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INSTRUCTOR

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MS 3043 HW10 Simple Regression Statistics (Homework)

Current Score	Due Date
QUESTION 1 2 3 4 5	SAT, MAY 9, 2020 10:29 AM GMT+5:30
Assignment Submission & Scoring Assignment Submission For this assignment, you submit answers by question parts. The number of submissions remaining for each question part only changes if you submit or change the answer. Assignment Scoring Your best submission for each question part is used for your score.	

1.



PREVIOUS ANSWERS

MY NOTES

The following data were used in a regression study.

Observation	1	2	3	4	5	6	7	8	9
x_i	2	3	4	5	7	7	7	8	9
y_i	4	5	4	7	4	6	9	5	11

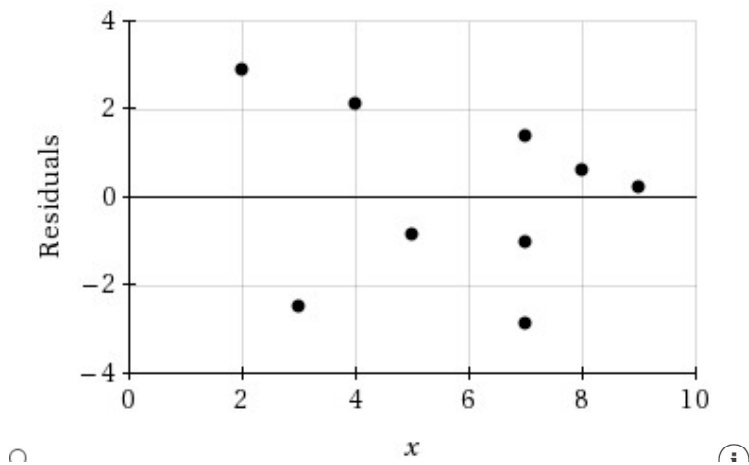
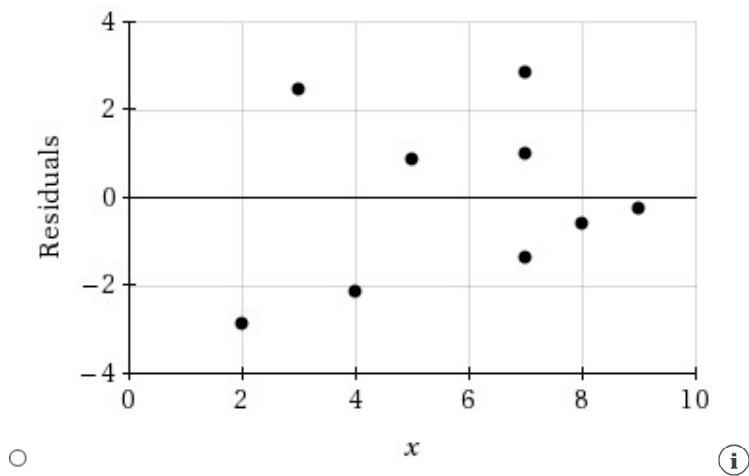
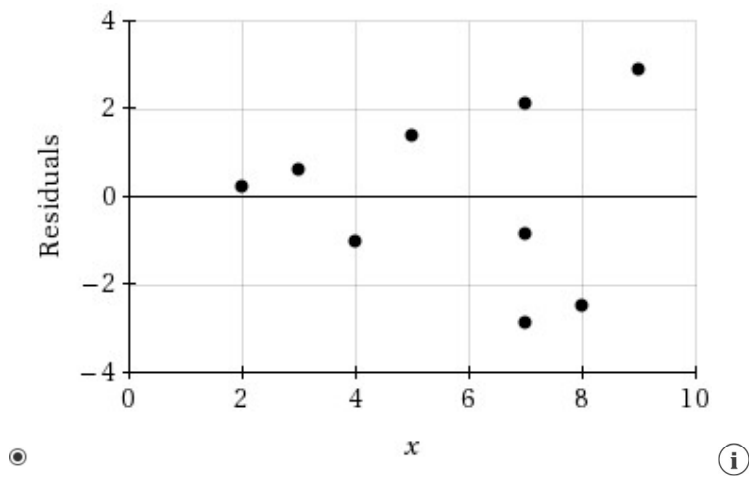
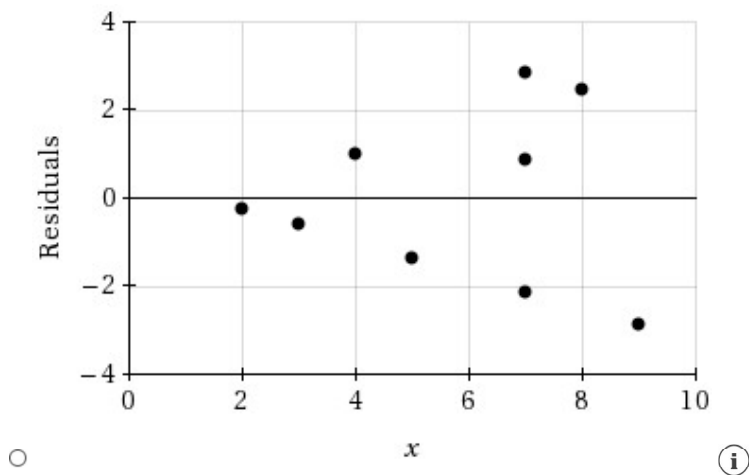
- (a) Develop an estimated regression equation for these data. (Round your numerical values to two decimal places.)

