

“Probability” and ***“Odds”***

Probability: is the chance of doing something out of the *total possible*.



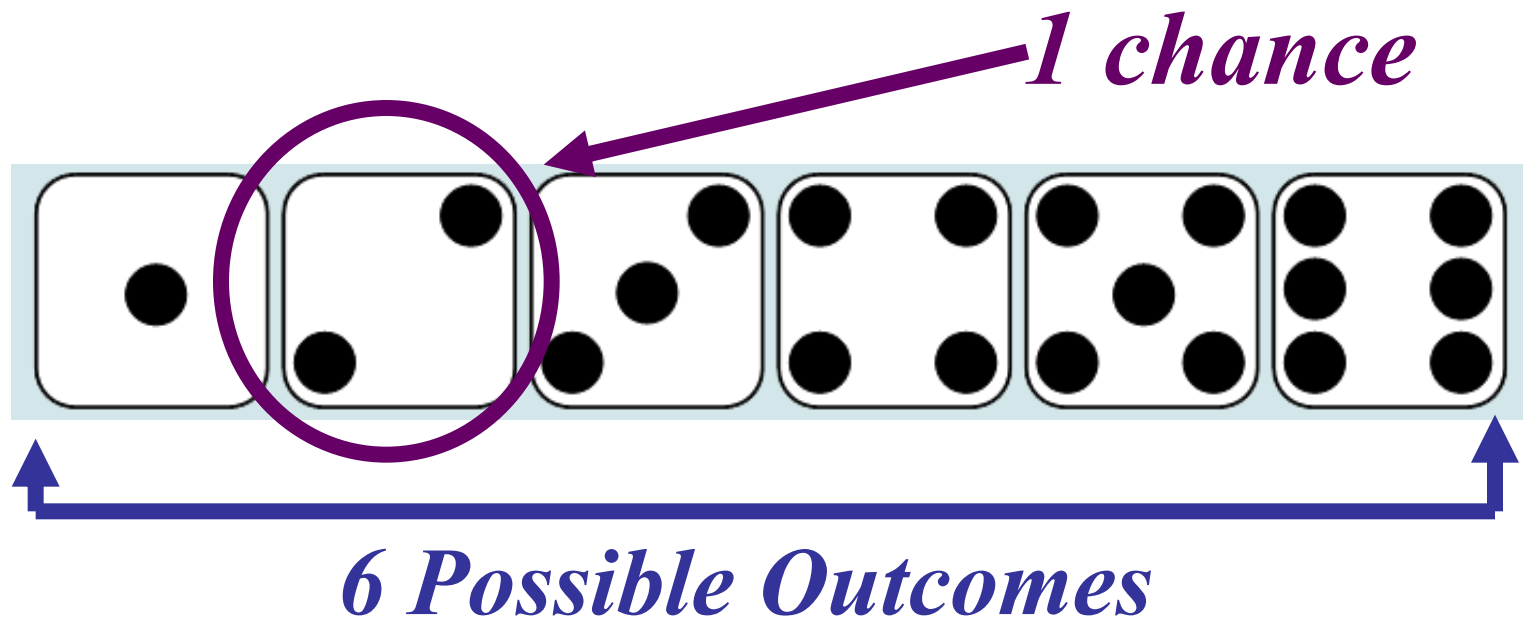
Let's check an example....

- *TROG likes to roll caveman dice.*



- What is the *Probability* of Trog rolling a “2” ?

Remember: Probability is the chance of doing something out of the TOTAL POSSIBLE.



- The *probability* of Trog rolling a “2” on the dice is:

