Department of Bitechnology
Biostatistics BT2023
Fall semester Aug-Dec 2023
Mid term exam

Date : 29 September 2023

Maximum Marks: 60

Plots should be tidy and clear. Adjust the axis so that the function and data can be compared

Please use the given COVID data set to answer the Questions 1 to 5.

1. Draw two line plots comparing the evolution of the COVID-19 in India and United States of America (USA)
   (a) plot the "New_cases" vs "Date_reported" in Y axis and X axis respectively.
   (b) plot the "Cumulative_cases" vs "Date_reported" in Y axis and X axis respectively.

2. Make a bar plot comparing the "Cumulative_deaths" till 27 September 2023 in USA, Brazil, India, Russia and Mexico.

3. Find the mean, mode, median, inter quartile range (IQR) and standard deviation of the "New_deaths" for India and USA.

4. Create two histograms to compare the Probability distribution of "New_deaths" for India and USA. Use the "Freedman–Diaconis rule" bin width (h) $= 2 * IQR * n^{-1/3}$.

5. Draw "violin plots" comparing the distribution of "New_deaths" for USA, Brazil, India, Russia and Mexico.

6. Using your favorite software plot the following functions Y vs X and Y vs Φ

$$Y = k(X - X_0)^2; \quad [X = -16 \; to \; 20] \quad parameters \; k = 1.5 \; k = 2.0; \; X0 = 2; \tag{1}$$

$$Y = k\left[(1 + cos(n\Phi - \delta)\right] \; ; [\Phi = 0 \;\; to \;\; 360] \quad parameters \; k = 0.1; \; n = 3; \; n = 2; \; \delta = 180 \tag{2}$$