

CLT for a Binomial Distribution

- CLT for Proportions
- Continuity Correction
- Examples

The CLT for Proportions

- **Requirements:** Must be a Binomial Distribution with $np > 5$, $nq > 5$ ($q = 1-p$)
- **Conclusion:** This Binomial Distribution is approximately normal with

$$\mu = np, \quad \sigma = \sqrt{npq}$$

- **Continuity Correction:** Adjust the discrete whole number x by 0.5 .

Continuity Correction

Binomial	Normal
$P(x < 10)$	$P(x < 9.5)$
$P(x \leq 10)$	$P(x < 10.5)$
$P(x > 10)$	$P(x > 10.5)$
$P(x \geq 10)$	$P(x > 9.5)$
$P(7 < x < 12)$	$P(7.5 < x < 11.5)$
$P(7 \leq x \leq 12)$	$P(6.5 < x < 12.5)$

Example

Twelve percent of the US population is left handed. If **200** randomly selected Americans are surveyed, what is the probability that fewer than **20** of them are left handed?

Example

According to a recent Gallup poll, 18% of Americans are underemployed. If 150 Americans are randomly selected, find the probability that between 20 and 30 of them are underemployed.

Testing a Claim

Is it likely that only **50%** of voters support the marijuana initiative? A recent field poll of **1000** decisive voters found that **547** of them will vote yes.