السؤال الأول: في المثال التالي تم سؤال عشرة موظفين من النساء والرجال في شركة ما عن المؤهل العلمي وعدد سنوات الخبرة والراتب الحالي، نصنف البيانات باستخدام المتغير ات التالية ثم نقوم بإدخالها

الجنس:

Male: 1 female: 2

المؤهل الدر اسي:

master's degree: 2

Bachelor's degree: 1

الخبرة:

greater than 5:3

between 5 and 10:2

Less than 5: 1

الراتب:

ta						
File	Edit	<u>V</u> iew <u>D</u> ata	Transform	Analyze D	irect <u>M</u> arketing	Graphs
2				*		<u>ا</u> ۲
11:s	alary					
		gender	edulevel	experince	salary	var
1	1	1.00	1.00	1.00	500.00	
	2	2.00	1.00	2.00	450.00	
	3	1.00	1.00	1.00	440.00	
	4	2.00	1.00	3.00	500.00	
	5	1.00	2.00	2.00	570.00	
	6	2.00	2.00	3.00	550.00	
	7	2.00	2.00	2.00	490.00	
	8	2.00	2.00	3.00	540.00	
	9	1.00	2.00	2.00	600.00	
1	10	1.00	2.00	3.00	650.00	
1	11					
1	12					

						of intered (Spare	raciol - Iow acaa a	ratous para e	Uncon		
Edit	View Data	<u>T</u> ransform	<u>A</u> nalyze D)irect <u>M</u> arketing	<u>G</u> raphs <u>U</u>	tilities Add-on	is <u>W</u> indow	Help			
			- E		P H				H 🕢 🎙	AB6	
	Name	Туре	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
Ŕ	gender	Numeric	8	2		{1.00, male}	None	8	🗃 Right	Unknown	> Input
2	edulevel	Numeric	8	2		{1.00, bach	None	8	Right	Unknown	Y Input
3	experince	Numeric	8	2		{1.00, less t	None	8	疆 Right	Unknown	Y Input
L I	salary	Numeric	8	2		None	None	8	🗃 Right	Unknown	S Input
5											
		Edit View Data Name gender edulevel salary	Edt View Data Transform	Edt View Data Transform Analyze D Name Type Width gender Numeric 8 edulevel Numeric 8 experince Numeric 8 salary Numeric 8	Eot View Data Transform Analyze Direct Marketing Marketing Constraints gender Numeric 8 2 edulevel Numeric 8 2 edulevel Numeric 8 2 salary Numeric 8 2	Edit View Data Transform Analyce Direct Marketing Graphic Image: State Stat	Edit View Data Transform Analyze Direct Harketing Graphs Utilities Addign Market Marke	Edi View Data Transform Analyce Direct Warteling Graphs Utilities Add-gns Window	Edit View Data Transform Analyze Direct Harketing Graphs Willes Add-gins Window Help Name Type Width Decimals Label Values Missing Columns gender Numeric 8 2 (100, bach None 8 deduevel Numeric 8 2 (100, bach None 8 sealary Numeric 8 2 None None 8	Edit Yiew Data Transform Analyce Direct Marketing Graphs Wittee Add-gens Window Help Image: State	Edt View Data Transform Analyze Direct Marketing Graphs Utilities Addigns Window Help Market Market Marketing Graphs Utilities Addigns Window Help Market Market

2						*Untitle:	d1 [DataSet0] - IBM	SPSS Statistics	Data Editor						-	٥
ile <u>E</u> dit	<u>V</u> iew <u>D</u> ata	Transform	Analyze Direct	t <u>M</u> arketing	<u>G</u> raphs <u>L</u>	Julities /	Add- <u>o</u> ns <u>W</u> in	dow <u>H</u> elp								
2.			⊐ 🖺 🎍		Ľ #1	*	¥ 📑	£ ∎	1e	ð 🍤	ABC					
1 : salary															Visible: 4 of 4	Variat
	gender	edulevel	experince	salary	var	var	var	var	var	var	var	var	var	var	var	
1	1.00	1.00	0 1.00	500.00	8		Frequencie	s: Statistics			4					
2	2.00	1.00	0 2.00	450.00	-Derestile	Values		Cart	tal Tandan		1					_
3	1.00	1.00	0 1.00	440.00	Percentile	values		Cent	rai rendeni	Ŋ	L					
4	2.00	1.00	3.00	500.00	Cut noi	nte for 10	equal grou		ledian		L					
6	2.00	2.00	0 2.00 N 3.00	570.00	Percent	file(s):	equal gro	νμο	lode		L					+
7	2.00	2.00	0 3.00 0 2.00	490.00				_ √ s	um							
8	2.00	2.00	0 3.00	540.00												
9	1.00	2.00	0 2.00	600.00												+
10	1.00	2.00	0 3.00	650.00	Remo	we										
11																
12						_		E Va	lues are gr	oup midpoints						
13					Dispersion	1		Distr	ibution							
14					Std. der	viation 👿 I	linimum	√ S	kewness			_				
15				_	Variance	e 🚺	/laximum	√ <u>K</u>	urtosis		-			_	_	+
17					Range		s. <u>E</u> . mean						_			
18							Cantinue	icel Helj	p							
19				_												+
20																
21																
	1						Location and the					annina a	_	_	-	
	Vew Data 1	Transform	nalve Direct Marke	tina Granh	tionur tionur	edi (DataSet)	EM SPSS Statistic	s Deta Editor	_	_	_	_		• • • •	I BNG	10:1 "¶\•1
- (-)			Reads	ang <u>G</u> rapis			Million Det			40.0					_	
3 6	ΞЩ	5	Descriptive Statistic	3	The France		7 44 🔛	14		-0						
: salary			Tables	•	Dascri	niuco							Visi	ble: 4 of 4 Variabl	es	
	gender	edulevel	Compare Means	•	A Emiore	poves	var	var	var	Var	var	var	var	var		
1	1.00	1.00	General Linear Mod	iel)	Crosset	aho									4	
2	2.00	1.00	Generalized Linear	Models)	TURE	Analysis										
3	1.00	1.00	Mixed Models)	Ratio	anaijona.										
4	2.00	2.00	Correlate	,	P.P.P.	nte										
6	2.00	2.00	Regression	,	S 0.0 PL	ots	H									
7	2.00	2.00	Loglinear	,	<u>w</u> uri	***	-									
8	2.00	2.00	Classife													
9	1.00	2.00	Dimension Reduction	ion 🕨												
10	1.00	2.00	Scale												1	
11			Nonparametric Test	ts)	,											
12			Forecasting	•												
15			Survival	•												
14			Nultiple Response	•												
16			Missing Value Analy	(sis			-									
17			Multiple Imputation	•												
18			Complex Samples	•												
19		Ę	Simulation													
20			Quality Control)												
21		1	ROC Curve												Ŧ	
	1										1000			•		
ata View V	/ariable View															
and a second second										011 0000 01	in Dener	an la sea at	Unio 1	01		
equencies	A	N _8			i				ĺ	BM SPSS Statis	tics Process	or is ready	Unicode	ON 012		

