

Probability

READ


Probability is the likelihood that a certain event will occur. Technically, that is the ratio of the number of favorable outcomes (a favorable outcome means that the event occurs) to the number of total outcomes possible. To make the probability easier to understand, the ratio may be simplified (reduced), or even written as a percent.

EXAMPLES 

1. John is rolling a number cube that has the letters A, B, C, D, E, and F written on each face.

a. What is the probability that he will roll a vowel?

Since there are two vowels (A and E), the probability of a favorable outcome is 2. There are six total outcomes (A, B, C, D, E, or F). The probability of rolling a vowel is $\frac{2}{6}$ (or $\frac{1}{3}$), or as a percent, 33.3%.

b. What is the probability that he will roll a “Z”?

Since there is no “Z” on the cube, there is no chance of rolling one. The probability of rolling “Z” is 0.

2. Kaya is spinning two spinners, each with equally divided sections. One has the letters A, B, and C, and the other has the numbers 1, 2, 3, 4, 5, and 6. Spinning each spinner just once, what is the probability of spinning a C on the first spinner and an even number on the second spinner?

First list all the possible outcomes in an organized way. A table is a good way to do this:

| | | First Spinner Outcome | | |
|-------------------------|---|-----------------------|----|----|
| | | A | B | C |
| Second Spinner Outcomes | 1 | A1 | B1 | C1 |
| | 2 | A2 | B2 | C2 |
| | 3 | A3 | B3 | C3 |
| | 4 | A4 | B4 | C4 |
| | 5 | A5 | B5 | C5 |
| | 6 | A6 | B6 | C6 |

There are 3 “favorable outcomes,” C2, C4, and C6. There are 18 possible outcomes.

The probability of spinning a “C” and an even number is $\frac{3}{18}$, or $\frac{1}{6} = 16.\bar{6}\%$.

Notice that the number of possible outcomes (18) can also be found by just multiplying the number of possible outcomes from each spinner [3 (from A, B, C) \times 6 (from 1, 2, 3, 4, 5, 6)].

PRACTICE

Please answer by giving the original ratio of favorable outcomes to total outcomes, then the simplified ratio, and finally the percent.

1. Kaya's friend Jonah spins the same spinners. What is the probability that he will spin an "A"?
2. Scottie is selling chances for a raffle drawing for his soccer team. Just one grand prize will be given to the winner of the drawing. Each member of the team has 25 tickets to sell, each with a different number on it. There are 20 players on his team. Scottie's grandmother buys all 25 of his tickets. If all of the tickets are sold, what is the probability that Scottie's grandmother will win the grand prize?
3. Natalie's little brother is playing with her calculator. Her calculator only has the numbers 0 through 9, four function keys ($+$, $-$, \times , \div), the $=$ button, and the on/off button. He randomly pushes one button on the calculator. What is the probability that he pushes each of the following:
 - a. a number?
 - b. one of the four function keys?
 - c. the " $=$ " or on/off button?
 - d. any button that is not a number?
4. Ryne is blindly pulling slips of paper with letters of the alphabet written on them from 2 different bags. Each bag contains two letters. The first bag contains two X's, and the second bag contains one X and one Y.
 - a. How many outcomes are possible?
 - b. What is the probability that he will choose two X's?
 - c. What is the probability that he will choose two Y's?