

# SOLUTIONS

AP Statistics  
Ch. 3 Review  
CW# \_\_\_\_\_

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

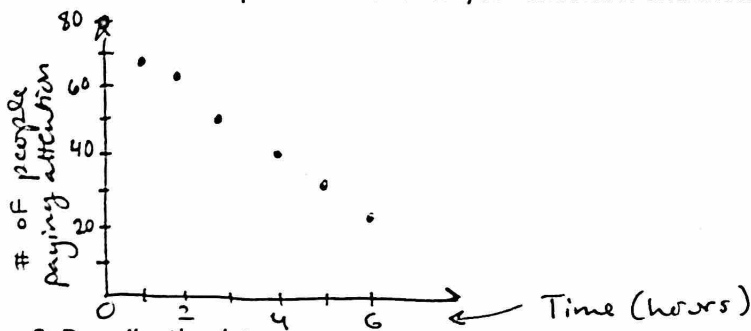
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## Chapter 3 Review Sheet

In my meeting yesterday, I noticed that the number of people paying attention to the training was declining throughout the day. I collected the following data:

Time (hours)	0	1	2	3	4	5	6
# people paying attention	80	68	62	50	48	32	21

1. Make a scatterplot of the data on your calculator and sketch it below.



$$\begin{aligned}\bar{x} &= 3 \\ s_x &= 2.16 \\ \bar{y} &= 51.6 \\ s_y &= 20.5 \\ r &= -.99\end{aligned}$$

2. Describe the data

The relationship btwn time in a training & # of people paying attention is strong, negative, and approximately linear with no outliers.

3. Find the line of best fit using the equations for a and b. Confirm that it matched with the calculator's line of best fit.

$$\hat{y} = a + bx$$

$$\begin{aligned}a &= \bar{y} - b\bar{x} = 51.6 - 3(-9.4) \\ &= 79.8\end{aligned}$$

$$b = r \frac{s_y}{s_x} = -.99 \frac{20.5}{2.16} = -9.4$$

$$\hat{y} = 79.8 - 9.4x$$

4. Make a prediction for the # of people paying attention at  $t = 2.5$  hours.

$$x = 2.5 \rightarrow \hat{y} = 79.8 - 9.4(2.5)$$

$$\hat{y} = 56.3$$

About 56 people are expected to

5. What is  $r$ ? Interpret.

$$r = -.99$$

be paying attention after 2.5 hours.

Since the relationship appears to be linear, this means the relationship is negative & very strong.

6. What is  $r^2$ ? Interpret.

$R^2 = .98$  meaning that about 98% of the variability in the # of people paying attention is explained by the LSR based on how many hours the training is lasting.

7. What is the slope of the LSRL? Interpret in the context of the problem.

slope  $-9.4$

For each additional hour the training lasts, the # of people paying attention is expected to decrease by 9.4.

8. What is the y-intercept of the LSRL? Interpret in the context of the problem.

y-int  $79.8$

For a training lasting zero hours, 79.8 people are expected to pay attention.

9. Identify the values a and b in the Minitab output:

Predictor	Coef	SE Coeff	T	P
Constant	79.75	5.34	3.41	0
Time	-9.393	4.23	-15.81	0

$S = 3.143$

$R\text{-Sq} = 98.0\%$

$R\text{-Sq (adj)} = 97.2\%$

St. Dev. of the residue

10. Interpret  $s = 3.143$  in the context of the problem.

The actual number of people paying attention typically varies from the predicted value by 3.143 people.

11. Find the residual for a time of 4 hours.

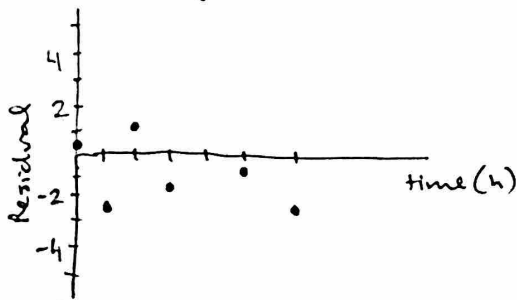
$$\hat{y} = 79.8 - 9.4(4)$$

$$\hat{y} = 42.2$$

Actual - predicted  
 $48 - 42.2 = 5.8$

About 5.8 more people are paying attention than expected.

12. Make a residual plot on your calculator. Sketch it below.



13. Mr. Bakri walked into the meeting at  $t = 7$  hours and all of a sudden 82 people were paying attention. Would this point be influential? Prove it.

Yes. Add this value to your lists.

Possible ways to prove it: Recalculate  $r^2$ , Recalculate LSRL.

& interpret how the values are different.