

Key

8th Grade Math M-Step Sample Performance Task

HEARTBEATS

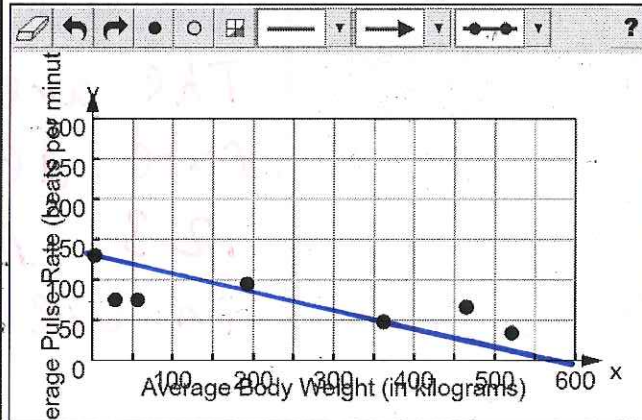
In this task, you will use data to create a model that shows the relationship between animal body weight and pulse rate measures. Then you will examine additional data to evaluate your model.

A study states that the relationship between an animal's pulse rate and body weight is approximately linear. The study data are below.

Table 1. Average Body Weight and Average Pulse Rate of Seven Animals

Animal	Average Body Weight (in kilograms)	Average Pulse Rate (in beats per minute)
Cat	3	130
Goat	28	75
Sheep	56	75
Pig	192	95
Ox	362	48
Cow	465	66
Horse	521	34

The data from Table 1 are plotted below. Create a linear model of these data.



$(3, 130)$; $(362, 48)$

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What is the equation of the line you drew in Question 1?

eq: $y = -.23x + 130.69$

$$m = \frac{130 - 48}{3 - 362} = \frac{82}{-359} \approx -.23$$

$$130 = -.23(3) + b$$

$$130 = -.69 + b$$

$$+ .69 \quad + .69$$

$$130.69 = b$$

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Interpret the slope of the line from Question 1 in the context of the situation.

Type your answer in the space provided.

$$m = -.23$$



The average pulse rate decreases about .23 per 1 kg in weight

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Part A

Based on the equation from Question 2, predict the average pulse rate in beats per minute of an animal that weighs 6000 kilograms.

$$y = -1,249.31 \text{ pulse rate}$$

$$y = -.23(6000) + 130.69$$

$$y = -1,380 + 130.69$$

$$y = -1,249.31 \text{ pulse rate}$$

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Part B

Explain whether the predicted average pulse rate in Part A is reasonable in the context of the situation.

The average pulse rate of $-1,249.31$ is NOT reasonable. Animals that are living have a positive pulse rate.

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The body weight and pulse rate of a guinea pig and rabbit are given in the table below.

Animal	Average Body Weight (in kg)	Average Pulse Rate (in beats per minute)
Guinea Pig	1	250
Rabbit	2.5	265

If the study had included these data, would this change the model relating average body weight and average pulse rate? How do you know?

Yes, it would change. The data points $(1, 250)$ and $(2.5, 265)$ could be considered outliers since they are further away than the rest of the data points.