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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?

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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?

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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?

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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

$x^m(x^n) = x^{m+n}$
m+n = 1,312,001
m=1,312,000
n = 1
x = 25
x^m = B
$25^1 = 25$