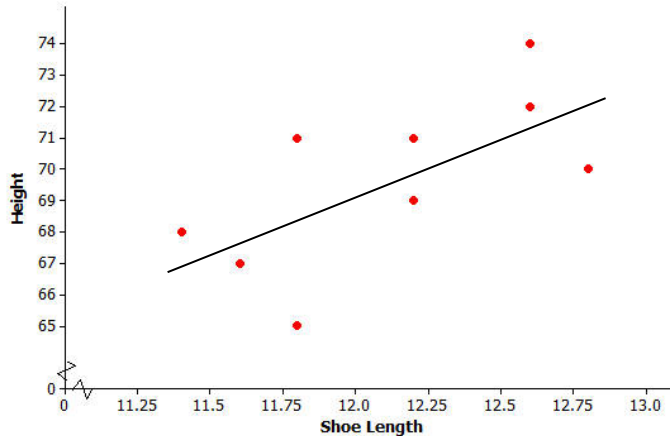


**UNIT 4****LESSON 9****Do now: Answer Part a and part b**

Kendra watched a show where investigators used a shoe print to help identify a suspect in a case. To investigate, she collected data on shoe length (in inches) and height (in inches) from 10 adult men. Her data appear in the table and scatter plot below.

$x =$ Shoe Length	$y =$ Height
12.6	74
11.8	65
12.2	71
11.6	67
11.4	68
12.8	70
12.2	69
12.6	72
11.8	71



- a. Is there a relationship between shoe length and height? *Round to the nearest tenth.* How would you describe the relationship?
- b. Using the table, find the height of a man whose shoe length is 11.6 inches. Circle this point on the scatterplot.
- c. The line  $y = 3.66x + 25.3$  might be used to describe the relationship between shoe length and height, where  $x$  represents shoe length and  $y$  represents height. Using the linear regression equation, find the predicted height of a man with a shoe length of 11.6. *Round to the nearest hundredth.*

**AIM: CALCULATING & INTERPRETING RESIDUALS**

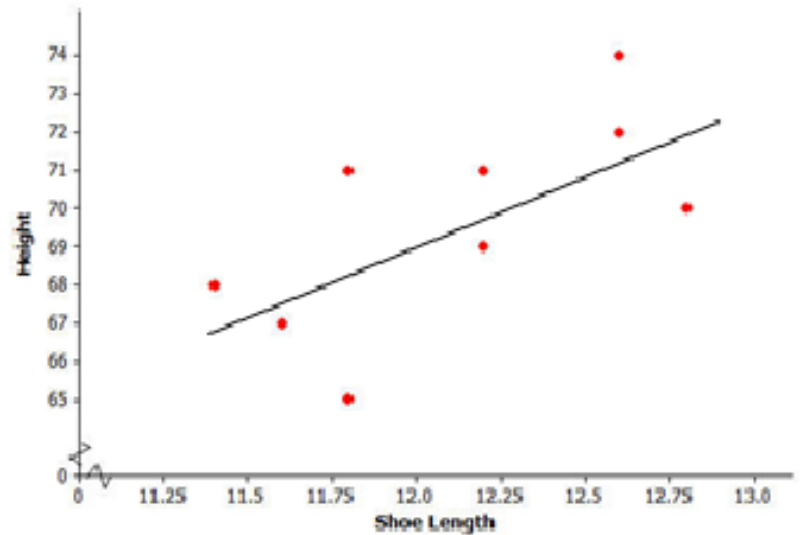
- d. Because his actual height was \_\_\_\_\_ inches, you can calculate the prediction error by subtracting the predicted value from the actual value. This prediction error is called a \_\_\_\_\_.

***Residual =***

- e. Calculate the residual whose shoe size is 11.6 inches. *Round to the nearest hundredth.*

1) For the line,  $y = 3.66x + 25.3$ , answer the following questions and then complete the table.

$x =$ Shoe Length	$y =$ Height	Predicted $y$ -value	Residual
12.6	74		
11.8	65		
12.2	71	69.95	1.05
11.6	67	67.76	-0.76
12.2	69	69.95	-0.95
11.4	68	67.02	0.98
12.8	70	72.15	-2.15
12.6	72	71.42	0.58
11.8	71	68.49	2.51



- Will the residual for the shoe size of 12.6 inches positive or negative? Explain your answer.
- Calculate the predicted height whose shoe size is 12.6 inches. *Round to the nearest hundredth.*
- Calculate the residual whose shoe size is 12.6 inches.
- Will the residual for the shoe size of 11.8 inches positive or negative? Explain your answer.
- Calculate the predicted height whose shoe size is 11.8 inches. *Round to the nearest hundredth.*
- Calculate the residual whose shoe size is 11.8 inches.

$x = \text{Shoe Length}$	$y = \text{Height}$	Predicted $y$ -value	Residual
12.6	74	71.42	2.58
11.8	65	<b>68.49</b>	-3.49
12.2	71	<b>69.95</b>	<b>1.05</b>
11.6	67	67.76	-0.76
12.2	69	69.95	-0.95
11.4	68	67.02	<b>0.98</b>
12.8	70	72.15	-2.15
12.6	72	71.42	0.58
11.8	71	68.49	2.51

- a. What is the sum of the residuals? \_\_\_\_\_
- b. Why did you get a number close to zero for this sum? Does this mean that all of the residuals were close to 0?
- c. If the residuals tend to be small, what does that say about the fit of the line to the data?
- d. Why are some residuals positive and some residuals negative?

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**UNIT 4****LESSON 9**

HW# \_\_\_\_\_

1. Fill in the formula to calculate the residual value:

RESIDUAL = \_\_\_\_\_ Value - \_\_\_\_\_ Value

2. The chart below shows the number of hours students studied for the CC regents and the grade they received.

# hours studied	Regents grade	Predicted grade	Residual
0	56	55.44	
2	58		
6	76		
8	84	80.08	
12	90	92.4	
14	98	98.56	

- A. The line of best fit for this data is  $y = 3.08x + 55.44$ . Using this line of best fit; find the two missing predicted grades. The work was started for one of the values. Show all work! *Round to the nearest hundredth.*

$y = 3.08x + 55.44$	$y = 3.08x + 55.44$
# hours studied = 2	# hours studied = 6
$y = 3.08 ( \quad ) + 55.44$	
$y =$	

- A. Fill in the residuals column.
- B. If a student studied for 5 hours, use the line of best fit equation to predict this students grade on the regents? *Round to the nearest hundredth.*
- C. If a student earned a 100% on the regents exam, use the line of best fit equation to predict how many hours would our line suggest they studied? *Round to the nearest integer.*