

QUANT Activity 3.1: An “Arm” and a “Leg”

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In this investigation, we will use measurement, data pooling, scatter plots, data organization, weighted means, the algebra of a linear function, and the concept of a median-median line to fit a set of collected data.

1. Working in pairs, measure in centimeters, *to the nearest millimeter*, the length of your dominant arm and foot (from wrist to elbow, and from heel to toe, with shoe on)
2. Place the data on chart paper. The instructor will send the pooled data from the entire class as a List & Spreadsheet page to the TI-*n*spire handhelds.
3. Plot the data in a Graphs & Geometry page. Let arm length be the independent variable and leg length be the dependent variable. Partition the data into three groups, the 1st, 2nd, and 3rd thirds, dividing it using two appropriately placed vertical lines.
4. (a) Draw vertical lines on the graph to group the plotted points into thirds. (b) Determine the median of the x 's (Arm data) and the median of the y 's (Leg data) for each of these three sets of points. (c) Put your answers in the table below. (d) Plot these three points on the graph, clearly identifying these points on the graph.

Which Third	Median of the x 's	Median of the y 's
1st		
2nd		
3rd		

5. (a) Find the equation of the line passing through the points for the median coordinates in the 1st and 3rd thirds. (b) Graph this line on the plot above and label it.

$$f_{13}(x) = \underline{\hspace{10em}}$$

6. (a) Find the equation of the line that passes through the point with the median coordinates for the 2nd third and that has the same slope as the equation from question 5. (b) Graph this line on the plot above and label it.

$$f_2(x) = \underline{\hspace{10em}}$$

7. (a) Find the weighted average of the y -intercepts to use with the common slope above to get the median-median line of fit. (b) Why is this a *weighted* average? Why is it used?

$$\frac{\text{y-intercept of } f_{13} + \text{y-intercept of } f_2 + \text{y-intercept of } f_{13}}{3}$$

8. (a) Determine an equation for the line with this weighted average y -intercept that is parallel to the other two lines. (b) Graph this third line. (c) Compare this equation and graph with the ones generated by your handheld using Med-Med regression.