https://classroom.github.com/a/kNVaSQGV

For each of the distribution functions below, follow the steps:

1. Make a plot of the density function.
   (a) Create a (not random) sequence of values `x` and evaluate the density function at these points, `f(x)`. Store these vectors in a `tibble()` and use this to make your plot.
   (b) Choose wisely the values in the sequence `x`. Your plot should highlight the overall shape of the distribution, include the expected value in the support, and display appropriately the type of random variable, discrete or continuous.
   (c) Choosing the values in `x` wisely can be accomplished by following these rules based on the support of the random variable S_X:
      i. If S_X discrete, use points.
      ii. If S_X continuous, use lines. Chances are good lines should appear smooth. A point of extra credit if you can correctly describe, using the appropriate mathematical terms, when a continuous density function might not appear smooth – what properties of `f(x)` will be necessarily true?
      iii. If S_X is bounded, `x` should enable display of the entire support of the density function.
      iv. If S_X is unbounded, `x` should be in the interval

$$(\max\{\mathbb{E}(X) - 4 * \mathbb{D}(X), \min(S_X)\}, \min\{\mathbb{E}(X) + 4 * \mathbb{D}(X), \max(S_X)\})$$

2. Generate $N = 1001$ random observations and store them into a variable `x`.
3. Estimate the expected value of X, $\mathbb{E}(X)$, using `x` using and `mean()`.
4. Write an `R` function that evaluates negative one times the simplified log-likelihood.
5. Use `optim()` and `x` to estimate the population parameter of interest (pretending you don't know it).
6. Use value `optim()$par` to provide another estimate of the expected value of X, $\mathbb{E}(X)$.

1. Binomial($K = 20, p = .75$).
2. Poisson($\lambda = 60$)
3. Exponential($\beta = 5$)