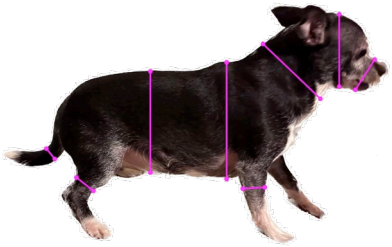
Which Dog is Roundest? Holly or Blue?

Have you ever looked at two dogs and asked yourself "Which dog is the roundest?" Well, if you are math-minded like us, these questions are intriguing, and interesting! We are going to answer the question when comparing a 7-year-old Chihuahua named Holly to a 5-year-old Corgi named Blue. To find the answer, diameter and perimeter measurements have been taken at various locations for both dogs. A scatterplot of the collected data (diameter vs perimeter) for each dog will be compared to the "ideal model" for roundness ($C = \pi \cdot d$). This visual will let us know if it's even a contest. To mathematically determine the dog having measurements closest to the ideal model, the residual standard error (RSE) will be calculated for both dogs. The roundest dog has the smallest RSE.

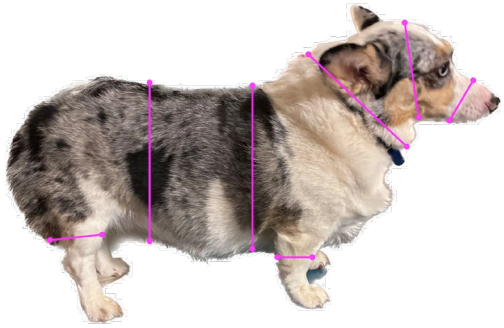
Data Collection Results

Holly



Location	Diameter(cm)	Perimeter(cm)
Snout	3.8	12
Head	9	27.8
Neck	9.8	27.7
Chest	14.8	44.6
Stomach	12.4	45
Front Leg	2.4	7
Back Leg	1.9	5.8
Tail	1.9	5.5

Blue



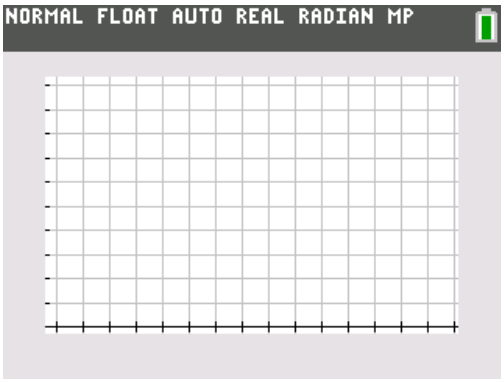
Location	Diameter(cm)	Perimeter(cm)
Snout	6	17.5
Head	11.4	37.7
Neck	12.5	38.5
Chest	18	62.8
Stomach	15.5	53.5
Front Leg	4.2	11.5
Back Leg	2.4	8.7
Tail	NA*	NA*

*Blue does not have a tail

Data Analysis - Holly

Visual Analysis

- Enter Holly's data into Lists L_1 and L_2 of a TI-84 CE Python™ graphing calculator.
- Create a scatter plot in a ZOOMSTAT window.
- Enter the circumference function ($C = \pi \cdot d$) into Y_1.

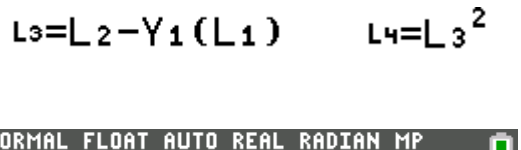


How well do you think Holly fits the model visually?

Residual Standard Error Analysis

$$RSE = \sqrt{\frac{\sum_{i=1}^{n} (y_i - \hat{y}_i)^2}{df}}$$

- Enter the formula "L_2 - Y1(L_1)" into L_3.
- Enter the formula "L_3^2" into L_4.
- On the home screen, calculate the square root of the sum of L_4 divided by 7.

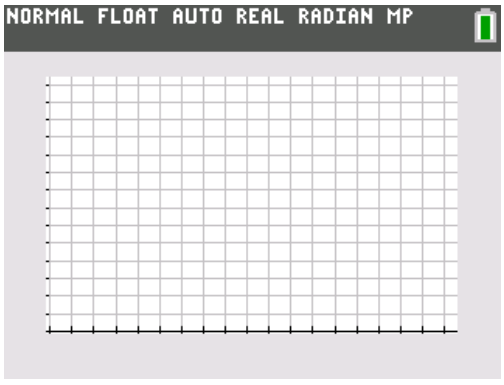


Holly's RSE = _____

Data Analysis - BLUE

Repeat for Blue's Data

Visual Analysis



How well do you think Blue fits the model visually?

Residual Standard Error Analysis

$$RSE = \sqrt{\frac{\sum_{i=1}^{n} (y_i - \hat{y}_i)^2}{df}}$$ with *df = 6*

Blue's RSE = _____

CONCLUSION: Which dog is the "roundest"? Explain your decision.