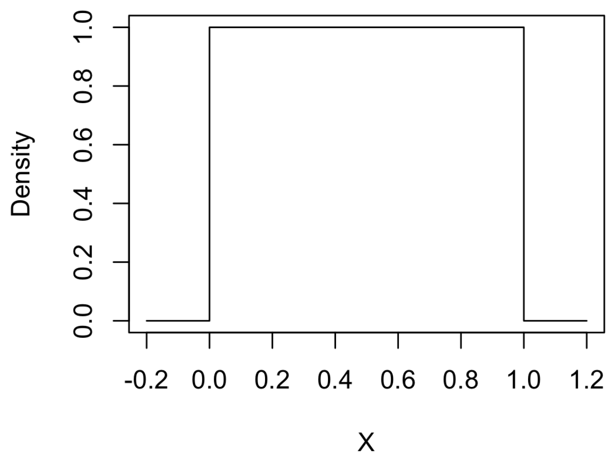
Psyc 3101, Homework 3

This density plot shows a Uniform distribution.
All scores between 0 and 1 are equally likely.

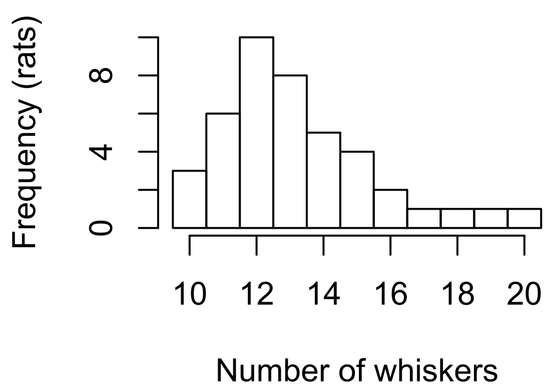


1. What proportion of scores area greater than .8?
   These scores correspond to the area under the curve between .8 and 1.0 on the x axis. This region is a rectangle with width .2 and height 1, so the area is .2. Therefore the answer's .2, or 20%, or 1/5. (Notice the area under the whole curve is 1, which is true of all density functions. So, you don't have to divide by that total area.)

2. What proportion of scores are less than .3?
   .3, or 30%, or 3/10

3. What proportion of scores are between .45 and .65?
   .2, or 20%, or 1/5

4. Draw a histogram of a skewed distribution.



Write the measurement scale of each variable

5. Time it takes people to walk to school: Ratio scale

6. People eat 5 cookies and rank them from favorite to least favorite. Ordinal scale

7. You measure people's height using a ruler on a wall, and later you learn the ruler was too high (so that 0 was above the floor), but you don't know by how much.
   You still know the differences between scores (e.g., if one person is two inches taller than another). However, you can't rely on the ratios; e.g., if one person measured 80" and another 40", the first might not be twice as tall as the second because the zero was in the wrong place. Therefore the answer is interval scale.

8. Create a distribution that has mean > median > mode, and write the value of each of these statistics.
If you need a starting point, begin with {1, 2, 3, 3, 4, 5}, which has mean = median = mode, and think of ways to change this by adding more scores.
{1, 1, 1, 2, 3, 3, 4, 5, 1000}
Adding the 1s makes the mode = 1.
The median is still 3.
Adding the outlier (1000) makes the mean very large: M = 113.3.

9. Calculate the variance of the population {51, 56, 54, 57, 47}.

$$\mu = \frac{\Sigma X}{N} = \frac{51+56+54+57+47}{5} = 53$$

$$X - \mu = \{-2, 3, 1, 4, -6\}$$

$$(X-\mu)^2 = \{4, 9, 1, 16, 36\}$$

$$\Sigma(X-\mu)^2 = 4+9+1+16+36 = 66$$

$$\sigma^2 = \frac{\Sigma(X-\mu)^2}{N} = \frac{66}{5} = 13.2$$

10. A population of 100 people has a standard deviation of 2. What's the sum of squares?

The standard deviation is the square root of the variance, meaning the variance equals the standard deviation squared. Therefore the variance equals $2^2 = 4$.

Now use the formula for variance from sum of squares:

$$\sigma^2 = \frac{SS}{N}$$

You can invert this equation to solve for SS in terms of σ^2:

$$SS = N \cdot \sigma^2 = 100 \cdot 4 = \underline{400}$$