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Analysis of Environmental Data

Probability and Frequentist Concepts

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Worked with Juliana Berube and Julia Vineyard

Q1: What is the probability of observing a count of exactly 3 successes in a binomial distribution with parameters n = 4 and p = 0.75?

dbinom(3, 4, 0.75)

**42.19%**

Q2: What is the probability of observing a count of 3 successes or fewer in a binomial distribution with parameters n = 4 and p = 0.75?

pbinom(3, 4, 0.75)

**68.36%**

Q3: What is the probability of observing more than 3 successes in a binomial distribution with parameters n = 5 and p = 0.75?

1 - pbinom(3, 5, 0.75)

**63.28%**

Q4: What is the probability of observing a value of less than 1.2 from a normally distributed population with mean = 2 and standard deviation = 2?

pnorm(1.2, 2, 2)

**34.46%**

Q5: - What is the probability of observing a value of greater than 1.2 from a normally distributed population with mean = 2 and standard deviation = 2?

1 - pnorm(1.2, 2, 2)

**65.54%**

Q6: - What is the probability of observing a value between 1.2 and 3.2 from a normally distributed population with mean = 2 and standard deviation = 2?

1 - (pnorm(1.2, 2, 2) + (1 - pnorm(3.2, 2, 2)))

OR

pnorm(3.2, 2, 2) - pnorm(1.2, 2, 2)

**38.12%**

Q7: Describe how the shape of the histogram changes as you continue to press the sample button.

**It changes very minimally.**

Q8: Describe how the shape of the histogram changes as you continue to press the sample button.

**It, again, changes very minimally, but is slightly less spread apart.**

Q9: Describe how the shape of the histogram changes as you continue to press the sample button.

**It resembles more of a normal distribution the more draws and samples you have.**

Q10: Why is there such a drastic change in the shape of the sampling distribution when you change the sample size from 1 to 2?

**Honestly, I didn’t see a drastic change between a sample size of 1 and a sample size of 2. I did see a drastic change when we increased the sample size to 50. With the increase in samples, the standard deviation decreases, and the distribution becomes more normal.**

Q11: What are the two main factors that determine the width of the sampling distribution of the mean?

**The sample size and the variance**

Q12: How many 3-character words are possible?

**15,625**

Q13: How many books would the Library contain if you added one additional position to the book size? Express your answer in terms of B.

**B x 25**

xm(xn) = xm+n

m+n = 1,312,001

m=1,312,000

n = 1

x = 25

xm = B

251 = 25