

Name: Key Hour: \_\_\_\_\_ Date: \_\_\_\_\_

## Can we predict a person's height from their shoe? Part 2.



Could we use the length of a person's shoe to accurately predict their height?

Here is the class data from a small class of 10 students.

Shoe (cm)	29	25	22	30	33	21	23	26	31	19
Height (cm)	183	174	170	185	190	163	170	179	190	164

Notice  $y = a + bx$

$height = 122.27 + 2.11 \cdot shoe$

1. What is the line of best fit for the data?  $y = 122.27 + 2.11x$

2. What is the slope of the line of best fit? 2.11. What does this slope mean in the context of the problem?

*predicted*  
The height goes up by 2.11 cm for every increase of 1 cm in shoe length.

$\frac{\Delta y}{\Delta x} = \frac{\Delta height}{\Delta shoe} = \frac{2.11}{1}$

3. What is the y-intercept of the line of best fit? 122.27. What does this y-intercept mean in the context of the problem?

A person with shoe length 0 cm is predicted to be 122.27 cm.

*Makes no sense! EXTRAPOLATION*

4. Use the line of best fit to predict the height of a person with a shoe size of 26 cm. Show work.

$$y = 122.27 + 2.11(26) = 177.13 \text{ cm}$$

5. What was the actual height of the student in class with a shoe size of 26 cm?

179 cm

6. How far off was our prediction from #2? Too high or too low?

Too high by  $179 - 177.13 = 1.87 \text{ cm}$

*residual = actual - predicted*