ODDS

The concept of *Odds* compares two things that cannot occur together – the number of desired outcomes to the number of undesired outcomes. There are usually two ways of expressing odds: as the odds in favor of, or as the odds against. Both ways use ratios, with the *# of chances in favor* of an outcome and the *# of chances against* that outcome.

$$Odds\ in\ favor = \frac{\#\ of\ chances\ in\ favor}{\#of\ chances\ against}$$

Example: Find the odds in favor of drawing an Ace from a fair deck of cards.

Solution: There are 4 Aces in a fair deck of cards and 48 cards that are not Aces (52 cards total – 4 Aces = 48).

$$odds\ in\ favor = \frac{4}{48} = \frac{1}{12}$$

As with other ratios, odds can be expressed as a simplified fraction (as above), with a colon (1:12), or with the word "to" between the quantities (1 to 12).

Similarly, odds against is used to compare the number of unfavorable outcomes to the number of favorable outcomes. It is expressed as the ratio of # of chances against to the # of chances in favor of (and is the reciprocal of odds in favor of).

$$Odds\ against = \frac{\#\ of\ chances\ against}{\#of\ chances\ in\ favor\ of}$$

Example: Find the odds against drawing a Diamond from a fair deck of cards.

Solution: There are 13 Diamonds (what we favor) in a fair deck of cards and 39 other cards (what we do not favor, in other words, what we are against).

$$odds\ against = \frac{39}{13} = \frac{3}{1}$$

Don't confuse odds with probability!

The probability of an event is expressed as the ratio of: *# of chances in favor* to the *total # of chances.*

$$Probability\ of\ an\ event = \frac{\#\ of\ chances\ in\ favor}{Total\ \#\ of\ chances}$$

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More examples of Odds in favor: $Odds\ in\ favor = \frac{\#\ of\ chances\ in\ favor}{\#of\ chances\ against}$

1. Eleven poker chips are placed in a jar. Ten of them are numbered consecutively from 1 through 10, and the eleventh chip is numbered a 6. A chip is drawn at random. Find the odds in favor of drawing a 6 from the jar.

2. A single die is rolled. Find the odds in favor of rolling a multiple of 2.

3. The game board Jeopardy is divided into 30 squares (there are six categories with five answers in each category). In the Double Jeopardy round, 2 Daily Double squares are hidden among the 30 squares. What are the odds in favor of randomly choosing a Daily Double square on the first selection?

Solutions

1) $Odds\ in\ favor = \frac{2}{9}$ expressed as 2:9 (There are 2 chips labeled 6, and 9 other chips.)

2) $Odds\ in\ favor = \frac{3}{3}$ expressed as 1:1 (There are 3 outcomes that are multiples of 2 [2, 4, 6], and 3 other outcomes)

3) $Odds\ in\ favor = \frac{2}{28}$ expressed as 1:14 (There are 2 Daily Double squares and 28 other squares.)

More examples of Odds against : $Odds\ against = \frac{\#\ of\ chances\ against}{\#\ of\ chances\ in\ favor\ of}$

1. A door prize at a party with 25 people is given to a guest choosing the lucky paper plate, from plates numbered 1 to 25. What are the odds against winning the door prize?

2. A single die is rolled. Find the odds against rolling a '4'.

Solutions:

1) $Odds\ against = \frac{24}{1}$ expressed as 24:1 (There is one plate with the winning number and twenty four other plates.)

2) $Odds\ against = \frac{5}{1}$ expressed as 5:1 (There is one outcome that is a '4' and five other outcomes [1, 2, 3, 5, 6].)