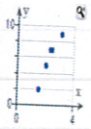
For the following data set, (a) Draw a scatter diagram, (b) by hand, compute the correlation coefficient, and (c) comment on the type of relation that appears to exist between x and y.

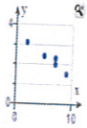
x	2	5	7	7	9
y	1.5	2.0	2.3	2.4	3.1

(a) Which of the following scatter diagrams corresponds to the given data?

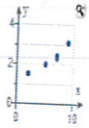
OA.



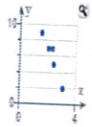
OB



OC.



OD



(b) $r \approx$ ☐

(Round to three decimal places as needed.)

(c) What type of relation appears to exist between x and y?

The linear correlation coefficient is close to ☐ so ☐ linear relation exists between x and y.

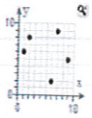
For the accompanying data set, (a) draw a scatter diagram of the data, (b) by hand, compute the correlation coefficient, and (c) determine whether there is a linear relation between x and y.

Click the icon to view the data set.

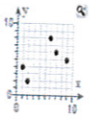
Click the icon to view the critical values table.

(a) Draw a scatter diagram of the data. Choose the correct graph below.

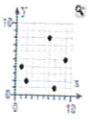
A.



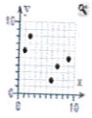
B.



C.



D.



(b) By hand, compute the correlation coefficient.

The correlation coefficient is $r =$ [ ]. (Round to three decimal places as needed.)

(c) Determine whether there is a linear relation between x and y.

Because the correlation coefficient is [ ] and the absolute value of the correlation coefficient, [ ], is [ ] than the critical value for this data set, [ ], [ ] linear relation exists between x and y. (Round to three decimal places as needed.)

#2

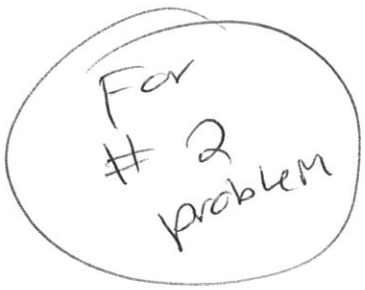
Data set

x	2	6	1	7	9
y	8	2	6	9	5

For #2 problem

Critical Values for Correlation Coefficient

n	
3	0.997
4	0.950
5	0.878
6	0.811
7	0.754
8	0.707
9	0.666
10	0.632
11	0.602
12	0.576
13	0.553
14	0.532
15	0.514
16	0.497
17	0.482
18	0.468
19	0.456
20	0.444
21	0.433
22	0.423
23	0.413
24	0.404
25	0.396
26	0.388
27	0.381
28	0.374
29	0.367
30	0.361



Will the following variables have positive correlation, negative correlation, or no correlation:

number of doctors on staff at a hospital and number of administrators on staff

Will these variables have positive correlation, negative correlation, or no correlation?

- ○ Positive
- ○ Negative
- ○ No correlation

#3

On an international exam, students are asked to respond to a variety of background questions. For the 41 nations that participated in the exam, the correlation between the percentage of items answered in the background questionnaire (used as a proxy for student task persistence) and mean score on the exam was 0.752. Does this suggest there is a linear relation between student task persistence and achievement score? Write a sentence that explains what this result might mean.

Click the icon to view the critical values table.

Does this suggest there is a linear relation between student task persistence and achievement score? Choose the best response below.

- A. Yes, since $|0.752|$ is less than the critical value for 30.
- B. No, since $|0.752|$ is less than the critical value for 30.
- C. No, since $|0.752|$ is greater than the critical value for 30.
- D. Yes, since $|0.752|$ is greater than the critical value for 30.

What does this result mean?

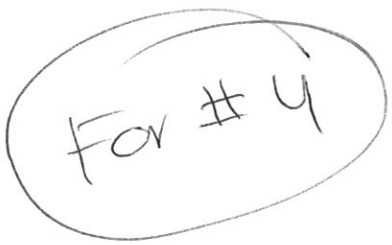
- A. Countries in which students answered a lesser percentage of items in the background questionnaire tended to have higher mean scores on the exam.
- B. There is no linear relation between countries in which students answered a greater percentage of items in the background questionnaire and higher mean scores on the exam.
- C. Countries in which students answered a greater percentage of items in the background questionnaire tended to have higher mean scores on the exam.
- D. Countries in which students cheated on the exam also cheated on the items in the background questionnaire.

