

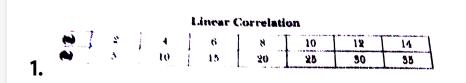


# **ECONOMICS**

# BOOKS - VK GLOBAL PUBLICATION ECONOMICS (HINGLISH)

# CORRELATION





Thus, for every change in variable (a) by 2 units

there is a change in variable (b) by 5 units.



2. The following tables gives height nad weight of the students of a class. Make a scattered diagram to show if the relationship is positive or negative and if the relationship is strong or weak.

Height (cm)	180	150	158	165	175	163	195	155	
Weight (kg)	65	54	55	65	60	54	63	50	



# 3. Calculate coefficient of correlation, given the

#### following data :





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#### 4. Calculate coefficient of correlation, between the

#### age of husbands and wives.

Age of Husband (Years)	21	22	28 -	32	35	36
Age of Wife (Years)	18	20	25	30	31	32

# 5. Calculate coefficient of correlation between the

# price and quantity supplied.

					and the second se
Price (₹)	4	6	8	15	20
Supply (kg)	10	15	20	25	30

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# 6. Calculated coefficient of correlation between

# the price and quantity demanded.

Price 🔻	5	10	15	20	25
Demand (kg)	<u>40</u>	35	30	25	20



accorded following ranks to the 10 participants :

 Judge X
 1
 2
 3
 4
 5
 6
 7
 8
 9
 10

 Judge Y
 10
 6
 5
 4
 7
 9
 8
 2
 1
 3

Calculate coefficient of rank correlation



**8.** In a Poetry Recitation Competition , 10 participants were accorded following marks by two different judges, X and Y :

X	15	17	14	13	11	12	16	18	10	9	
Y	15	12	1	6	7	9	3	10	2	5	

**9.** Calculate coefficient of rank correlation between the marks in Economics and Statistics, as indicated by answer books of each of the two examiners.

Marks in Statistics	15	10	20	28			16	
Marks in Economics	16	14			11	15		12



**10.** From the following data, compute the coefficient of correlation between X and Y series.

	1 - 1 - 1 - 1	X-Series	Y-Series
Number of Items		6	6
Arithmetic Mean		350	138
Squares of Deviations from Mean		19	94

Summation of product of deviations of X and Y

series from their respective arithmetic mean =41

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**11.** From the following table, calculate the coefficient of correlation by Karl Pearson's method:

 X
 6
 2
 10
 4
 8

 Y
 9
 11
 8
 7

Arithmetic means of X and Y series are 6 and 8

respectively.



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35 **45 44 42** 

12. From the data given below, find the number of items (N), r=0.5,  $\sum xy = 120$ , Standard Deviation of  $Y(\sigma_y) = 8$ ,  $\sum x^2 = 90$  where , x and y are deviations from arithmetic mean.

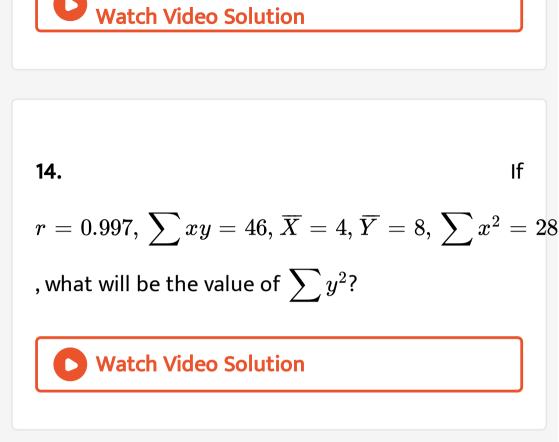
**13.** Find the coefficient of correlation from the following data: x = 10 12 18 16 15 19 18 17

48

47

Y

30



**15.** Two ladies were asked to rank 10 different types of cell phone . The rank given by them are given below.

Cell Phone	А	В	С	D	E	F	G	ніј
Neclu	1	6	3	9	5	2	7	10 8 4
Neena	6	8	3	7	2	1	5	9 4 10

#### Calculate Spearman's rank correlation coefficient



# 16. Calculate coefficient of correlation by means of

#### ranking method from the following data :

X	40	50	60	60	80 -	50-	70	60	
Y	80	120	160	170	130	200	210	130	



# 17. Calculate the coefficient of correlation using

Karl Pearson's formula of the series given below:

	x	10	12		15	23	1	20
n an an an an The Theorem States	Y	14	17	ti u	23	25		21



#### 18. Calculate coefficient of correlation from the

#### following data:

X	100	200	300	400	500	600
Y	110	120	135	140	160	165

**19.** Calculate Karl Pearson's coefficient of correlation between the values of X and Y for the following data:

X	78	89	96	69	59	79	68	61
Y	125	137	156	112	107	136	123	108

Assume 69 and 112 as the mean values for X and Y

respectively.

