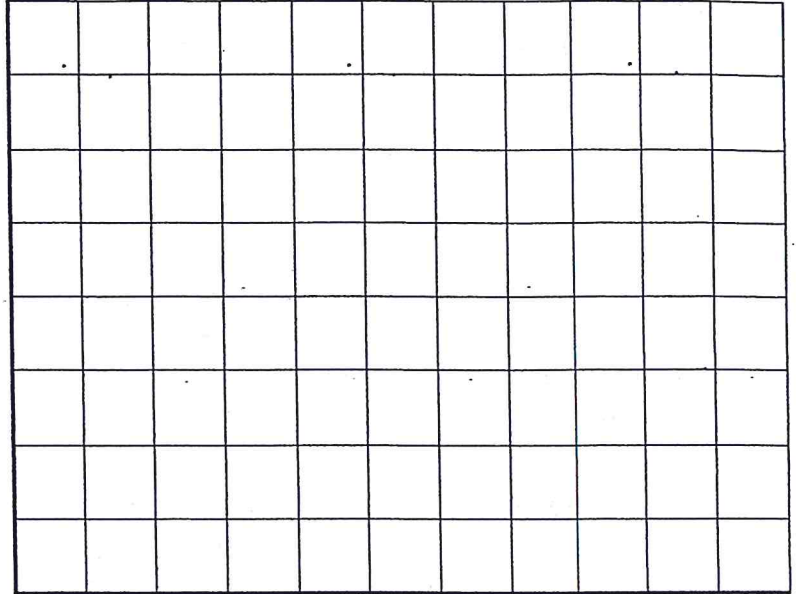


Day 3 Upper and Lower Bounds of my Prediction

Plot the following data taken from an archeological dig on a scatter plot. Label the axes and scale each axis appropriately. Start the scale on the x-axis at 20 cm. and count by 1's. Start the scale on the y-axis at 120 cm. and count by 10's. Draw a line of best fit and find the equation of your line. Modified 6.22-23

| Forearm Length (cm) | Height (cm) | Residual | Square of the Residual |
|---------------------|-------------|----------|------------------------|
| 23 | 143 | | |
| 26 | 160 | | |
| 27 | 173 | | |
| 24 | 175 | | |
| 28 | 165 | | |
| 26 | 154 | | |
| 29 | 185 | | |
| 21 | 147 | | |
| | | | |
| | | | |
| | | | |
| | | | |



Compare your line with your teammates lines. They should each be a little different.

1. Describe the association for this data. Are there any outliers?

2. What does the y-intercept mean for this data? *The y-intercept is* _____.

Since the y-intercept is where $x = 0$, in this situation, when the forearm length is 0 cm, the person is _____ centimeters tall.

3. What does the slope mean for this data? *The slope is* _____.

The slope means that for every 1 cm the forearm length increases, the height increases _____ cm.

4. Use the equation for your line of best fit to predict the height of an early hominid if the forearm bone archeologists have is 24.6 cm long. Show your work.

How close is the model? How useful is the model?

5. Find the difference between each actual height (in the data table) and each predicted height (from your equation) and write the residual distances in your data table. Add it to your graph by drawing a line from the line of best fit to the data point and writing the distance. Use 6-23 to see an example. These distances are called **residuals**.
- a. What is the difference between a positive and negative residual in the context of this problem?
6. Using color draw a dashed line that is parallel to your line of best fit and passes through the data point that resulted in the **residual with the largest absolute value**. Use that SAME distance to draw another line that is on the other side of and parallel to your line of best fit. These lines are the **Upper and Lower Bounds**. You can use them to add a Margin of Error to any prediction you make.
7. Write the square of each residual into the fourth column in your data table. Then find the sum of those squares. Write your total below the data table and here
- a. **The Sum of the squares of the residuals is** _____.
- b. Compare with your teammates. Who has the smallest sum of the squares of the residuals?
Keep this in mind for the next lesson.

6-28