 $\hat{y} =$

2.53+0.62x



(b) Construct a plot of the residuals.



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A statistical program is recommended.

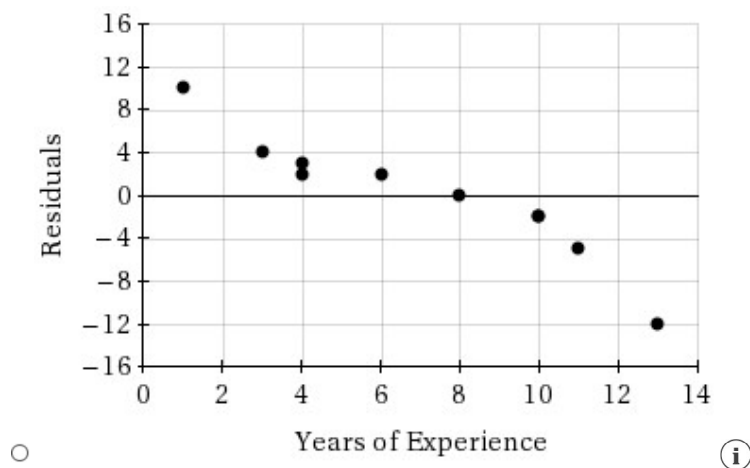
A sales manager collected the following data on x = years of experience and y = annual sales (\$1,000s). The estimated regression equation for these data is $\hat{y} = 81 + 4x$.

Salesperson	Years of Experience	Annual Sales (\$1,000s)
1	1	80
2	3	97
3	4	97
4	4	107
5	6	103
6	8	101
7	10	119
8	10	123
9	11	127
10	13	136

(a) Compute the residuals.

Years of Experience	Annual Sales (\$1,000s)	Residuals
1	80	-5 ✓
3	97	4 ✓
4	97	0 ✓
4	107	10 ✓
6	103	-2 ✓
8	101	-12 ✓
10	119	-2 ✓
10	123	2 ✓
11	127	2 ✓
13	136	3 ✓

Construct a residual plot.



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(b) Do the assumptions about the error terms seem reasonable in light of the residual plot?

- ☐ The plot suggests curvature in the residuals indicating that the error term assumptions appear reasonable.
- ☐ The plot suggests a funnel pattern in the residuals indicating that the error term assumptions do not appear reasonable.
- ☒ The plot suggests a generally horizontal band of residual points indicating that the error term assumptions appear reasonable.
- ☐ The plot suggests a funnel pattern in the residuals indicating that the error term assumptions appear reasonable.
- ☐ The plot suggests a generally horizontal band of residual points indicating that the error term assumptions do not appear reasonable.



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Consider the data.

x_i	1	2	3	4	5
y_i	4	8	6	10	12

The estimated regression equation for these data is $\hat{y} = 2.60 + 1.80x$.