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**20.** From the following data, compute Karl Pearson coefficient of correlation :

	X-Series	<b>Y-Series</b>
Number of liens	7	7
Arithmetic Mean	4	8
Sum of Squares of Deviations from Arithmetic Mean	28	76

Summation of product of deviation of X and Y

series from their respective means is 46

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21. If 
$$r=0.25,\ \sum xy=45, \sigma_y=3,\ \sum x^2=50$$
,

where x and y denote deviation from their

respective means, find the number of items.

# 22. The rank of 8 same students in tests in

#### Mathematics and Statistics were as follows :

**Rank in Mathematics** 1 2 3 4 5 6 7 8 4 2 1 6 8 **Rank in Statistics** - 3 5 7

#### Calculate the coefficient of rank correlation.



#### 23. Find out coefficient of rank correlation

between X and Y



**24.** The rank correlation coefficient between marks obtained by 10 students in English and Statistics was found to be 0.5. Find the sum of squares of different of ranks.

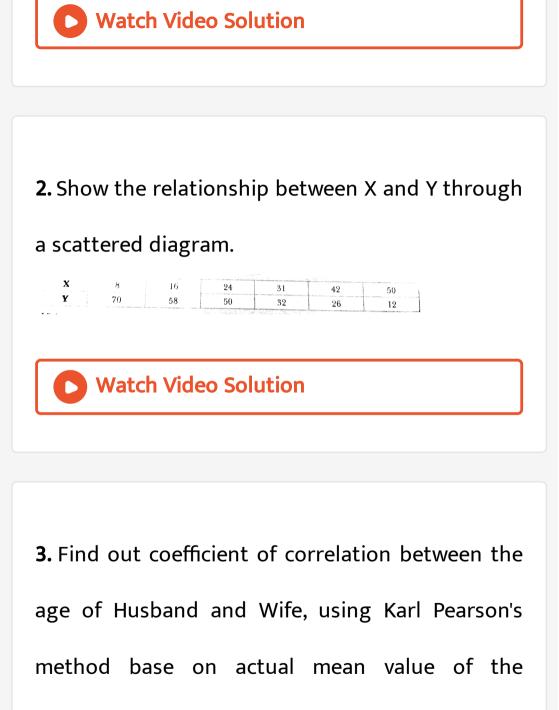


Learning By Doing

1. Explain the relation between price and quantity

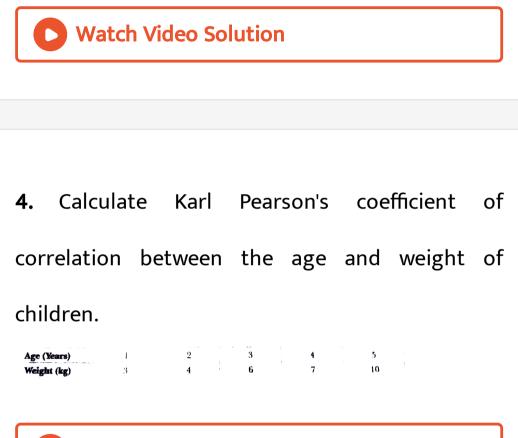
supplied through a scattered diagram

Price (7)					an is an	
• • • • • • • • • • • • • • • • • • •	10	20	30	40	50	60
Quantity Supplied	25	50	75	100	105	which induces, the lange of a grant set of
and the second sec			15	100	125	150



# following series:

Age of Husband	20	23	÷	27		31	1	35	38	40	42	
Age of Wife	18	20		24	Ì	30		32	34	36	58	



# 5. Caculate coefficient of rank correlation, given

# the following data set:

x	20	11	72	65	43	29	50
Y	60	63	26	35	43	51	

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# **Objective Type Questions**

