

StatCrunch Lab 8 for Statistics 301

Topics: sampling distributions for mean, proportion

Sampling distribution for mean. Temperature, X , on any given day during winter in Laporte averages $\mu_X = 0$ degrees with standard deviation of $\sigma_X = 1$ degree. Consider average temperature over random $n = 40$ days during winter.

- $\mu_{\bar{X}} = \mu_X = 0$
- $\sigma_{\bar{X}} = \frac{\sigma_X}{\sqrt{n}} = \frac{1}{\sqrt{40}} = 0.15811388$

Data, Compute expression, Expression: $1/\text{sqrt}(40)$, Compute.

- $P(\bar{X} > 0.2) \approx 0.10$

Stat, Calculators, Normal, Mean: 0, Std. Dev.: 0.15811388, Prob($X > 0.2$) = , Compute.

Sampling distribution for proportion Let $p = 0.63$ and $n = 45$ and approximate

$$P(\hat{p} < 0.41).$$

- *Check assumptions.*
Since $np(1-p) = 45(0.63)(1-0.63) = 10.4895 > 10$, assumptions necessary to proceed with approximation are satisfied
- $\mu_{\hat{p}} = p = 0.63$
- $\sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}} = \sqrt{\frac{0.63(1-0.63)}{45}} \approx 0.07197221$

Data, Compute expression, Expression: $\text{sqrt}(0.63*0.37/45)$, Compute.

- $P(\hat{p} < 0.41) \approx 0.001$

Stat, Calculators, Normal, Mean: 0.63, Std. Dev.: 0.07197221, Prob($X \leq 0.41$) = , Compute.