

## Probability and Chance

Probability is how we describe the chance of an event happening. Events range from *impossible* (never happens) to *certain* (always happens), with *unlikely*, *equally likely*, and *likely* in between.

| Word           | Meaning  |
|----------------|--|
| Impossible     | Will never happen (e.g., rolling a 7 on a 6-sided die) |
| Unlikely       | Possible but probably won't happen                     |
| Equally likely | Same chance as the opposite outcome                    |
| Likely         | Probably will happen                                   |
| Certain        | Will always happen (e.g., the sun rising)              |

### Key Concepts

- Probability** describes the chance of something happening, on a scale from impossible to certain.
- An **impossible** event cannot happen. A **certain** event always happens.
- An event is **likely** if there are more ways for it to happen than not. **Unlikely** is the opposite.
- Equally likely** means two outcomes have the same chance, like a coin landing on heads or tails.

### Worked Examples

① On the spinner, is landing on Blue certain, likely, unlikely, or impossible?

 Depends on how much of the spinner is blue. If most of the spinner is blue, it's *likely*. If only a small section is blue, it's *unlikely*.

 **Answer:** *Depends on the spinner; e.g. likely if most is blue*

② Is landing on Red possible or impossible?

 If there is at least one red section, it's *possible*. If there is no red section at all, it's *impossible*.

 **Answer:** *Possible (if any red)*

③ A bag has 3 red and 3 blue marbles. Is drawing a red marble likely, unlikely, or equally likely?

 Same number of red and blue means same chance for either. So *equally likely*.

 **Answer:** *Equally likely*

### Practice Problems

Label each as *impossible*, *unlikely*, *equally likely*, *likely*, or *certain*.

- A coin lands on heads. \_\_\_\_\_
- Roll a 7 on a standard die. \_\_\_\_\_
- Pull a red from 5 red, 1 blue. \_\_\_\_\_
- The sun sets tonight. \_\_\_\_\_
- Snow in July in Florida. \_\_\_\_\_
- Pick blue from 3 blue, 3 green. \_\_\_\_\_

7. Roll less than 7 on a die. \_\_\_\_\_
8. Spinner: 3 red, 1 blue; land red? \_\_\_\_\_
9. Bag: 1 red, 9 blue; pick red? \_\_\_\_\_
10. A cat will fly today. \_\_\_\_\_
11. Roll an even on a die. \_\_\_\_\_
12. It will rain sometime this year. \_\_\_\_\_

### Study Tips

- ☞ Count the favorable outcomes (the ones you want) vs. the total outcomes. If favorable is most of the total, it's likely. If few, it's unlikely.
- ☞ "Impossible" has 0 chance. "Certain" has 100% chance.
- ☞ Two outcomes with the same count are equally likely.

### Word Problems

1. A bag holds 4 green balls and 1 yellow ball. Is it **likely** or **unlikely** that you pick a green ball? Explain.

Answer: \_\_\_\_\_

2. Maria spins a spinner that has 2 red, 2 blue, and 2 yellow sections. Is landing on blue certain, equally likely, or impossible?

Answer: \_\_\_\_\_

**Answer Key — with Friendly Explanations****Practice Problems**

1. Heads or tails are equally likely.

 **Answer:** *Equally likely*

2. A die only goes 1 to 6.

 **Answer:** *Impossible*

3. 5 out of 6 are red.

 **Answer:** *Likely*

4. The sun always sets.

 **Answer:** *Certain*

5. Florida doesn't get snow.

 **Answer:** *Impossible*

6. Same number, same chance.

 **Answer:** *Equally likely*

7. Every number 1 to 6 is less than 7.

 **Answer:** *Certain*

8. 3 red out of 4 sections.

 **Answer:** *Likely*

9. 1 red out of 10.

 **Answer:** *Unlikely*

10. Cats can't fly.

 **Answer:** *Impossible*

11. 3 even numbers out of 6 (2, 4, 6).

 **Answer:** *Equally likely*

12. Rain happens at some point each year.

 **Answer:** *Certain (in most places)*

**Word Problems**

1. 4 green vs 1 yellow: green is likely.

 **Answer:** *Likely*

2. All three colors have 2 sections: equally likely.

 **Answer:** *Equally likely*

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