



# **Inferential statistics**

## **Section No. (4)**

### **Chapter (3): Correlation Coefficient**

**FACULTY OF COMMERCE**

**Presented by**

**Ghidaa abobakr Hamouda**

Assistant Lecturer in Department of  
Insurance, Statistics and Mathematics

### Choose the correct answer

- In a study of the relationship between the grade of 8 students in statistics and accounting, the following data was obtained. Using a 95% confidence level, can we conclude that there is positive correlation in the population?

statistics	C	E	B	A	C	C	A	D
accounting	D	F	C	A	B	C	B	D

- 1) The appropriate correlation coefficient between two variables

a) Cramer	<b>b) spearman</b>	c) chi-square	d) Pearson
-----------	--------------------	---------------	------------

- 2) The correlation coefficient between two variables =

$$r_s = 1 - \frac{6 \sum_{i=1}^n d^2}{n(n^2 - 1)} = 0.85$$

a) 0.08	b) 0.87	c) 0.97	<b>d) 0.85</b>
---------	---------	---------	----------------

- 3) The direction and strength of the relation between two variables

a) positive weak	<b>b) positive strong</b>	c) negative weak	d) negative strong
------------------	---------------------------	------------------	--------------------

- 4) Scatter plot between two variables

<b>a) Monotonically increasing</b>	b) Monotonically decreasing	Not monotonic
------------------------------------	-----------------------------	---------------

- 5) State the null and alternate hypothesis

H0: $\rho_s = 0$	H0: $\rho_s \neq 0$	<b>H0: <math>\rho_s \leq 0</math></b>	H0: $\rho_s \geq 0$
H1: $\rho_s \neq 0$	H1: $\rho_s = 0$	<b>H1: <math>\rho_s &gt; 0</math></b>	H1: $\rho_s < 0$

- 6) Choose the appropriate test to test Is the correlation coefficient is significantly different from zero

<b>a) t-distribution</b>	b) chi-square	c) F-distribution	d) Z-distribution
--------------------------	---------------	-------------------	-------------------

- 7) The hypothesis is...

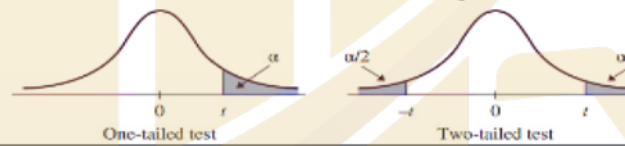
<b>a) One- Tailed</b>	<b>b) Two-Tailed</b>	c) Zero	d) mean
-----------------------	----------------------	---------	---------

- 8) The value of the test statistics

$$t = \frac{r_s \sqrt{n-2}}{\sqrt{1-r_s^2}} = \frac{0.85 \cdot \sqrt{6}}{\sqrt{1-0.7225}} = 3.95$$

a) 0.095	b) 0.5	c) 0.95	<b>d) 3.95</b>
----------	--------	---------	----------------

9) The critical value is  
(t-distribution table) جدول توزيع  $t$



Degree of Freedom (df)	Confidence Intervals					
	0.20	0.10	0.05	0.02	0.01	0.001
	Level of significance for One-Tailed Test (Alpha)					
	0.10	0.05	0.02	0.01	0.001	0.0005
(df)	Level of significance for Two-Tailed Test (Alpha)					
	0.20	0.10	0.05	0.02	0.01	0.001
1	3.0777	6.3138	12.7062	31.8205	63.6567	636.6192
2	1.8856	2.9200	4.3027	6.9646	9.9248	31.5991
3	1.6377	2.3534	3.1824	4.5407	5.8409	12.9240
4	1.5332	2.1318	2.7764	3.7469	4.6041	8.6103
5	1.4759	2.0150	2.5706	3.3649	4.0321	6.8688
6	1.4398	1.9432	2.4469	3.1427	3.7074	5.9588

$$t_{(\alpha, n-2)} = t_{(0.05, 6)} = 1.94$$

a) 0.095      b) 0.5      c) 0.95      d) 1.94

10) The decision rule is

a) correlation is significant	b) don't reject $H_0$	c) correlation is insignificant	d) reject $H_1$
-------------------------------	-----------------------	---------------------------------	-----------------

- A sample of 6 children was selected, data about their age (in years) and weight (in kilograms) was recorded as shown in the following table. Data don't follow normal distribution. can we conclude that the correlation in the population is less than zero?

Correlations			
		age	weight
Spearman's rho	age		
	Correlation Coefficient	1.000	.882**
	Sig. (1-tailed)	.	.010
	N	6	6
	weight		
	Correlation Coefficient	.882**	1.000
	Sig. (1-tailed)	.010	.
	N	6	6

\*\* . Correlation is significant at the 0.01 level (1-tailed).

11) The appropriate correlation coefficient between two variables

a) Cramer      b) spearman      c) chi-square      d) Pearson

12) The correlation coefficient between two variables =

a) 0.08	b) - 0.97	c) 0.97	d) <b>0.882</b>
---------	-----------	---------	-----------------

13) The direction and strength of the relation between two variables

a) positive weak	b) <b>positive strong</b>	c) negative weak	d) negative strong
------------------	---------------------------	------------------	--------------------

14) State the null and alternate hypothesis

H0 : $\rho_s = 0$ H1 : $\rho_s \neq 0$	H0 : $\rho_s \neq 0$ H1 : $\rho_s = 0$	H0 : $\rho_s \leq 0$ H1 : $\rho_s > 0$	H0 : $\rho_s \geq 0$ H1 : $\rho_s < 0$
---	---	---	---

15) Choose the appropriate test to test Is the correlation coefficient is significantly different from zero

a) <b>t-distribution</b>	b) chi-square	c) F-distribution	d) Z-distribution
--------------------------	---------------	-------------------	-------------------

16) The hypothesis is...

a) <b>One- Tailed</b>	b) Two-Tailed	c) Zero	d) mean
-----------------------	---------------	---------	---------

17) The p-value is

a) 0.095	b) <b>0.5</b>	c) 0.95	d) <b>0.01</b>
----------	---------------	---------	----------------

18) The decision rule is

p-value  $\leq$  0.01

a) <b>correlation is significant</b>	b) don't reject H0	c) correlation is insignificant	d) reject H1
--------------------------------------	--------------------	---------------------------------	--------------