#4

Data Table

Critical Values for Correlation Coefficient

n	
3	0.997
4	0.950
5	0.878
6	0.811
7	0.754
8	0.707
9	0.666
10	0.632
11	0.602
12	0.576
13	0.553
14	0.532
15	0.514
16	0.497
17	0.482
18	0.468
19	0.456
20	0.444
21	0.433
22	0.423
23	0.413
24	0.404
25	0.396
26	0.388
27	0.381
28	0.374
29	0.367
30	0.361



The linear correlation between violent crime rate and percentage of the population that has a cell phone is −0.918 for years since 1995. Do you believe that increasing the percentage of the population that has a cell phone will decrease the violent crime rate? What might be a lurking variable between percentage of the population with a cell phone and violent crime rate?

Will increasing the percentage of the population that has a cell phone decrease the violent crime rate? Choose the best option below.

- ○ Yes
- ○ No

What might be a lurking variable between percentage of the population with a cell phone and violent crime rate?

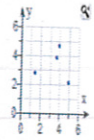
- ○A. the average cell phone's effectiveness as a weapon
- ○B. the police
- ○C. overall cell phone signal strength
- ○D. the economy

Consider the data on the right. (a) Draw a scatter diagram of the data and compute the linear correlation coefficient. (b) Draw a scatter diagram of the data and compute the linear correlation coefficient with the additional data point (10.4,9.3). Comment on the effect the additional data point has on the linear correlation coefficient. Explain why correlations should always be reported with scatter diagrams.

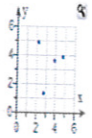
x	y
2.2	3.9
3.9	1.4
2.8	3.6
4.7	4.9

(a) Which of the following best represents the data?

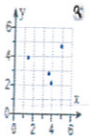
OA.



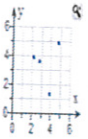
OB.



OC.



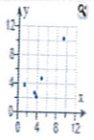
OD.



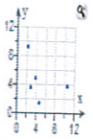
The linear correlation coefficient for the four pieces of data is ☐.
(Round to three decimal places as needed.)

(b) Draw a scatter diagram of the data with the additional data point (10.4,9.3).

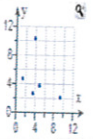
OA.



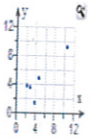
OB.



OC.



OD.



The linear correlation coefficient for the five pieces of data is ☐.
(Round to three decimal places as needed.)

#6

Comment on the effect the additional data point has on the linear correlation coefficient.

OA. The additional data point strengthens the appearence of a linear association between the data points.

OB. The additional data point weakens the appearence of a linear association between the data points.

OC. The additional data point does not effect the linear correlation coefficient.

Explain why correlations should always be reported with scatter diagrams.

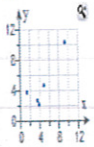
Consider the data on the right. (a) Draw a scatter diagram of the data and compute the linear correlation coefficient. (b) Draw a scatter diagram of the data and compute the linear correlation coefficient with the additional data point (10.4,9.3). Comment on the effect the additional data point has on the linear correlation coefficient. Explain why correlations should always be reported with scatter diagrams.

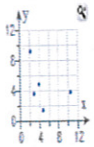
x	y
2.2	3.9
3.9	1.4
2.8	3.6
4.7	4.9

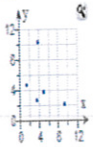


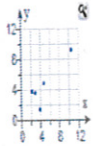

The linear correlation coefficient for the four pieces of data is ☐.
(Round to three decimal places as needed.)

(b) Draw a scatter diagram of the data with the additional data point (10.4,9.3).

○A.


○B.


○C.


○D.


The linear correlation coefficient for the five pieces of data is ☐.
(Round to three decimal places as needed.)

Comment on the effect the additional data point has on the linear correlation coefficient.

○A. The additional data point strengthens the appearence of a linear association between the data points.

○B. The additional data point weakens the appearence of a linear association between the data points.

○C. The additional data point does not effect the linear correlation coefficient.

Explain why correlations should always be reported with scatter diagrams.

○A. The scatter diagram is needed to see if the correlation coefficient is being affected by the presence of outliers.

○B. The scatter diagram can be used to distinguish between association and causation.

○C. The scatter diagram is needed to determine if the correlation is positive or negative.

#6 part 2

If the linear correlation between two variables is negative, what can be said about the slope of the regression line?

Choose the correct answer below.

