

GOLDEN RATIO LAB

Take these measurements for yourself and the members of your group: Put your measurements into your calculator in the STATS function. Then connect to the Navigator system.

Calculator Help:

The STAT is in row 3 column 3. Then select 1 or press enter. Go to the top of each list and press CLEAR, ENTER.

Team Member 1:

Name	List 1		List 2
Height from floor to naval, cm		Your height, in cm	
Index finger tip to 2 nd knuckle, cm		Index finger, in cm	
Leg from hip to knee, cm		Length of leg, in cm	
Middle finger to elbow, cm		Length of arm, in cm	
Chin to top of ear, cm		Height of head, chin to top, cm	

Team Member 2:

Name	List 1		List 2
Height from floor to naval, cm		Your height, in cm	
Index finger tip to 2 nd knuckle, cm		Index finger, in cm	
Leg from hip to knee, cm		Length of leg, in cm	
Middle finger to elbow, cm		Length of arm, in cm	
Chin to top of ear, cm		Height of head, chin to top, cm	

Team Member 3:

Name	List 1		List 2
Height from floor to naval, cm		Your height, in cm	
Index finger tip to 2 nd knuckle, cm		Index finger, in cm	
Leg from hip to knee, cm		Length of leg, in cm	
Middle finger to elbow, cm		Length of arm, in cm	
Chin to top of ear, cm		Height of head, chin to top, cm	

The teacher will collect your data and send you out a new list with the data from everyone in the class.

Pick an ordered pair from your list of numbers and select another from the list sent to you by the teacher.

1.

Your Ordered
Pair: _____

The Other Ordered
Pair: _____

2. Calculate the slope of your line from the two ordered pairs you chose

$\left(m = \frac{y_2 - y_1}{x_2 - x_1} \right)$. Write the slope as both a fraction and a decimal.

3. Write an equation for your line using the slope you calculated and the point from your body, use point-slope form ($y = m(x - x_1) + y_1$).

Put your equation into y2 in the y= menu. Turn on a plot and graph your line and the points in list 1 and list 2.

4. How closely does your line fit the data?

Calculator Help:

The Y= key is in row1, column 1 of the calculator.

- Press 2nd Y= to get to STAT PLOTS,
- Press ENTER on PLOT1,
- press ENTER on ON
- select TYPE 1,
- XLIST is L1 (2nd 1) and
- YLIST is L2 (2nd 2).
- Choose the last mark.

5. Calculate the regression equation for the data in list 1 and 2. Write it below accurate to thousandths place.

6. How closely does your slope match the slope of the regression equation?

7. The slope of the line that fits the data should be a special number, called the Golden Ratio. What is that number?

Definition of the Golden Ratio for line segments:

If a line segment is divided into two lengths such that the ratio of the segment's entire length to the longer length is equal to the ratio of the longer length to the shorter length, then the segment has been divided into the Golden Ratio. Algebraic methods say the ratio is: $\frac{1 + \sqrt{5}}{2}$.

8. Use your calculator to find the decimal approximation of the Golden Ratio.

Now you are to go the website <http://cuip.uchicago.edu/~dlnarain/golden/> and work through the activities that show the historical relationship between the Golden Ratio and art, architecture, and other number patterns.