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## Question: Q3.a. Consider that the life time of a particular brand of lapto...

Please answer Q4.

Q3 need solve for Q4c.

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with an average lifetime of 10 years. Again, assume that you have this particular brand of a laptop battery which is 7 years old and still functioning. Find the probability that your laptop battery will alive 8 more years. Explain the procedure or methodology that you have used to solve this problem. [2]

**Q3.b.** The thickness of a particular company's glass sheets, say company A, produced by a certain process are normally distributed with mean  $\mu = 5.0$  mm and variance  $\sigma^2 = 0.25$  mm. Suppose the thickness of another particular company's glass sheets, say company B, produced by a similar process are also normally distributed with mean  $\mu^* = 10$  mm and variance  $\sigma^{2*} = 0.25$  mm. Sketch roughly their pdfs in a single graph. What is the probability that a glass sheet produced by company A is thicker than 4.5 mm? [3]

**Q4. (a)** The SD of a particular type of 10-mg tablets is 1 mg, while the SD of another type of 50-mg tablets is 2 mg. Which type of tablets has more variability? Justify your answer. [2]

- (b) The table below shows the number of absences,  $x$ , in a Statistics course and the final exam grade,  $y$ , for 7 students. [2]

$x$	1	0	2	6	4	3	3
$y$	95	90	90	55	70	80	85

**Necessary calculations:** You may need to find the following quantities to answer the following questions:  $\sum_{i=1}^7 x_i = ?$ ,  $\sum_{i=1}^7 x_i^2 = ?$ ,  $\sum_{i=1}^7 y_i = ?$ ,  $\sum_{i=1}^7 y_i^2 = ?$ , and  $\sum_{i=1}^7 x_i y_i = ?$ .

- Draw a scatter diagram for the variables  $x$  and  $y$  and hence indicate what type of relationship exist between them.
  - Find the sample correlation coefficient and interpret your result.
- (c) Suggest a suitable statistical model to model the data given in question 3. For your suggested model do the followings: [2]
- Estimate the model parameters and interpret them.
  - Predict the final exam grad when number of absence  $x = 5$ .
- (d) The information below represents some summary statistics for MAT361, fall 2019, *students* in quiz 1 and quiz 2. [2]

Summary statistics	Quiz 1	Quiz 2
$Q_1$	6	9
$Q_2$	12	12
$Q_3$	16	16
(Lowest, Highest)	(2, 22)	(2, 22)

- Draw a box plots in a single graph for quiz 1 and quiz 2 using the above information.
- Explain how the students did in quiz 2 compared to quiz 1?

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## Expert Answer ⓘ



Anonymous answered this  
63 answers

Was this answer helpful?





Solution:-

Given data:-

Question 4:-

⇒ a) Type of tablets has more variability.

→ The table of 50mg has more variability because the standard deviation of 50-mg tablet is 2 mg which is more than 1 mg for 10-mg tablet. The standard deviation is a measure of variation, it describes the variation of the data point from the mean value.

b) The number of absences,  $x$ , in a statistics course and the final exam grade  $y$ , for 7 students.

Given information:-

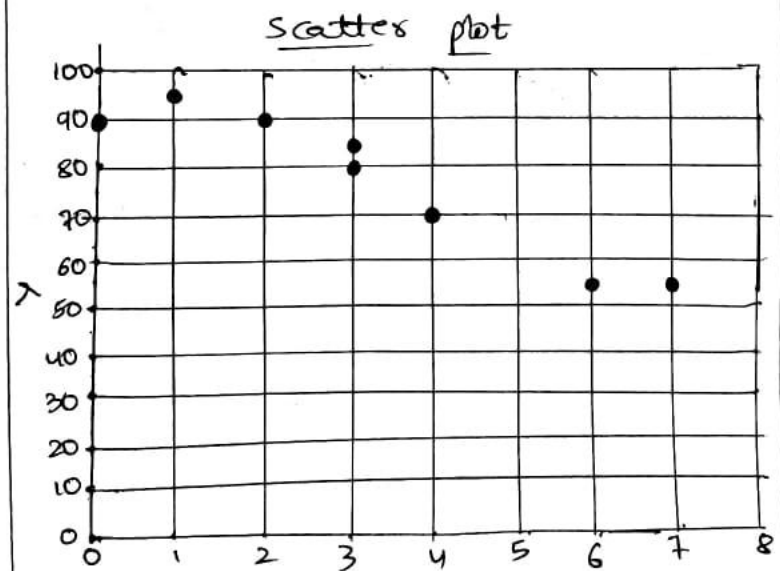
$x$	1	0	2	6	4	3	3
$y$	95	90	90	55	70	80	85

