

Push Tasks



Critique probability claims and reasoning. Explain why assumptions matter and when they fail.

1. A student says “The probability of head is $\frac{1}{2}$, so 10 heads in 10 flips is impossible.” What is wrong with this claim?

2. A coin lands heads 18 times in 20 flips. Give one reason this does not automatically prove bias.

3. Give one reason 180 heads in 200 flips would be much more suspicious.

4. Why is a fair game not always a game where both players win equally often in a short run?

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Analyse how violations of fairness assumptions affect probability calculations and experiment design.

5. A six-sided die is not a perfect cube. What assumption behind $\frac{1}{6}$ may fail?

6. A bag draw is without replacement. Why can the second-draw probability be different from the first?

7. Why does good experimental design matter when judging whether a device is biased?

8. A player chooses a card after peeking at marked backs. Is the experiment still random? Explain.

Push Tasks



Evaluate real-world probability scenarios and identify unstated assumptions or design flaws.

9. A casino says a wheel is fair because it has 20 labelled spaces. What extra assumption is missing?

10. Why might experimental probability be a better guide than theoretical probability for a biased device?

11. A student says “It hasn’t rained for five days, so rain is now more likely.” What mistake are they making?

12. Describe one situation where theoretical probability is a poor model for a real-world outcome.