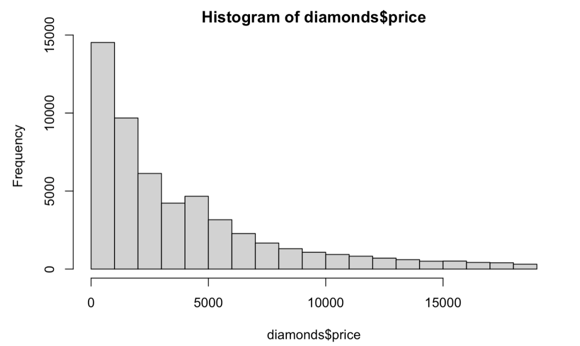
**In-Class Assignment 13**

1. For the price field in the diamonds dataset

    a. First plot a histogram of the data. Does it look approximately exponential?

Yes!




hist(diamonds$price)

    b. Adapt the LL optimization code to find the maximum likelihood estimate for an exponential distribution for the price data.

        i. f <- function (lamb) length(diamonds$price)*log(lamb)-1*lamb*sum(diamonds$price)

        ii. optimize(f,c(0,3),maximum=TRUE)

            1. $maximum
            2. [1] 0.000239011
            3. $objective
            4. [1] -500508.4

2. A sample consists of {0.1, 0.2, 0.5, 0.7, 0.8, 0.9, 0.95}. It is thought to fit a probability distribution of the form $p(x) = (\alpha+1)x^{\alpha}$, for $0 \le x \le 1$. Find the maximum likelihood estimate for the parameter $\alpha$.

    a. samp <- c(0.1, 0.2, 0.5, 0.7, 0.8, 0.9, 0.95)
    b.
    c. product <- prod(samp)
    d. summed <- sum(samp)
    e.

f. LL <- function(x) log(product) + length(diamonds$z) * log(x) - summed*x

g. optimize(LL, c(0, 4), maximum = TRUE)

   i. $maximum

   ii. [1] 3.99994

   iii.

   iv. $objective

   v. [1] 74753.96

3. From diamonds dataset take the field z. Adopt the code to find the MLE's for the parameters of the normal distribution.

   a. glimpse(diamonds$z)

   b. product <- prod(diamonds$z)

   c. summed <- sum(diamonds$z)

   d. LL <- function(x) log(product) + length(diamonds$z) * log(x) - summed*x

   e. optimize(LL, c(0, 4), maximum = TRUE)

      i. $maximum

      ii. [1] 3.99994

      iii.

      iv. $objective

      v. [1] -Inf