**1.** When two variables change in the same direction, then such a collection is called :

A. negative

B. positive

C. no correlation

D. all of above

Answer: B



2. When the relation of three or more variables is

studied simultaneously, it is called :

A. siple correlation

B. partial correlation

C. multiple correlation

D. none of above

#### Answer: C



# 3. Relation between price and demand is :

A. positive

B. negative

C. one to one

D. no relationship

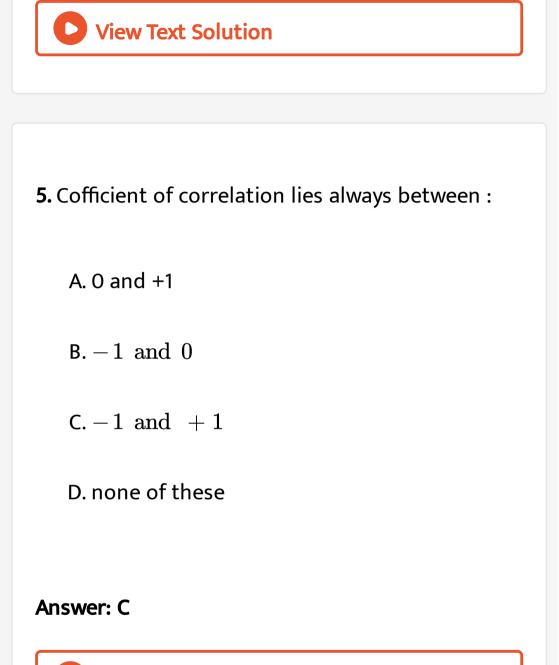
Answer: B



4. When cofficient of correlation lies between+0.25 and +0.75, it is called :

- A. perfect degree of correlation
- B. high degree of correlation
- C. moderate degree of correlation
- D. low degree of correlation

Answer: C



6. Rank colleration is a superior method of

analysis in case of \_\_\_\_\_ distribution .

A. qualitative

B. quantitative

C. frequency

D. none of these

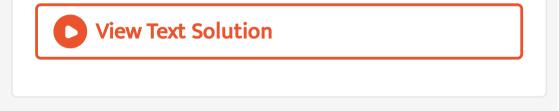
**Answer: A** 



7. Which of the following equations is correct ?

$$\begin{array}{l} \text{A. } r_k = 1 - \frac{6 \sum D^2}{N} \\ \text{B. } r_k = 1 - \frac{6 \sum D^2}{N^2 - N} \\ \text{C. } r_k = 1 - \frac{6 \sum D^2}{N^3 - N} \\ \text{D. } r_k = 1 - \frac{6 \sum D^2}{N^4 - N} \end{array}$$

#### Answer: C



**8.** Formula of Karl pearson's cofficient of colleration is :

A. 
$$rac{N\sigma_x\sigma_y}{N^3-N}$$

B. 
$$rac{\sum xy}{N\sigma_x\sigma_y}$$
  
C.  $rac{\sigma_x\sigma_y}{N^3-N}$   
D.  $rac{\sum xy}{\sigma_x\sigma_y}$ 

#### Answer: B

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**9.** Whien two variables change in a constant proportion, it is called :

A. linear correlation

B. non-linear correlation

C. partial correlation

D. none of these

#### Answer: A

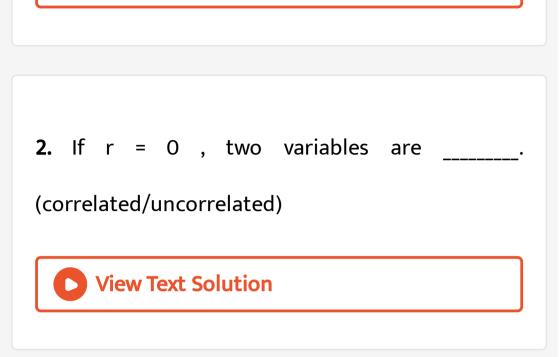
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# Choose Apporpiate Word And Fill In The Blank

#### 1. Correlation is a statistical technique that

measures \_\_\_\_\_ relationship between

different variables. (quantitative/qualitative)



**3.** \_\_\_\_\_\_offers a graphic expression of the

direction and degree of correlation. (scattered

diagram /Rank correlation)

