random is defective? **$\frac{3}{500}$**

The ratio of the number of favorable outcomes to the number of unfavorable outcomes is called the **odds.**

$$\text{odds in favor of an event} = \frac{\text{number of favorable events}}{\text{number of unfavorable events}}$$

Problem

A letter from the word ALGEBRA is selected at random. What are the odds that the letter will be a vowel?

Favorable outcomes: A, E, A   Total: 3

Unfavorable outcomes: L, G, B, R   Total: 4

The odds that the letter will be a vowel are $\frac{3}{4}$, or 3 : 4.

Exercises

You choose a jellybean at random from a bag containing 4 orange jellybeans, 2 green jellybeans, 5 yellow jellybeans, and 3 black jellybeans. Find the odds.

11. odds in favor of orange **2 : 5**   **12.** odds in favor of green **1 : 6**

13. odds in favor of yellow **5 : 9**   **14.** odds in favor of black **3 : 11**