

AP Statistics - Binomial and Geometric Distributions - Quiz

Common Core AP STAT 4.10, AP STAT 4.11, AP STAT 4.12, HSS-MD.A.3, HSS-CP.B.9 · maths-pdf.fr/en/

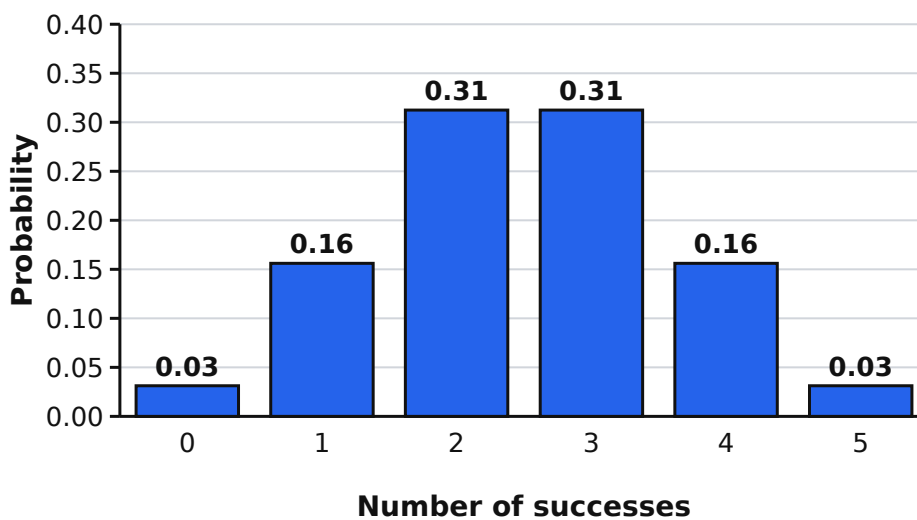
Name: _____ Class: _____ Date: ____/____/____

Ten multiple-choice questions test the BINS conditions, binomial probabilities, and geometric probabilities. Read each explanation, especially for at-least problems and the geometric mean.

AP Statistics · Common Core State Standards: **AP STAT 4.10, AP STAT 4.11, AP STAT 4.12, HSS-MD.A.3, HSS-CP.B.9**

Questions

Question 1

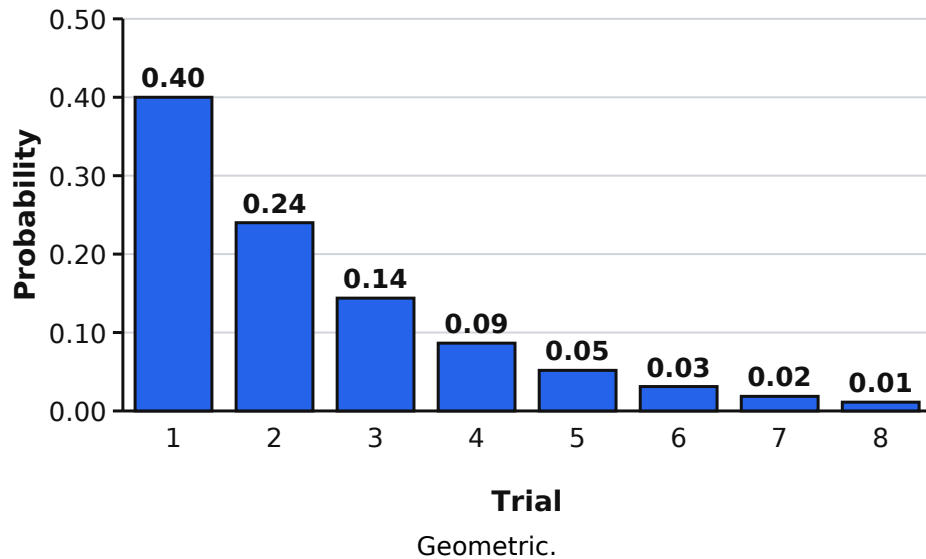


Binomial with $n = 5$.