4. In the step-deviation method of estimating

standard deviation, deviations are taken from the

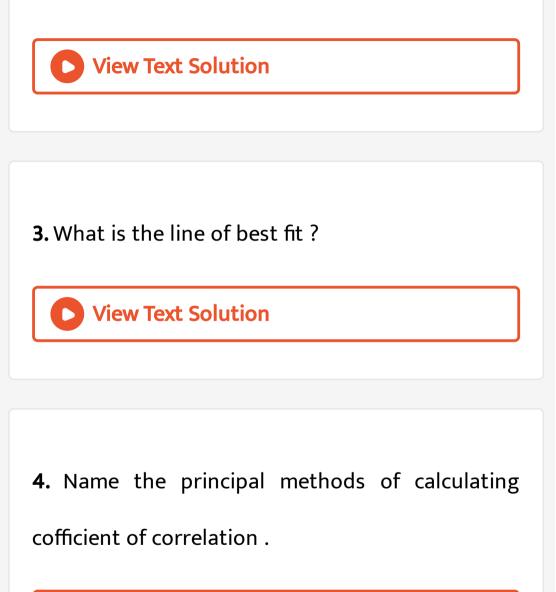
\_ (actual average/assumed average)



#### **Concept Based Objective Questions**

**1.** Define correlation .

2. Define partial correlation .



5. What is the difference between positive and

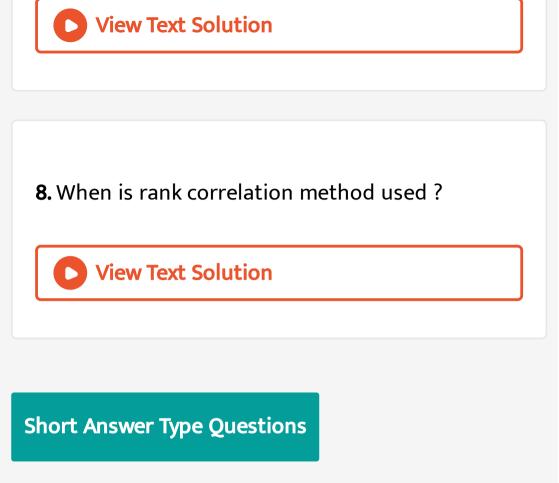
negative correlation .



**6.** What is the nature of correlation of two variables , when they move in the same direction ?

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7. Cofficient of correlation is between -1 and +1.How would you express it arithmetically ?



# **1.** IMPORTANCE OR SIGNIFICANCE OF CORRELATION

2. Describe the various degrees of correlation .

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3. What are the different methods of finding
correlation ?
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4. Explain the various kinds of correlation .



5. Explain the scattered diagram method of correlation.
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6. Describe Karl Pearson's method of calculating

cofficient of correlation.

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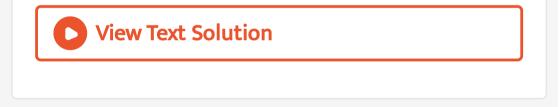
7. State the properties of correlation cofficient.



8. Describe Spearman's rank difference method.



9. State the merits of rank correlation cofficient .



**10.** What kind of relationship between X and Y is indicated , if the points of the scattered diagram tend to cluster about

(i) a straight line parallel to the X-axis

(ii) a straight line parallel to the Y-axis

(iii) a straight line sloping upward ,and

(iv) straight line sloping downward ?

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# Long Answer Type Questions

1. Define correlation . Give its importance in

statistics .

2. What is maent by correlation ? Explain its various kinds.
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**3.** Discuss Karl Pearson's method of calculating cofficient of correlation. Give its merits and limitations .



**4.** Discuss Spearman's method of calculating cofficient of correlation. Give its merits and limitations.



**5.** Explain the concept of correlation .what is the basic difference between :(i) Linear and non-linear correlation, and (ii) positive and negative correlation .



**6.** (i)How is Karl Pearson's cofficient of correlation difened ?

(ii) What are the limits of the correlation cofficient

r ?

If r = +1 in one situation and r = -1 in the other,

what kind of relationship exists between the variables X and Y ?

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7. (i) Define Spearman's rank correlation  $(r_k)$ .

(ii) What are limits of  $r_k$  ?

(iii) If the values of X and Y have been ranked and

we complete correlation between ranks of X and Y

, will this correlation be equal to the value of  $r_k$  ?

B.

A.

D.

C.

