

Binomial Distribution

Assume fixed independent trials with constant success probability. Identify n , p , and X before using the binomial formula; round only final probabilities.

1. Let X count successes in 10 trials with $p = 3/10$. Find $P(X = 8)$.

Assumptions: The number of trials is fixed; trials are independent; each trial has two outcomes and the same success probability.

2. Let X count successes in 6 trials with $p = 1/10$. Find $P(X \leq 4)$.

Assumptions: The number of trials is fixed; trials are independent; each trial has two outcomes and the same success probability.

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3. Let X count successes in 16 trials with $p = 17/20$. Find $P(X \geq 14)$.

Assumptions: The number of trials is fixed; trials are independent; each trial has two outcomes and the same success probability.

4. Let X count successes in 18 trials with $p = 7/10$. Find the mean and population variance of X .

Assumptions: The number of trials is fixed; trials are independent; each trial has two outcomes and the same success probability.

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5. Let X count successes in 20 trials with $p = 3/5$. Find $P(X = 6)$.

Assumptions: The number of trials is fixed; trials are independent; each trial has two outcomes and the same success probability.

6. Let X count successes in 15 trials with $p = 1/4$. Find $P(X \leq 9)$.

Assumptions: The number of trials is fixed; trials are independent; each trial has two outcomes and the same success probability.

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7. Let X count successes in 19 trials with $p = 4/5$. Find the mean and population variance of X .

Assumptions: The number of trials is fixed; trials are independent; each trial has two outcomes and the same success probability.

8. Let X count successes in 9 trials with $p = 3/4$. Find $P(X \geq 5)$.

Assumptions: The number of trials is fixed; trials are independent; each trial has two outcomes and the same success probability.

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Worked Answer Key

Assume fixed independent trials with constant success probability. Identify n , p , and X before using the binomial formula; round only final probabilities.

1. Let X count successes in 10 trials with $p = 3/10$. Find $P(X = 8)$.

Answer: approximately 0.001

1. $P(X=8) = C(10,8)(3/10)^8(1-3/10)^2$.
2. $P(X=8)$ is approximately 0.001.

2. Let X count successes in 6 trials with $p = 1/10$. Find $P(X \leq 4)$.

Answer: approximately 1.000

1. Add $P(X=x)$ for $x=0$ through 4.
2. $P(X \leq 4)$ is approximately 1.000.

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Binomial Distribution

Worked Answer Key

Assume fixed independent trials with constant success probability. Identify n , p , and X before using the binomial formula; round only final probabilities.

3. Let X count successes in 16 trials with $p = 17/20$. Find $P(X \geq 14)$.

Answer: approximately 0.561

1. Add the upper-tail terms $P(X=x)$ for $x=14$ through 16.
2. $P(X \geq 14)$ is approximately 0.561.

4. Let X count successes in 18 trials with $p = 7/10$. Find the mean and population variance of X .

Answer: mean $63/5$, variance $189/50$

1. $E(X) = np = 18(7/10) = 63/5$.
2. $\text{Var}(X) = np(1-p) = 189/50$.

Binomial Distribution

Worked Answer Key

Assume fixed independent trials with constant success probability. Identify n , p , and X before using the binomial formula; round only final probabilities.

5. Let X count successes in 20 trials with $p = 3/5$. Find $P(X = 6)$.

Answer: approximately 0.005

1. $P(X=6) = C(20,6)(3/5)^6(1-3/5)^{14}$.
2. $P(X=6)$ is approximately 0.005.

6. Let X count successes in 15 trials with $p = 1/4$. Find $P(X \leq 9)$.

Answer: approximately 0.999

1. Add $P(X=x)$ for $x=0$ through 9.
2. $P(X \leq 9)$ is approximately 0.999.

Binomial Distribution

Worked Answer Key

Assume fixed independent trials with constant success probability. Identify n , p , and X before using the binomial formula; round only final probabilities.

- 7.** Let X count successes in 19 trials with $p = 4/5$. Find the mean and population variance of X .

Answer: mean 76/5, variance 76/25

1. $E(X) = np = 19(4/5) = 76/5$.
2. $\text{Var}(X) = np(1-p) = 76/25$.

- 8.** Let X count successes in 9 trials with $p = 3/4$. Find $P(X \geq 5)$.

Answer: approximately 0.951

1. Add the upper-tail terms $P(X=x)$ for $x=5$ through 9.
2. $P(X \geq 5)$ is approximately 0.951.