Lab 3: Exploring Discrete Probability Distributions

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Bernoulli and Binomial Distributions

Functions `dbinom`,`pbinom`,`qbinom`,`rbinom`

Binomial

Taken from Open Intro Exercise 4.17:

Data collected by the Substance Abuse and Mental Health Services Administration (SAMSHA) suggests that 69.7% of 18-20 year olds consumed alcoholic beverages in any given year. A random sample of 10 people age 18-20 was taken.

Write text below:

1. What distribution does the number of 18-20 that consumed alcohol follow?
2. What is the expected value of this distribution?
3. What is the variance of this distribution?

Write code below:

4. What is the probability that exactly 5 out of 10 18-20 year olds have consumed an alcoholic beverage?
5. What is the probability that at most 3 out of 10 randomly sampled 18-20 year olds have consumed alcoholic beverages?
6. What is the probability that at least 6 out of 10 randomly sampled 18-20 year olds have consumed alcoholic beverages?
7. What is the median of this distribution?

You can also randomly generate samples using a binomial distribution.

Geometric Distribution

Functions `dgeom()`,`pgeom()`,`qgeom()`,`rgeom()`

In R, these functions model differently than the book. This looks at the number of failures until the first success.

The probability of a defective lightbulb at a certain factor is 0.30. Write text here:

8. What is distribution would the number of bulbs until the first defective is found follow?
9. What is the expected number of lightbulbs that are checked before finding a defective bulb?
10. What is the probability that the tenth lightbulb is the first defective bulb?
11. What is the probability that the first defective bulb is found after the first 3 bulbs are checked?
12. Again we can draw a random sample: