

Section 6.5 — Approximating a Binomial Distribution Using a Normal Distribution

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Outline

Introduction

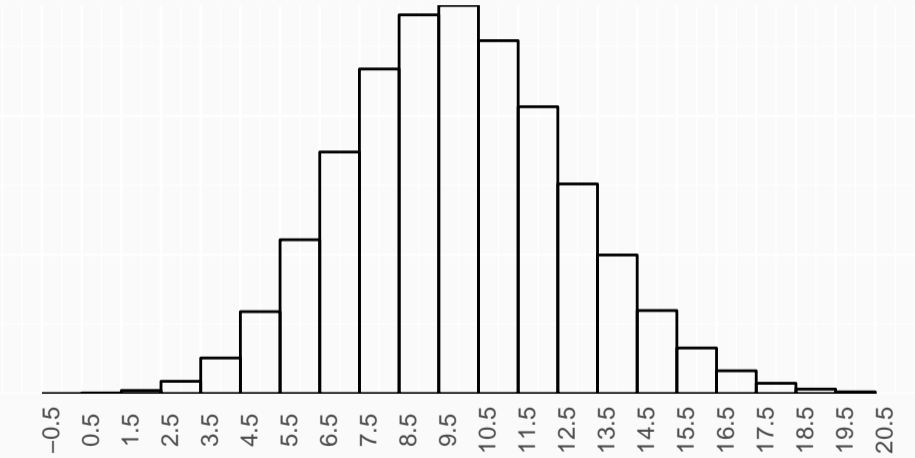
Requirements

For a binomial distribution, if $np \geq 5$ and $n(1 - p) \geq 5$ are met for a given binomial distribution, then a normal distribution can be used to approximate the binomial distribution with the mean and standard deviation

$$\mu = np$$

$$\sigma = \sqrt{np(1 - p)}$$

Continuity Correction



Continuity Correction

| Binomial | Normal Approximation |
|---------------|----------------------------|
| $P(X = x)$ | $P(x - 0.5 < X < x + 0.5)$ |
| $P(X < x)$ | $P(X < x - 0.5)$ |
| $P(X \leq x)$ | $P(X < x + 0.5)$ |
| $P(X > x)$ | $P(X > x + 0.5)$ |
| $P(X \geq x)$ | $P(X > x - 0.5)$ |

Examples

Voting

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- What is the probability that at least 25 voted? What about 15?
- What is the probability that exactly 23 voted? What about 19?

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- What is the probability of 291 or more adults in a group of 1004 adults consider being a professional athlete their dream job.
- If 25% is correct, would you consider 291 unusually high?
- What might that mean about the 25% assumption?