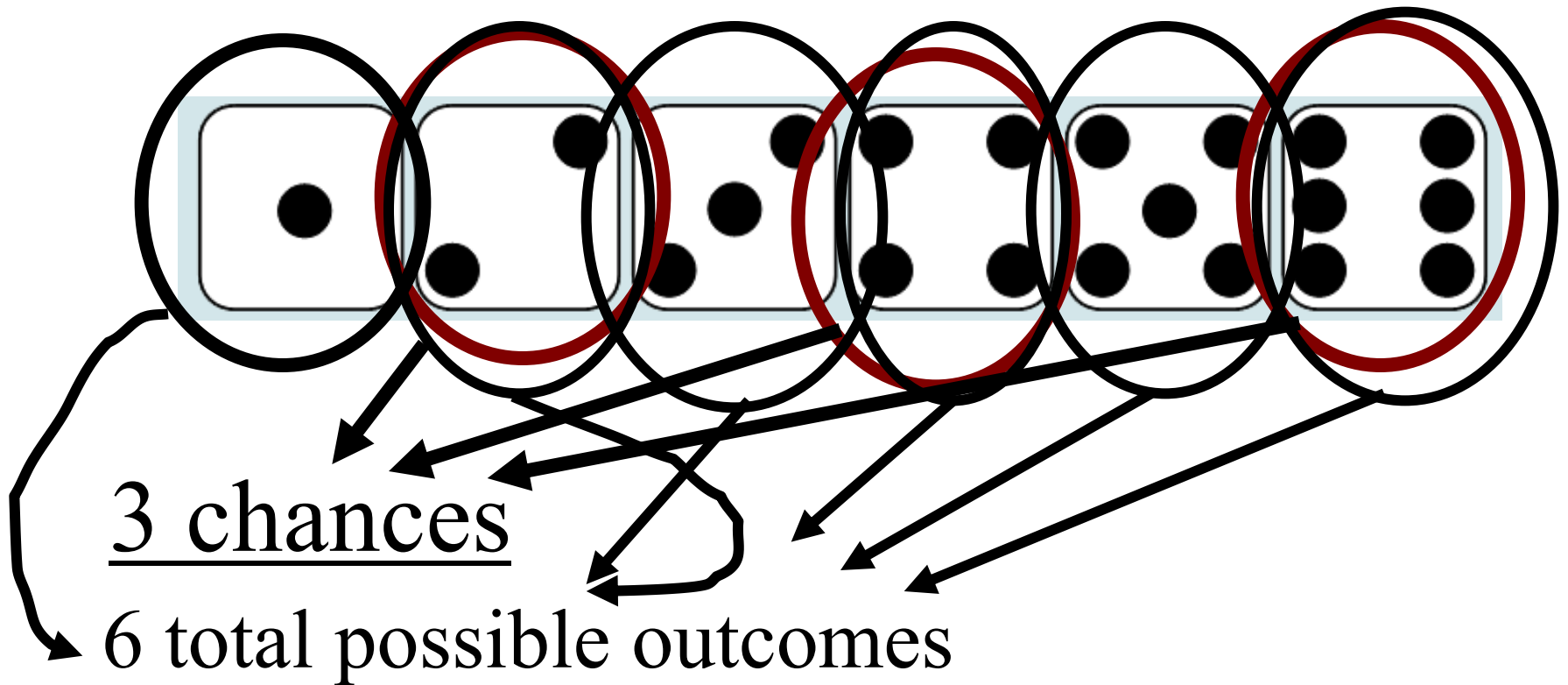
$$\frac{1}{6}$$

What *percent* is that?

$$1 \div 6 =$$
$$= 1666666666666666$$

...around 16-17%

- What is the *probability* of Trog rolling an *even number*?



- The *probability* of Trog rolling an even number is:

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

What is the **percent**? (you should know this one by heart!!)

50%

That is *Probability*.....

...what about “*ODDS*”?

NEWS FLASH!



“ODDS” and *“PROBABILITY”*

are

NOT THE

SAME ! ! ! ! !

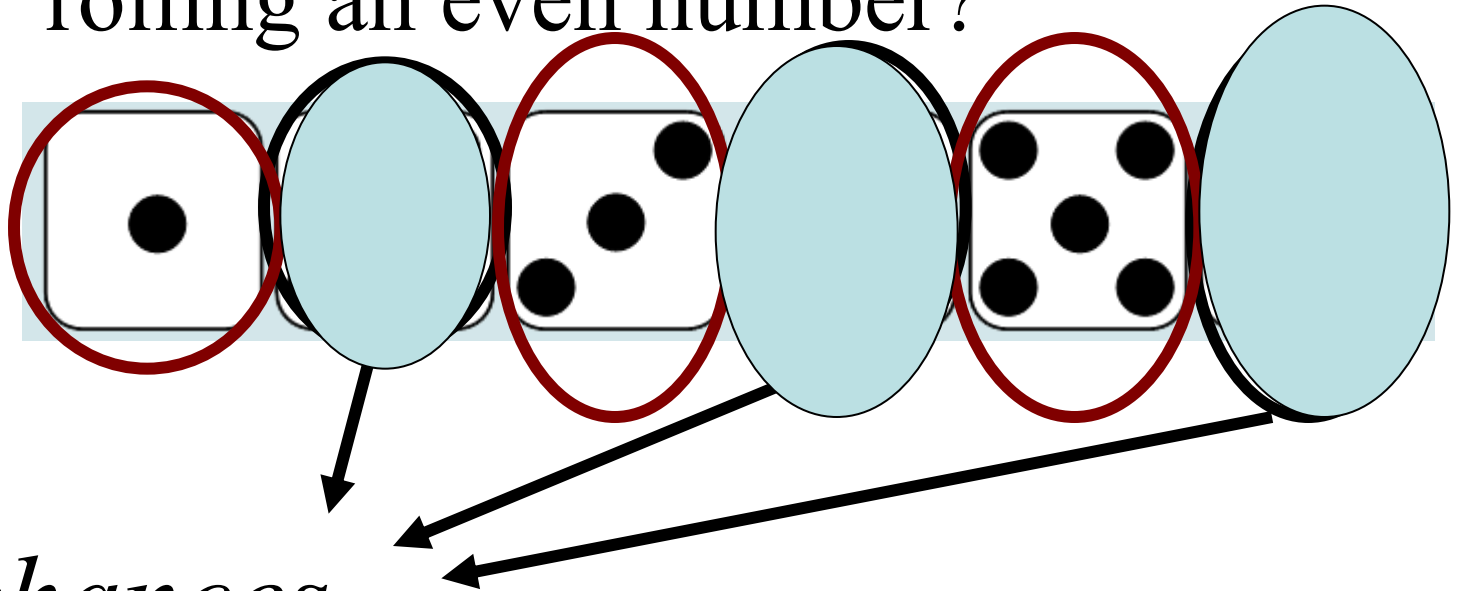
- *Odds* and *Probability* are **NOT THE SAME!!!!**



