ENED 1100	12/2/2021	Section 003	Name: Thavishka Gamage	1/2
Homework 14.1	Task 1	Team 024	Signature: Thavishka Gamage	

Problem Statement: Kleiber's Law states that an animals metabolic rate scales to the 3/4th Power of the mass of said animal. A student who is testing this law collected the following data:

Aimal	Mass (kg)	Metabolic Rate
Rat	0.26	1.45
Dog	16	20
Sheep	45	50
Human Female	60	68
Human Male	70	87
Cow	400	266
Steer	680	411

Determine of this set of data supports Kleiber's Law.

Diagram: see file HW_14.1_Task 1_gamageid.xlsx

Theory

$$\left[\log(y) - \log(y_0)\right] = \left(\frac{\log(y_1) - \log(y_0)}{\log(x_1) - \log(x_2)}\right)\left(\log(x) - \log(x_0)\right)$$

$$y = bx^m$$

$$\log(y) = m\log(x) + \log(b), \text{ where } b = 10^{\log(b)}$$

Assumptions:

- The line of best fit is accurate, as well as the equation.
- The point chosen for MSP are on the line of best fit.
- The points will not yield 100% accuracy. So anything close to 3/4 within 0.1 may be accepted.

Solution: Points chosen are: (1,3) and (100,100)

$$m = \frac{\log(100) - \log(3)}{\log(100) - \log(1)} \qquad y = 3.001x^{.7614}$$

$m = .7614$

$$\log(b) = \log(100) - .7614\log(100)$$

$b = 3.001$

$$\boxed{y = 3.001x^{.7614}}$$

Verification:

Look at excel file

Conclusion:

From the equation I found by the two coordinate points, & the data I found from the sum of the squares using the new equation, I conclude that the student is correct. The equation I found has a slope of .7614, which is very close to that of the Kleiber's Law's slope, .75//