

Section 6.7

Probability and Odds

Goals: to find probabilities of events

The probability that an event occurs is a measure of the likelihood that the event will occur.

What does it mean is something has a 0% chance of happening? 50%? 80%?

$\frac{1}{2} + \frac{1}{2}$ ← not possible
 → 80% likely

When tossing a coin, what is the probability of getting a heads?

theoretical probability:

$$\frac{\text{favorable}}{\text{total possible}} = \frac{h}{h+t} = \frac{1}{2}$$

$\frac{1}{2}$

Flip a coin 50 times and keep track of how many heads you get.

ie: 38 heads would be $\frac{38}{50} = \frac{19}{25}$

Experimental Probability:

$$\frac{\text{favorable outcome achieved}}{\text{total trials}}$$

Suppose you roll a number cube. What is the probability that you will roll either a 4 or a 5?

$$\frac{2}{6} = \frac{1}{3}$$

Probability that you will roll an even? $\frac{3}{6} = \frac{1}{2}$

Probability that you will roll a factor of 6?

1, 2, 3, 6

$$\frac{4}{6} = \frac{2}{3}$$

Of the first 70 visitors through the turnstiles at a theme park, 18 visitors agreed to participate in a survey being conducted by the park employees. Find the experimental probability that a them park will not participate.

$$70 - 18 = 52 \text{ 'no's'}$$

$$\frac{52}{70} = \frac{26}{35}$$

Last year, Alexia planted 12 tulip bulbs, but only 10 of them bloomed. What is the experimental probability that the bulbs will bloom?

$$\frac{10}{12} = \frac{5}{6}$$

Based on this probability, how many of the 60 bulbs that she plants this year can she expect to bloom?

$$\frac{10}{60} \cdot 5 = 50 \text{ bulbs}$$

odds: when all outcomes are equally likely, the ratio of the number of favorable outcomes to the number of unfavorable outcomes is called odds in favor. Odds against is the number of unfavorable to the number of favorable.

odds for:

$$\frac{\text{favorable}}{\text{unfavorable}} \leftarrow \text{not to total}$$

Suppose you randomly choose one letter from A through J.

A B C D E F G H I J

1) What are the odds in favor of choosing a vowel?

$$\frac{\text{vow}}{\text{cons}} = \frac{3}{7}$$

2) What are the odds against choosing a vowel?

$$\frac{\text{cons}}{\text{vow}} = \frac{7}{3}$$

Hwk: pg. 321 - 323

#3-10 all, 12, 14, 15,

16, 19, 21, 24, 30, 31, 32,