“Probability” is : $\frac{\text{Total Chances}}{\text{Total Possible}}$

“Odds” is : $\frac{\text{Total Chances}}{\text{What's left over}}$

What are the *Odds* of Trog rolling an even number?



3 chances

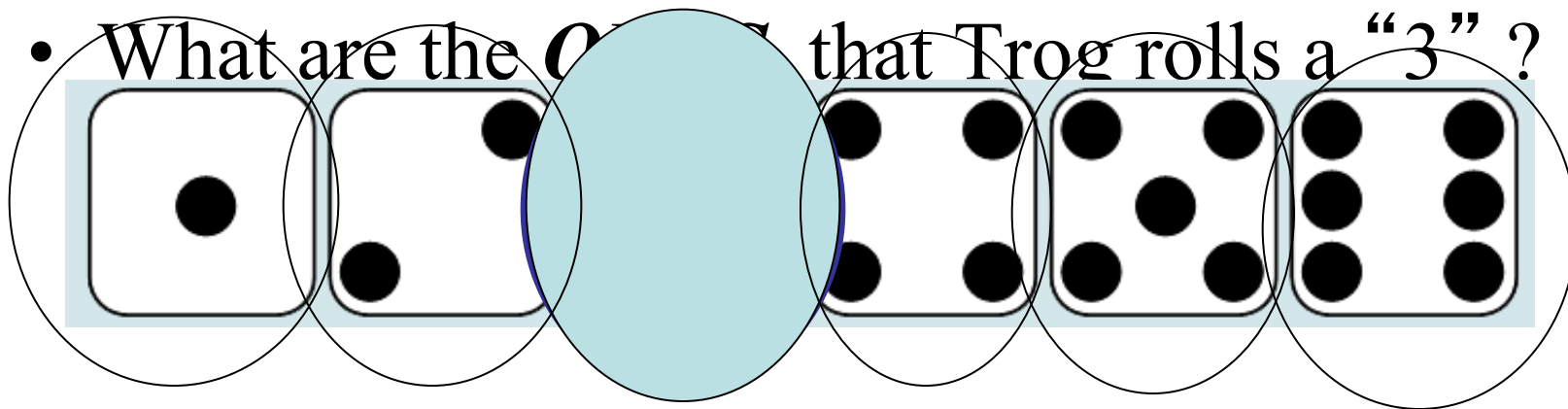
3 left over

- The *Odds* of Trog rolling an even number are:

