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The probability in question is given by

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The probability in question is given by the Binomial distribution evaluated with

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The probability in question is given by the Binomial distribution evaluated with the Normal approximation (boxed result page 99).

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The probability in question is given by the Binomial distribution evaluated with the Normal approximation (boxed result page 99). Let A_i define the event that i voters in the sample prefer A . Then $P(A_i)$ is given by the

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The probability in question is given by the Binomial distribution evaluated with the Normal approximation (boxed result page 99). Let A_i define the event that i voters in the sample prefer A . Then $P(A_i)$ is given by the $Bin(n, 0.55)$ distribution.

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$$\Phi\left(\frac{\frac{n}{2} + \frac{1}{2} - 0.55 \cdot n}{\sqrt{n \cdot 0.55 \cdot 0.45}}\right) \leq$$

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$$\Phi\left(\frac{\frac{n}{2} + \frac{1}{2} - 0.55 \cdot n}{\sqrt{n \cdot 0.55 \cdot 0.45}}\right) \leq 0.99$$

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$$\Phi\left(\frac{\frac{n}{2} + \frac{1}{2} - 0.55 \cdot n}{\sqrt{n \cdot 0.55 \cdot 0.45}}\right) \leq 0.99$$

Thus

$$\frac{\frac{n}{2} + \frac{1}{2} - 0.55 \cdot n}{\sqrt{n \cdot 0.55 \cdot 0.45}} \leq$$

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$$\Phi\left(\frac{\frac{n}{2} + \frac{1}{2} - 0.55 \cdot n}{\sqrt{n \cdot 0.55 \cdot 0.45}}\right) \leq 0.99$$

Thus

$$\frac{\frac{n}{2} + \frac{1}{2} - 0.55 \cdot n}{\sqrt{n \cdot 0.55 \cdot 0.45}} \leq -2.33$$

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$$\Phi\left(\frac{\frac{n}{2} + \frac{1}{2} - 0.55 \cdot n}{\sqrt{n \cdot 0.55 \cdot 0.45}}\right) \leq 0.99$$

Thus

$$\frac{\frac{n}{2} + \frac{1}{2} - 0.55 \cdot n}{\sqrt{n \cdot 0.55 \cdot 0.45}} \leq -2.33 \Rightarrow n > 557 .$$

Pitman gets 537 ignoring the continuity approximation.