

Question 4

Luai is doing research to see students' perceptions of course based projects for STA304 and STA305. Approximately 66% of students claim they preferred courses with a capstone project over courses that are examination heavy. We then randomly sample 100 students. What is the probability that more than 50 of them enjoy course based projects?

Hint: use the normal approximation to the binomial distribution, and check all assumptions to justify using the normal approximation!

Let Y represent the # of students that prefer capstone courses. Here, $Y \sim \text{Binom}(n=100, p=0.66)$

Verify assumptions: $np = 100(0.66) = 66 \geq 5$ ✓

$n(1-p) = 100(0.34) = 34 \geq 5$ ✓

$P(Y > 50) = P(Y \geq 51)$ binom continuity correction:

$$= P(Y \geq 50.5)$$

~~50.5 51~~
50.5 51

$$= P\left(Z \geq \frac{50.5 - np}{\sqrt{np(1-p)}}\right)$$

$$= P\left(Z \geq \frac{50.5 - 66}{\sqrt{22.44}}\right) = P(Z \geq -3.272)$$

≈ 1 (not on the table! in R: 0.9994662)

YES. LUAI WILL GIVE VALUES ON THE TABLE.

This data is based off of a true story!