



## PSTAT 5A: Discussion Worksheet 05

Spring 2023, with Ethan P. Marzban

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- The weights of adult male rats is found to vary normally with mean 4.2 oz and standard deviation 0.67 oz.
  - Define the random variable of interest, and call it  $X$ .
  - What proportion of adult male rats have weights under 4 oz?
  - What proportion of adult male rats have weights between 3.8 oz and 4.3 oz?
  - Suppose a sample of  $n = 120$  rats is taken (with replacement), and the number of rats between 3.8 oz and 4.3 oz in weight is recorded. What is the probability that this sample contains exactly 35 rats with weights between 3.8 oz and 4.3 oz? **Hint:** You will need to define another random variable and identify its distribution; you will also need your result from part (c) above.
- A particular random number generator picks a number at random from the set of real numbers between -10 and 10. The number that the generator selects can be viewed as following a uniform distribution.
  - What is the probability that the number generated is negative?
  - What is the probability that the number generated is between 5 and 7, inclusive on both ends?
  - What is the probability that the number generated is between 5 and 7, exclusive on both ends (i.e. *not* including 5 or 7 themselves)?
  - What is the probability that the number generated is between 5 and 12?
- The US Census Bureau has determined that 80.7% of US Citizens live in urban areas. A representative sample of 200 US Citizens is taken, and the proportion of these that live in urban areas is recorded.
  - Define the random variable of interest, and use the notational conventions introduced in Lecture 10.
  - Identify the distribution of the random variable you defined in part (a). Be sure to include the parameters of this distribution, and be sure to check any conditions that might be necessary to check!
  - What is the probability that the proportion of citizens in the sample that live in urban areas lies within 2.5% of the true proportion of 80.7%?