**Statistics # 1 – Central Tendency and Plotting**

It is understood that the cross-sectional area of a muscle is directly proportional to the amount of force that can be generated. Using a magnetic resonance imaging (MRI) machine, the cross-sectional area, of the right biceps brachii muscle, of 20 elite female kayakers was determined. The biceps brachii is the primary muscle used to flex the elbow. Each kayaker was then tested to determine the amount of force they could generate during a maximum isometric contraction with the elbow fixed at 90°. Estimating the moment arm of the biceps brachii, the amount of force present in the muscle was calculated. Please complete the following steps:

1. Open Microsoft Excel and enter the data **exactly** as shown below.
2. Save the file as “Last Name First Name Statistics #1” e.g. “MacKenzie Sasho Statistics #1”
3. Generate a column that shows the amount of force generated per unit of cross-sectional area to two decimals. For help, type “Enter a formula” into the Help box at the top of the menu. It will also be useful to use the “fill handle” feature to easily copy formulas to adjacent cells.
4. Calculate the [Mean](http://en.wikipedia.org/wiki/Mean), [Median](http://en.wikipedia.org/wiki/Median) and [Mode](http://en.wikipedia.org/wiki/Mode_%28statistics%29) for all three columns. The Mean and Median should be shown to two decimals. Use Help, the book, or Wikipedia. Note: Mode may not calculate.
5. Generate a Scatter Plot of the data as a separate sheet and name the tab Force vs. Area. The graph should look **identical** to the one shown below on this handout. This includes the X and Y axis ranges and scales, the colouring, and titles. Use the Chart feature.
6. Below the data in your spreadsheet, insert a “Text Box” and clearly provide definitions for the mean, median, and mode.
7. Email your Excel file to [hk396fall2021@gmail.com](mailto:hk396fall2021@gmail.com) Type “Statistics #1” as your subject and nothing else.

|  |  |  |  |
| --- | --- | --- | --- |
| **Subject** | **Area** | **Force** | **Force/Area** |
|  | **(cm2)** | **(Kg)** | **(Kg/cm2)** |
|  |  |  |  |
| 1 | 30 | 330 |  |
| 2 | 36 | 337 |  |
| 3 | 26 | 270 |  |
| 4 | 33 | 306 |  |
| 5 | 35 | 361 |  |
| 6 | 30 | 287 |  |
| 7 | 26 | 275 |  |
| 8 | 33 | 288 |  |
| 9 | 32 | 352 |  |
| 10 | 22 | 275 |  |
| 11 | 26 | 251 |  |
| 12 | 31 | 318 |  |
| 13 | 30 | 297 |  |
| 14 | 30 | 284 |  |
| 15 | 19 | 207 |  |
| 16 | 23 | 226 |  |
| 17 | 37 | 364 |  |
| 18 | 33 | 347 |  |
| 19 | 36 | 350 |  |
| 20 | 20 | 200 |  |
| Mean |  |  |  |
| Median |  |  |  |
| Mode |  |  |  |

