Probability, Random Variables, and Probability Distributions

AP Statistics · Vocabulary in context

Word	Example
random /ˈrændəm/	Decay is **random**: we cannot say which nucleus decays next.
outcomes /ˈaʊtkʌmz/	The possible **outcomes** of a coin toss are heads and tails.
repetitions	After many **repetitions**, the results settle down.
relative frequencies /ˈrelətɪv ˈfriːkwənsiz/	The **relative frequencies** get close to the true probabilities.
law of large numbers /lɔː ɒv lɑːdʒ ˈnʌmbəz/	The **law of large numbers** says results get closer to the true probability over many trials.
simulation /ˌsɪmjʊˈleɪʃn/	A **simulation** can model how traffic moves through a town.
chance process	Rolling a die is a **chance process**.
random digits	Use a table of **random digits** to choose a sample.
trials	A binomial distribution needs a fixed number of independent **trials**, each with the same probability of success.
probability /ˌprɒbəˈbɪlɪti/	A fair coin gives **probability** one half for heads.
event /ɪˈvent/	Rolling a six is an **event**.

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sample space /ˈsæmpl speɪs/	The **sample space** is the list of all possible outcomes.
complement /ˈkɒmplɪmənt/	The **complement** of “rain” is “no rain”. “rain” “no rain”
mutually exclusive /ˈmjuːtʃuːəli eksˈkluːsɪv/	**Mutually exclusive** outcomes cannot occur together.
disjoint /dɪsˈdʒɔɪnt/	**Disjoint** events cannot happen at the same time.
addition rule /əˈdɪʃn ruːl/	The **addition rule** says $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$. $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$。
overlap /ˌəʊvəˈlæp/	Subtract the **overlap** so it is not counted twice.
conditional probability /kənˈdɪʃənl ˌprɒbəˈbɪlɪti/	Find the **conditional probability** using only the chosen group.
Two-way tables	**Two-way tables** help find probabilities for two variables.
false positive	A **false positive** says you have a disease when you do not.
independent /ˌɪndɪˈpendənt/	**Independent** events do not change each other’s probabilities.
multiplication rule /ˌmʌltɪplɪˈkeɪʃn ruːl/	The **multiplication rule** says $P(A \text{ and } B) = P(A) \times P(B \text{ given } A)$. $P(A \text{ and } B) = P(A) \times P(B \text{ given } A)$
dependent /dɪˈpendənt/	The events are **dependent**: one changes the chance of the other.

Word	Example
random variable /ˈrændəm ˈveərɪəbl/	The measured noise voltage is a **random variable**.
probability distribution /ˌprɒbəˈbɪlɪti ˌdɪstrɪˈbjuːʃn/	A **probability distribution** describes how likely different noise values are.
discrete /dɪˈskriːt/	The number of children is **discrete**: you can count it.
continuous /kənˈtɪnjuːəs/	The beta particles have a **continuous** range of energies. β
mean (expected value) /miːn/	The **mean (expected value)** of a die roll is 3.5. 3.5
probability-weighted average	The expected value is a **probability-weighted average**.
standard deviation /ˈstændəd ˌdiːvɪˈeɪʃn/	A larger **standard deviation** means the values are more spread out.
means add	For any two random variables, the **means add**.
variances add	For independent random variables, the **variances add**.
binomial /baɪˈnəʊmɪəl/	A **binomial** setting has a fixed number of independent trials.
success	Getting a six counts as a **success**.
failure	Any other number counts as a **failure**.
geometric /ˌdʒiːəʊˈmetrɪk/	A **geometric** setting counts the trials until the first success.

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