- (a) Compute SSE, SST, and SSR using equations $SSE = \sum (y_i - \hat{y}_i)^2$, $SST = \sum (y_i - \bar{y})^2$, and $SSR = \sum (\hat{y}_i - \bar{y})^2$.

SSE = ✓

SST = ✓

SSR = ✓

- (b) Compute the coefficient of determination r^2 .

$r^2 =$ ✓

Comment on the goodness of fit. (For purposes of this exercise, consider a proportion large if it is at least 0.55.)

- ☒ The least squares line provided a good fit as a large proportion of the variability in y has been explained by the least squares line.
- ☐ The least squares line provided a good fit as a small proportion of the variability in y has been explained by the least squares line.
- ☐ The least squares line did not provide a good fit as a small proportion of the variability in y has been explained by the least squares line.
- ☐ The least squares line did not provide a good fit as a large proportion of the variability in y has been explained by the least squares line.



- (c) Compute the sample correlation coefficient. (Round your answer to three decimal places.)

✓

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The following data show the brand, price (\$), and the overall score for six stereo headphones that were tested by a certain magazine. The overall score is based on sound quality and effectiveness of ambient noise reduction. Scores range from 0 (lowest) to 100 (highest). The estimated regression equation for these data is $\hat{y} = 21.722 + 0.333x$, where x = price (\$) and y = overall score.

Brand	Price (\$)	Score
A	180	78
B	150	71
C	95	61
D	70	56
E	70	38
F	35	26

- (a) Compute SST, SSR, and SSE. (Round your answers to three decimal places.)

SST = ✓

SSR = ✓

SSE = ✓

- (b) Compute the coefficient of determination r^2 . (Round your answer to three decimal places.)

$r^2 =$ ✓

Comment on the goodness of fit. (For purposes of this exercise, consider a proportion large if it is at least 0.55.)

- ☐ The least squares line provided a good fit as a small proportion of the variability in y has been explained by the least squares line.
- ☐ The least squares line did not provide a good fit as a small proportion of the variability in y has been explained by the least squares line.
- ☐ The least squares line did not provide a good fit as a large proportion of the variability in y has been explained by the least squares line.
- ☒ The least squares line provided a good fit as a large proportion of the variability in y has been explained by the least squares line.



- (c) What is the value of the sample correlation coefficient? (Round your answer to three decimal places.)

✓

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DATAfile: [RacingBicycles](#)

Bicycling, the world's leading cycling magazine, reviews hundreds of bicycles throughout the year. Their "Road-Race" category contains reviews of bikes used by riders primarily interested in racing. One of the most important factors in selecting a bike for racing is the weight of the bike. The following data show the weight (pounds) and price (\$) for 10 racing bikes reviewed by the magazine.†

Brand	Weight	Price (\$)
FELT F5	17.8	2,100
PINARELLO Paris	16.1	6,250
ORBEA Orca GDR	14.9	8,370
EDDY MERCKX EMX-7	15.9	6,200
BH RC1 Ultegra	17.2	4,000
BH Ultralight 386	13.1	8,600
CERVELO S5 Team	16.2	6,000
GIANT TCR Advanced 2	17.1	2,580
WILIER TRIESTINA Gran Turismo	17.6	3,400
SPECIALIZED S-works Amira SL4	14.1	8,000

- (a) Use the data to develop an estimated regression equation that could be used to estimate the price for a bike given the weight. (Round your numerical values to the nearest integer).

 $\hat{y} =$

28574.10 - 1439.01x



- (b) Compute r^2 . (Round your answer to three decimal places.)

 $r^2 =$ 

Did the estimated regression equation provide a good fit?

- ☐ The estimated regression equation provided a good fit, since $r^2 < 0.55$.
☒ The estimated regression equation provided a good fit, since $r^2 \geq 0.55$.
☐ The estimated regression equation did not provide a good fit, since $r^2 < 0.55$.
☐ The estimated regression equation did not provide a good fit, since $r^2 \geq 0.55$.



- (c) Predict the price (in dollars) for a bike that weighs 14 pounds. (Round your answer to the nearest dollar.)

\$ 8428.012879 ✓

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Question 1 of 5

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