#### **Answer:**



**Essential Practicals** 

## 1. Make a scattered diagram of the given below.

Does any relationship exist between the two?

 X
 4
 5
 6
 7
 8
 9
 10
 11
 12
 13
 14
 15

 Y
 78
 72
 66
 60
 54
 48
 42
 36
 30
 24
 18
 12

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## 2. Calculate cofficient of correlation of the age of

#### husband and wife using Karl Person's method.

Husband (Age)	23	27	28	29	30	31	33	35	86	
Wife (Age)	18	20	22	27	29	27	29	28	29	1

## 3. Calculate correlation of the following data

#### using Karl Pearson's method:

Series A 112	114	108 124	145	150	119	125	147	150	
Series B 200	190	214 187	170	170	210	190	180	181	



# **4.** Using assumed average in Karl Pearson's formula , calculate cofficient of correlation , given

the following data:

X		89	97	69	59	79	68	61
	125	137	156	112	107	106	123	138



## 5. Find out Karl Pearson's cofficient of correlation :

Capital Units (in '000)	10	20	30	1	40	50	60	70	80	90	100
Profit Receipt	2	4	8		5	10	15	14	20	22	30



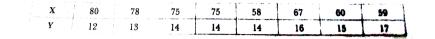
**6.** Seven students of a class secured following marks in economics and history . Calculate cofficient of correlation with the help of these

#### data:

Economics	66	90	89	55	58	44	42
History	58	76	65	58	53	49	56



#### 7. Find out rank difference of X and Y:



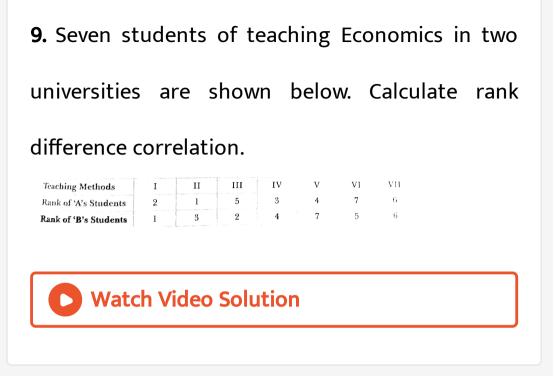
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8. Calculate cofficient of correlation of the

following data with rank difference and Karl

#### Pearson's method:

Economics (Marks)	77	54	27	52	14	35	90	25	56	<b>6</b> 0
Hindi (Marks)	35	58	60	46	50	40	35	56	44	42



10. Give three xamples of perfect correlation. Find

out rank difference cofficient of correlation with

the help of the following data:

x	48	33	40	9	16	65	26	15	57	
Ŷ	13	13	22	6	14	20	20 9	6	15	



## 11. Calculate cofficient of correlation of the

#### following data :

		,			1		and the second second second	
x	10	6	9	10	12	13	11	9
Y	9	4	6	9	11	13	8	4

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12. Deviation of two series X and Y are shown .

Calculate coefficient of correlation .

13. In a baby competition, two judges accorded following ranks to 12 compititors . Find the coefficient of rank correlation.  $\frac{kmy}{judge Y} = \frac{A}{12} = \frac{B}{2} = \frac{C}{3} = \frac{B}{4} = \frac{E}{5} = \frac{F}{6} = \frac{C}{7} = \frac{H}{4} = \frac{1}{7} = \frac{J}{10} = \frac{K}{11} = \frac{L}{12}$ Watch Video Solution

**14.** In a Fancy - dress competition, two judges

accorded the following ranks to eight participants



Calculate coefficient of rank correlation.





## 15. In a beauty contest , three judges accorded

following ranks to 10 participants:

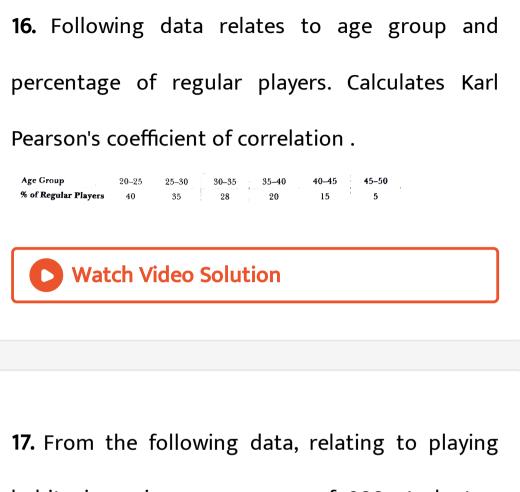
Judge I	1	6	5	10	3	2	4	9	7	8
Judge II	3	5	8	4	7			1	6	9
Judge III	6	4	9	8	1		3	10	5	7

Find out by Spearman's Rank Difference Method

which pair of judges has a common taste in

respect of beauty.





habits in various age group of 900 students .

