The following table shows the gestation period (in days) and life expectancy (in years) for 18 species of mammals. Is there evidence that gestation period is related to the animal’s lifespan?

1. Create the scatterplot with life expectancy as the explanatory and gestation as the response

   ![Scatterplot](image)

   Scatterplot shows a positive, linear, moderately weak ($r = 0.544$) association with a few large outliers (one far outside the pattern)

2. Describe the scatterplot.

3. Are there any outliers? What are they?
   The humans (81,278) and the elephants (35,624)

4. Are there any influential points? What are they?
   Yes. The humans

5. Are there any points with high leverage? What are they?
   Yes. The humans and the elephants

6. Calculate the LSRL and find the correlation.
   
   \[
   y = 90.625 + 4.725x
   \]
   
   where $x = \text{life expectancy}$ and $y = \text{gestation}$
   
   $r = 0.544$

7. Draw the residual plot.

   ![Residual Plot](image)
8. From the residual plot how can you tell if a point is an outlier, an influential point or has high leverage?
   - Points far away from the rest of the data
   - Points with very large residuals

9. Can we remove a point to make a stronger linear model? Do you think we are justified in doing so?
   Yes. The humans should be removed. Because of medicine and medical procedures their life expectancy is very high, higher than may naturally occur.

10. Remove the humans and recalculate the LSRL and correlation.
    \[ \hat{y} = -39.517 + 15.498x \]
    where \( x \) = life expectancy and \( y \) = gestation
    \[ r = 0.850 \]

11. Did the model improve? How can you tell?
    Yes! The correlation strengthened dramatically. The line also fits the data much better.

12. Redraw the residual plot.

13. Is there any reason to simplify the model now?

14. Remove the elephants and recalculate the LSRL and correlation.
    \[ \hat{y} = -1.271 + 11.609x \]
    where \( x \) = life expectancy and \( y \) = gestation
    \[ r = 0.727 \]

15. Were elephants an influential point?
    Yes. They changed the slope of the regression line

16. Should we continue to remove animals from the model to improve the strength of the model?

17. Put the humans and elephants back into your data. Switch the explanatory and response variables and draw the scatterplot. Would humans have high leverage here?