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

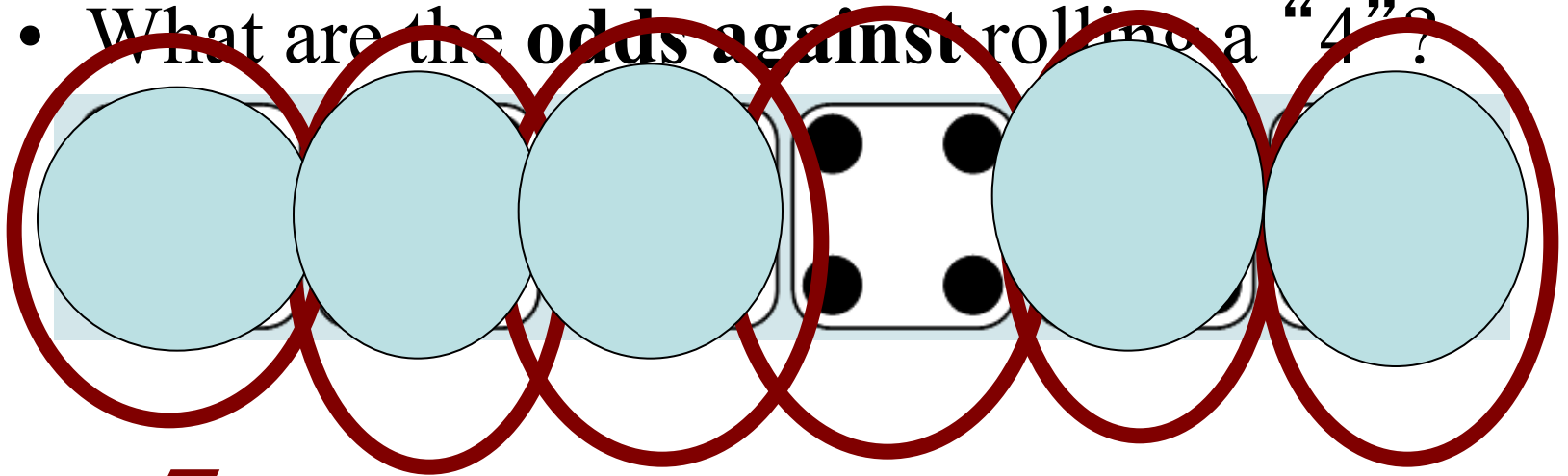
Odds are usually written like this → **1 : 1**

- What are the O that Trog rolls a “3”?



$$\frac{1}{5} = 1:5$$

- What are the odds against rolling a “4”?



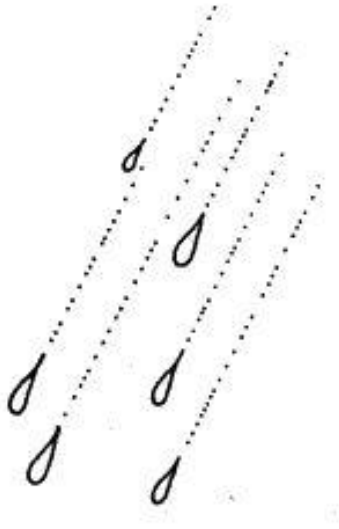
$$\frac{5}{1}$$

$$5:1$$



Putting it together.

- The weather station says there is a 40% probability of rain tomorrow. What are the **odds** that it will rain?



- Remember **ODDS** compares the chance of something happening vs. something not happening!!!



Chance of rain happening: $\frac{4}{6}$ → $\frac{40\%}{6}$

Chance of rain NOT happening. $\frac{6}{6}$ → $\frac{60\%}{6}$
(The leftovers)

2 : 3 are the odds that it will rain.



Odds

- We can determine odds using the following ratios:

$$\text{Odds in Favor} = \frac{\text{number of successes}}{\text{number of failures}}$$

$$\text{Odds Against} = \frac{\text{number of failures}}{\text{number of successes}}$$



Example #1

- Suppose we play a game with 2 number cubes.
- If the sum of the numbers rolled is 6 or less – **you win!**
- If the sum of the numbers rolled is not 6 or less – **you lose**

In this situation we can express odds as follows:

Odds in favor = $\frac{\text{numbers rolled is 6 or less}}{\text{numbers rolled is not 6 or less}}$

Odds against = $\frac{\text{numbers rolled is not 6 or less}}{\text{numbers rolled is 6 or less}}$



Example #2

- A bag contains 5 yellow marbles, **3 white** marbles, and 1 black marble. What are the odds drawing a **white** marble from the bag?

$$\text{Odds in favor} = \frac{\text{number of white marbles}}{\text{number of non-white marbles}} = \frac{3}{6}$$

$$\text{Odds against} = \frac{\text{number of non-white marbles}}{\text{number of white marbles}} = \frac{6}{3}$$

Therefore, **the odds for are 1:2**
and **the odds against are 2:1**

- **Example 3:** If a pair of fair dice are rolled once, what are the odds in favor of rolling a sum of 7?
- **Example 4:** The probability of tossing five coins with a result of three heads and two tails is $5/16$. What are the odds in favor of three heads and two tails?

Your Turn – Exit Quiz Odds

Event 1 - First Die

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

Event 2 - Second Die

Sum of the dice