

## Ever dropped a grenade in PUBG, scored a free-kick in FIFA, or drifted in Need for Speed and thought, “Wow, that felt real?”

Well, that’s not just because of fancy graphics or cool coding. It’s because of something even more powerful — **Math** and **Logic** working together behind the scenes.

Yes, you read that right. The thrilling moments in PUBG are not just made by developers, but by the smart use of numbers, patterns, and formulas.

Let’s break it down — in **simple language** — how PUBG is actually a *mathematical masterpiece in disguise*.

### 1. How Bullets Travel: The Science Behind Sniping

In PUBG, bullets don’t just fly straight and fast. They **travel like in real life**, slowing down over distance, and falling due to gravity.

**Think of throwing a ball in the air** — it goes up, slows down, and comes down. The same idea is used for bullets.

Behind it is a concept called **Projectile Motion** — basically, how things move when thrown or shot.

- Vertical Distance = Speed × Time – Gravity Effect
- Horizontal Distance = Speed × Time

While playing, If you’re sniping, you often aim a little above the enemy or ahead if they’re running — you’re actually using physics and math without even knowing it!

### 2. Shrinking Safe Zone: The Blue Circle of Doom

You’ve seen it — that **blue zone** pushing you toward the centre. But did you know it’s shrinking based on **geometric calculations**?

- Each new circle is chosen **randomly** but still within rules.
- It **shrinks gradually**, using a smooth math technique called **linear interpolation** (like slowly pulling a rubber band inward).

For players it feels “natural” and keeps the game unpredictable, thanks to a mix of randomness and logic.

### 3. Loot Spawning: Why Some Places Have More Guns

Ever dropped in Pochinki and found great loot, while some houses are nearly empty? That's not luck. It's **Probability Math** in action.

- Every place has a **loot table** — a list of what can appear.
- Each item has a **chance number** — like lottery tickets.
- A computer randomly picks what appears using **RNG (Random Number Generator)**.

Your loot is not by your choice but it lies on the hand of the developers *control randomness* to make the game fair — some places are riskier but give better loot.

#### 4. Damage Calculations: Why Headshots Are Deadly

A bullet to the leg and one to the head don't hurt the same — just like in real life. PUBG uses **multipliers** to adjust damage.

Total Damage = Gun Damage × Body Part Multiplier × (1 – Armor Protection)

- Headshot? 2.5× more damage 🦴
- Chest? Normal damage
- Limbs? Half damage
- Wearing a helmet or vest? Damage is reduced

Knowing where to aim (and what to wear) makes a huge difference — it's strategic *math in action*.

The formula talked above is not a derived one but a hypothetical calculated by observations of the play.

#### 5. Matchmaking & Ranking: How PUBG Finds Fair Opponents

Ever wondered how the game knows who to put you against? It uses a **ranking system**, kind of like how cricket or chess players are ranked.

- Based on **kills, survival time, wins**, etc., you're given a "skill number".
- You're matched with people near your skill level using math models like **Elo Rating** and **MMR (Matchmaking Rating)**.

You often understand we are matched with the people who appears online but you're not randomly put into matches — the game is *trying* to make it fair using data and stats.

We have just seen is the math behind one of the world's most popular games — **PUBG** — but these examples are just the surface. As we dive deeper into the world of game development, we discover that **each sub-step, each reaction, and each event is a web of logical decisions.**

As my **web/gaming teacher** wisely says:

*"We don't build games or websites for developers. We build them for the users — the layman."*

This single line changed how I see coding.

It's not about showing off complex syntax or flashy animations.

It's about **solving a real-world need with simplicity.**

Many people think coding is only about typing some strange characters and semicolons. But the truth is:

**Coding is 90% logic and 10% language.**

Just like in PUBG — the thrill isn't in the code, but in the **logic that powers the action.** Whether it's deciding how loot appears, how fair matchmaking is done, or how a headshot works — everything follows a pattern of **structured thought and mathematical reasoning.**

If we really wanted, we could dive even deeper into every concept — like explaining:

- Why bullet motion follows a parabola
- How random number generators mimic chance
- How geometric interpolation creates smooth animations

But even without that, the message is clear:

**Behind every great game is great logic. Behind great logic is great thinking, that's where the real learning begins.**

**And, there is no learning completed without the queen -> "MATHS".**