The required values are,

$x$	4	2	2	..
-----	---	---	---	----

0	90	0	8100	0
2	90	4	8100	180
6	55	36	3025	330
4	70	16	4900	280
3	80	9	6400	240
3	85	9	7225	255
7	54	49	2916	378
26	619	124	4969	1758

(i) a scatter diagram for  $x$  and  $y$  and type of relationship exist between them



more obtained scores per  
indicates a negative relationship  
between the variables.

ii) The sample correlation coefficient  
and interpret your result.

→ the sample correlation coefficient is

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{(n\sum x^2 - (\sum x)^2)(n\sum y^2 - (\sum y)^2)}}$$

$$r = \frac{8(1758) - (26)(619)}{\sqrt{(8(124) - (26)^2)(8(4969) - (619)^2)}}$$

$$r = -0.9527.$$

Interpretation: the correlation between  
the variables the number of  
absences,  $x$  and the final exam  
grade,  $y$  is  $-0.9527$  which indicates  
there is a negative linear and

Variables.

c) a suitable statistical model to model the data given question 3.

→ The model parameters can be obtained using excel as:

Summary output

Regression Statistics	
Multiple R.	0.953
R Square	0.908
Adjusted R Square	0.892
Standard Error	5.256
Observations	8.000

ANOVA

	df	SS	MS	F	Significance F
Regression	1.000	1630.103	1630.103	59.000	0.000
Residual	6.000	165.772	27.629		
Total	7.000	1795.875			

	Coefficient	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	98.253	3.293	29.840	0.000	90.196	106.310
x	-6.424	0.836	-7.681	0.000	-8.470	-4.378

The regression model is

$$\hat{y} = 98.253 - 6.424x$$

(i) the model parameters and interpret them

→ The intercept is 98.253 which is the value of final exam grade when the number of absence is zero.

→ The slope is -6.424 which indicates that with every unit change in the number of absences, the final exam grade will decrease by 6.424 units.

(ii) the final exam grade when number of absence  $x = 5$

→ the predicted final exam grade for  $x = 5$  is



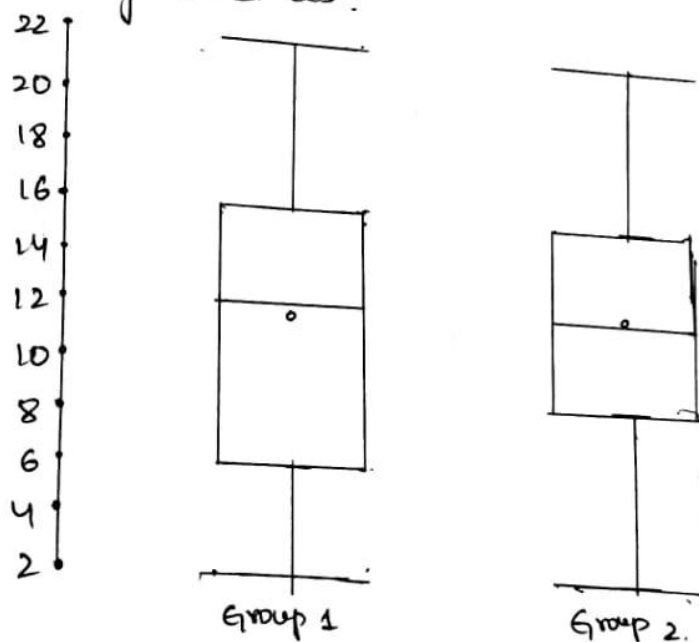
$$\bar{y} = 98.253 - 6.424(5)$$

$$\bar{y} = 98.253 - 32.14$$

$$\bar{y} = 66.113$$

d) (i) a box plots in a single graph for  
quiz 1 and quiz 2

⇒ The required box plot. is obtained.  
using excel as:



Group 1 :- Quiz 1.      Group 2 :- Quiz 2.

(ii) the students did in Quiz 2  
compared to quiz 1

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- the major difference between quiz 1 and quiz 2 is the value of first quartile, that is bottom 25% of the students in quiz 2 got 9 whereas in quiz 1 it is only 6.

Here I provided question 4 and question 4c.

If you have any doubts please comment  
Please like, thank you.

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