

## 13.1 Probability and Odds

HW: p. 846: 7-16, 19, 20

Vocabulary

- Outcome- A possible result of an experiment
- Probability of an event- A measure of the likelihood, or chance, that an event will occur; can be expressed as a decimal, fraction, or percent.
- Theoretical Probability- computed chance that an event will occur,

$$\text{theoretical probability} = \frac{\# \text{ of favorable outcomes}}{\text{total } \# \text{ of outcomes}}$$

- Experimental Probability- based on repeated trials of an experiment (what happens in real life)

$$\text{experimental probability} = \frac{\text{Number of Successes}}{\text{Total } \# \text{ of trials}}$$

- Odds - comparison of favorable and unfavorable outcomes

$$\text{odds in favor} = \frac{\text{number of favorable outcomes}}{\text{number of unfavorable outcomes}}$$

$$\text{odds against} = \frac{\text{number of unfavorable outcomes}}{\text{number of favorable outcomes}}$$

Use the given information for problems 1-4: Jerome's school store has 10 green shirts with a gold emblem, 8 green shirts with a silver emblem, 6 red shirts with a gold emblem and 6 red shirts with a silver emblem.

1. If choosing a t-shirt at random, what is the probability of choosing a red shirt?

$$\text{Red shirts: } 6 + 6 = 12$$

$$\text{Total shirts: } 10 + 8 + 6 + 6 = 30$$

$$\text{Prob: } \frac{12}{30} = \boxed{\frac{2}{5}}$$

2. What is the probability of choosing a green shirt with a gold emblem at random?

$$\text{Green w/Gold: } 10$$

$$\text{Prob. } \frac{10}{30} = \boxed{\frac{1}{3}}$$

3. What are the odds in favor of choosing a red shirt?

$$\text{Red Shirts: } 12$$

$$\text{Other Shirts: } 18$$

$$\text{Odds: } \frac{12}{18} = \frac{2}{3}$$

4. What are the odds against choosing a shirt with a silver emblem?

$$\text{Non-silver: } 10 + 6 = 16$$

$$\text{Silver: } 8 + 6 = 14$$

$$\frac{16}{14} = \frac{8}{7}$$

5. A game spinner is  $\frac{1}{4}$  red,  $\frac{1}{4}$  green,  $\frac{1}{4}$  blue and  $\frac{1}{4}$  yellow. What is the theoretical probability of landing on green?

$$\frac{1}{4}$$

6. With the spinner from #5, what are the odds against stopping on yellow?

$$\frac{3}{1}$$

5. During a game, using the spinner from problem 4, red was rolled 5 times, green was rolled 9 times, and blue and yellow were each rolled 3 times. What is the experimental probability of stopping on green?

$$\frac{9}{5+9+3+3} = \frac{9}{20}$$

6. When you rolled a dice seven times, 1 came up twice, but what is the theoretical probability of rolling 1?

$$\frac{1}{6}$$

7. There are 15 girls and 12 boys in your homeroom. Your teacher calls on one student at random. What is the probability a boy is chosen?

$$\frac{12}{27} = \frac{4}{9}$$

What are the odds in favor of choosing a boy?

$$\frac{12}{15} = \frac{4}{5}$$

8. What are the odds that a person chosen at random got a passing grade on an algebra test if the scores were 3 A's, 4 B's, 10 C's, 2 D's, and 2 F's?

$$\frac{3+4+10+2}{2} = \frac{19}{2}$$

9. A local meteorologist reports there is a 70% chance of snow today. What are the odds against it snowing today?

$$\frac{70}{100} = \frac{7}{10} \text{ Prob.}$$

$$\frac{3}{7} \text{ Odds against}$$

10. You know that your odds in favor of winning in a euchre game are 5 to 2. What is the probability that you will lose your next game?

Odds of losing 2:5

$$\text{Prob. of losing } \frac{2}{7}$$