What is the shape of this distribution?

- A. Skewed left
- B. Skewed right
- C. Symmetric
- D. Uniform

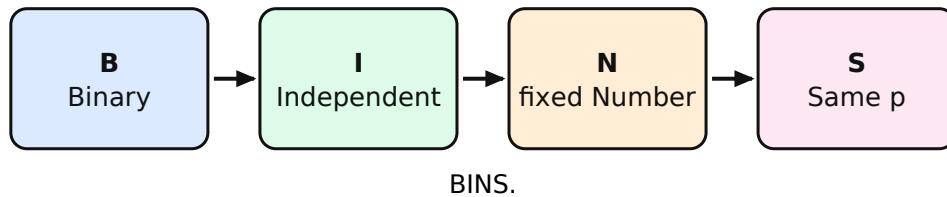
Question 2



Which describes this distribution?

- A. Binomial, symmetric
- B. Normal
- C. Uniform
- D. Geometric, skewed right

Question 3



A binomial setting requires:

- A. trials continuing until the first success
- B. dependent trials
- C. a fixed number of independent trials with the same probability of success
- D. a changing probability of success

Question 4

X is binomial with $n = 100$ and $p = 0.3$. The mean of X is:

- A. 30
- B. 3
- C. 21
- D. 0.3

Question 5

X is binomial with $n = 100$ and $p = 0.3$. The standard deviation is about:

- A. 4.58
- B. 21
- C. 5.5
- D. 30

Question 6

To find $P(X \geq 5)$ for binomial $n = 12$, use:

- A. `binomcdf(12, p, 5)`
- B. `1 - binomcdf(12, p, 4)`
- C. `binompdf(12, p, 5)`
- D. `1 - binomcdf(12, p, 5)`

Question 7

A geometric distribution has $p = 0.25$. The mean number of trials to the first success is:

- A. 0.25
- B. 4
- C. 3
- D. 1

Question 8

For a geometric distribution with $p = 0.5$, $P(X = 3) =$

- A. 0.125
- B. 0.5
- C. 0.25
- D. 0.375

Question 9

Which of these is binomial?

- A. The number of flips until the first head
- B. The number of heads in 30 flips of a coin
- C. The height of a randomly chosen student
- D. The number of cards drawn until an ace appears

Question 10

Rolling a die until a 6 appears has a probability of needing more than 3 rolls equal to:

- A. $(1/6)^3$
- B. $1 - (5/6)^3$

C. $\frac{3}{6}$

D. $(\frac{5}{6})^3$

Answers

1. **C** - With $p = 0.5$ the binomial distribution is symmetric about np .
2. **D** - The bars decrease from the first trial, which is a geometric pattern.
3. **C** - Those four conditions are the BINS rule.
4. **A** - $np = 100(0.3) = 30$.
5. **A** - $\sqrt{100 \times 0.3 \times 0.7} = \sqrt{21} = 4.58$. The value 21 is the variance.
6. **B** - At least 5 is the complement of at most 4.
7. **B** - The mean is $1/p = 4$.
8. **A** - $(0.5)^2 (0.5) = 0.125$.
9. **B** - Only the coin-flip count has a fixed number of independent binary trials with the same p .
10. **D** - More than 3 rolls means the first three are not 6s: $(5/6)^3$.

Remember

- Binomial conditions: Binary, Independent, fixed Number, Same probability.
- Binomial: mean = np , standard deviation = $\sqrt{np(1-p)}$; use `binompdf` and `binomcdf`.
- At least k successes: $1 - \text{binomcdf}(n, p, k - 1)$.
- Geometric: trials until the first success; $P(X = n) = (1-p)^{(n-1)} p$; mean $1/p$.
- Without replacement, treat trials as independent only if n is at most 10% of the population.