- A. More information is needed
- B. Positive
- C. Negative

The scatter diagram for the data set below is shown.

(a) Given that $\bar{x} = 3.5, s_x = 2.1679483, \bar{y} = 3.633, s_y = 1.8970152$, and $r = -0.9628873$, determine the least-squares regression line.

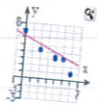
(b) Graph the least-squares regression line on the scatter diagram.

x	0	2	4	4	5	6
y	6.9	4.2	3.2	3.3	3.1	1.1

(a) $\hat{y} = \square x + \square$ (Round to four decimal places as needed.)

(b) Choose the correct graph of the least-squares regression line below.

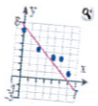
OA



OB.

OC

OD



#8

Consider the data set given in the accompanying table. Complete parts (a) through (c).

Click the icon to view the data table.

(a) Determine the least-squares regression line. Choose the correct answer below.

- A. The least-squares regression line is $y = 2.1x + 2.25$.
- B. The least-squares regression line is $y = 0.5x + 2.25$.
- C. The least-squares regression line is $y = 2.1x + 1.2$.
- D. The least-squares regression line is $y = 1.2x + 2.1$.

(b) Graph the least-squares regression line on the scatter diagram. Choose the correct graph below.

A.

B.

C.

D.

(c) Compute the sum of the squared residuals for the least-squares regression line found in part (a).

The sum of the squared residuals for the least-squares regression line is ☐.
(Type an integer or a decimal.)

#9

Data Table

x	−2	−1	0	1	2
y	−4	0	2	3	5

#9 Data table

A student at a junior college conducted a survey of 20 randomly selected full-time students to determine the relation between the number of hours of video game playing each week, x, and grade-point average, y. She found that a linear relation exists between the two variables. The least-squares regression line that describes this relation is $\hat{y} = -0.0561x + 2.9287$.

(a) Predict the grade-point average of a student who plays video games 8 hours per week.

The predicted grade-point average is ☐.
(Round to the nearest hundredth as needed.)

(b) Interpret the slope.

For each additional hour that a student spends playing video games in a week, the grade-point average will ☐ by ☐ points, on average.

(c) If appropriate, interpret the y-intercept.

- A. The grade-point average of a student who does not play video games is 2.9287.
- B. The average number of video games played in a week by students is 2.9287.
- C. It cannot be interpreted without more information.

(d) A student who plays video games 7 hours per week has a grade-point average of 2.63. Is the student's grade-point average above or below average among all students who play video games 7 hours per week?

The student's grade-point average is ☐ average for those who play video games 7 hours per week.

#10

The following data represent the living situation of newlyweds in a large metropolitan area and their annual household income. Find the marginal frequency for newlyweds who own their own home.

	< $20,000	$20 – 35,000	$35 – 50,000	$50 – 75,000	> $75,000
Own home	31	52	202	355	524
Rent home	67	65	52	23	11
Live w/ family	89	69	30	4	2

A. 31

B. 1,164

C. 202

D. 524

#17

The following data represent the living situation of newlyweds in a large metropolitan area and their annual household income. What percent of people who rent their home make between $35,000 and $50,000 per year? Round to the nearest thousandth of a percent.

	< $20,000	$20 – 35,000	$35 – 50,000	$50 – 75,000	> $75,000
Own home	31	52	202	355	524
Rent home	67	65	52	23	11
Live w/ family	89	69	30	4	2

A. 30.137%

B. 23.744%

C. 10.502%

D. 18.310%

#12

The following data represent the living situation of newlyweds in a large metropolitan area and their annual household income. Find the marginal frequency for newlyweds who make less than $20,000 per year.

	< $20,000	$20 - 35,000	$35 - 50,000	$50 - 75,000	> $75,000
Own home	31	52	202	355	524
Rent home	67	66	52	23	11
Live w/ family	89	69	30	4	2

A. 67

B. 31

C. 89

D. 187

#13

The following data represent the living situation of newlyweds in a large metropolitan area and their annual household income. What percent of people who rent their home make between $35,000 and $50,000 per year? Round to the nearest thousandth of a percent.

	< $20,000	$20 – 35,000	$35 – 50,000	$50 – 75,000	> $75,000
Own home	31	52	202	355	524
Rent home	67	66	52	23	11
Live w/ family	89	69	30	4	2

A. 30.137%

B. 18.310%

C. 23.744%

D. 10.502%

#14