

ODDS & PROBABILITY

The odds or probability of an event tell us the likelihood of that event actually occurring.

The odds will always be written as a ratio.

This ratio will always be written as follows:

Odds of the Event Happening

Chances for : Chances against

Odds of the Event Not Happening

Chances against : Chances for

EXAMPLE

For example, what are the odds of rolling a 6 on a 6 - sided die?

There is 1 chance of rolling a 6, and 5 chances of rolling something else so the odds of rolling a 6 are:

Chances for : Chances against

1 : 5 are the odds of rolling a 6.

The odds of not rolling a 6 can be written as:

Chances against : Chances for

15 : 1 are the odds of not rolling a 6.

The probability of an event is always written as a fraction. This fraction will always be written as follows:

Probability of the Event Happening

$$P(A) = \frac{\text{\# of Outcomes Favourable to Event A}}{\text{Total \# of Possible Outcomes}}$$

Probability of the Event Not Happening

$$P(A') = \frac{\text{\# of Outcomes Not Favourable to Event A}}{\text{Total \# of Possible Outcomes}}$$

Note that we used the symbol A' to denote events that are contrary or complementary to A (basically they mean “not A ”).

EXAMPLE #1

Let's look at the probability of rolling a 6 on a 6 – sided die.

The number of favourable outcomes is 1 and the total number of outcomes is 6, so:

$$P(\text{rolling a 6}) = \frac{1}{6}$$

If we look at the contrary event, that is, not rolling a 6, we get

$$P(\text{not rolling a 6}) = \frac{5}{6}$$

EXAMPLE #2

The odds of Mr. Bigtall beating Mr. Shortnthin in a hotdog eating contest are 95 : 4. What is the probability that Mr. Bigtall will win?

Step 1: Find A and A'

95 : 4

A : A'

A = 95 , A' = 4

Step 2: Find P(A)

$$P(A) = \frac{A}{A + A'}$$
$$= \frac{95}{95 + 4}$$

$= \frac{95}{99}$ is the probability that Mr. Bigtall will win

EXAMPLE #3

What is the probability of drawing a King from a standard deck of 52 cards?

Step 1: How many Kings are in a standard 52 – card deck?

There are 4 Kings to choose from.

Step 2: What is the total number of possible outcomes?

There are 52 cards, so there are 52 possible outcomes

Step 3: Find the probability

$$\begin{aligned} P(A) &= \frac{\# \text{ of Kings}}{\# \text{ of Cards}} \\ &= \frac{4}{52} \\ &= \frac{1}{13} \text{ is the probability of} \\ &\quad \text{drawing a King} \end{aligned}$$

EXAMPLE #4

What are the odds of drawing a Spade from a standard deck of 52 cards?

Step 1: How many Spades are in a standard 52 – card deck?

There are 13 Spades

Step 2: How many Hearts, Diamonds and Clubs are in a standard deck?

There are 13 Hearts, 13 Diamonds and 13 Clubs.

Step 3: Find the odds of drawing a Spade

Chances of drawing a Spade : Chances of drawing a Heart, Diamond or Club

$13 : 13 + 13 + 13$

$13 : 39$

1 : 3 are the odds of drawing a Spade