

Chapter 8 Practice test

1. Given the regression equation: $\hat{y} = 3x - 1$, finish the table below.

x	y	\hat{y}	$y - \hat{y}$	$(y - \hat{y})^2$
1	7	2	5	25
2	5	5	0	0
3	12	8	4	16
4	3	11	-8	64
			SSres =	105

Dog's Weight Problem (2-5): As dogs of a particular breed grow, their weight is a function of their length. Suppose that these lengths and weights have been measured.

x (in.)	y (lb)
6	2
12	14
24	98
29	170
34	260
37	330

4. Use the appropriate kind of regression to find the function of the type in Problem 2 that best fits all six data points. Write the correlation coefficient, and explain how it indicates that the function fits the data quite well.

$$y = 0.013 \cdot x^{2.81}$$

$$r = 0.99999$$

r is close to 1

2. What pattern do the first three data points follow? What type of function has this pattern?

mult-mult
Power

3. Find the particular equation for the function in Problem 2 algebraically by substituting the second and third points into the general equation. Show that the equation gives values for the last point close to the value in the table.

$$y = ax^b$$

$$y = 0.013 \cdot x^{2.81}$$

$$\begin{aligned} 14 &= a \cdot 12^b \\ 98 &= a \cdot 24^b \\ \hline 7 &= 2^b \end{aligned}$$

$$\log 7 = b \log 2$$

$$b = 2.81$$

$$14 = a \cdot 12^{2.81}$$

$$a = 0.013$$

5. Use the regression equation from Problem 4 to predict the weight of a newborn puppy 4 inches long. Which do you use, interpolation or extrapolation, to find this? How can you decide?

$$x = 4$$

$$y = 0.64 \text{ lbs}$$

extrapolation because 'x' is outside of the given set of data