Calculate cor=efficient of correlation between age

## group and playing habits:

Age Group	15-16	16–17	17-18	18-19	19-20	20 - 21
Number of Students	250	200	150	120	100	80
<b>Regular Players</b>	200	150	90	48	30	12



**18.** Following data relates to density of population , number of deaths and population of various cities. Calculate death rate and Karl Pearson coefficient between density of population and

#### death rate:

Cities	Р	Q	R	S	Т	U
<b>Density of Population</b>	200	500	700	500	600	900
Number of Deaths	840	300	312	560	1,440	1,224
Population	<b>42,00</b> 0	30,000	24,000	40,000	90,000	72,000



#### 19. From the following information, determine

coefficient of correlation between X and Y series.

	X-Series	<b>Y-Series</b>
Number of Items	15	15
Mean	25	18
SD	3.01	3.03
Sum of Squares of deviation from Mean	136	138
Sum of product of deviations of X and Y from their respective Means	]	22



#### 20. From the following data, determine Karl

Pearson's coefficient of correlation between X and

#### Y series for 15 pairs .

	X-Series	Y-Series
Mean	80	120
Sum of Squares of deviation from Arithmetic Mean	56	156
Sum of product of deviations of X and Y from their respective Means	92	





Ncert Questions With Hints To Answers

1. Can r lies outside the -1 and 1 range depending

on the type of data ?

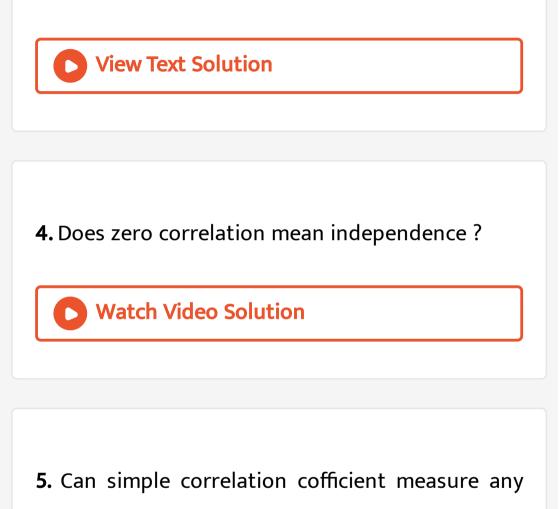
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**2.** Does correlation imply causation ? ,No.

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3. When is rank correlation more precise than

simple correlation cofficient ?



type of relationship ?

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**6.** Interpret the value of r as 1, -1 and 0.

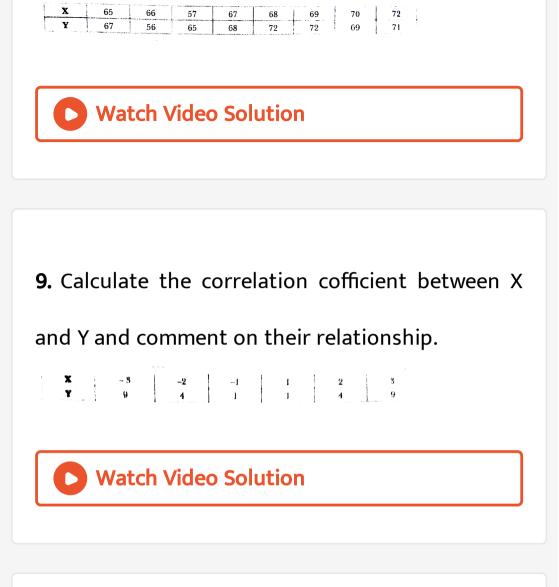


7. Why does rank correlation cofficient differ from

Pearsonian correlation cofficient ?

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**8.** Calculate the correlation cofficient between the heights of Fathers in inches (X) and their sons (Y).



**10.** Calculate the correlation cofficient beteen X and Y and comment on their relationship .