استخدام الخيار Frequencies لحساب المقاييس الإحصائية والجداول التكرارية

ta							tHotitler	1 [DataSat0] - IR	M CDCC Statistics	Data Editor						-	T ×
File Edit	View	Data	Transform	Analyze D	irect Marketing	Graphs L	Jtilities A	dd-ons Wi	ndow Help	Data Eultor							_
(<u>)</u>				N		P #1	*	2	4	(1ର୍କ		ABC					
11 : salary															Vis	sible: 4 of 4 V	ariables
	ger	nder	edulevel	experince	salary	var	var	var	var	var	var	var	var	var	var	var	
1		1.00	1.00	1.00	500.00												-
2		2.00	1.00	2.00	450.00												
3		1.00	1.00	1.00	440.00												
4		2.00	1.00	3.00	500.00	ta	4 2	Frequer	cies: Charts	×		-					
5		1.00	2.00	2.00	570.00		- Cha	t Type			Otoliation						
6		2.00	2.00	3.00	550.00	💰 gender	Cha	lene			Statistics						
7		2.00	2.00	2.00	490.00	💑 eduleve		one			Charts						
8		2.00	2.00	3.00	540.00	al expering		ar charts			Eormat						
9		1.00	2.00	2.00	600.00			le charts			Style						
10	_	1.00	2.00	3.00	650.00			istograms.	al aunua an bia	tearand	Bootstrap						
11	_							Supervision International	al cuive on his	logram	<u> </u>						
12	_						Cha	rt Values									
13	_						@ F	requencies (Percentages								
14						✓ Display fr	ec										
15	_						6	ontinue	ancel He	lp							
16	_																
17	_																
18	_																
19	_																
20	_																
21	_																-
	4												a a ser a				
Data View	Variabl	e View															
													listics Process	or in ready	Linicoda	ON	
			<u>~</u> 1							-	16	m or 35 old	isuos r 100855	or is ready	- Onicode	1	0.11
	e		•	- V		/ <u>X</u>	2	<u>~</u> (4	2					·····		ENG m	۹/•۳/۱٦

Frequencies

Statistics

salary		
N	Valid	10
	Missing	0
Mean		529.0000
Median		520.0000
Mode		500.00
Std. Deviation	ı	66.07235
Variance		4365.556
Skewness		.435
Std. Error of S	Skewness	.687
Kurtosis		351-
Std. Error of k	Kurtosis	1.334
Range		210.00
Minimum		440.00
Maximum		650.00
Sum		5290.00
Percentiles	25	480.0000
	50	520.0000
	75	577.5000



			salary		
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	440.00	1	10.0	10.0	10.0
	450.00	1	10.0	10.0	20.0
	490.00	1	10.0	10.0	30.0
	500.00	2	20.0	20.0	50.0
	540.00	1	10.0	10.0	60.0
	550.00	1	10.0	10.0	70.0
	570.00	1	10.0	10.0	80.0
	600.00	1	10.0	10.0	90.0
	650.00	1	10.0	10.0	100.0
	Total	10	100.0	100.0	



استخدام الخيار descriptive لحساب المقاييس الإحصائية

تظهر لنا النتائج التالية

Descriptives

Notes

	Minimum	Maximum	Mean	Std. Deviation	Variance	Skev	vness	Kur	tosis
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
salary	440.00	650.00	529.0000	66.07235	4365.556	.435	.687	351-	1.334
Valid N (listwise)									

Q2)

For a sample of 10 fruits from thirteen-year-old acidless orange trees, the fruit shape (determined as adiameter divided by height) was measured [Shaheen and Hamouda (1984b)]: 1.066 1.084 1.076 1.051 1.059 1.020 1.035 1.052 1.046 0.976 Assuming that fruit shapes are approximately normally distributed, find and interpret a 90% confidence interval for the average fruit shape.

to use the T- test, we need to make sure that the population follows a normal distribution

i.e.

 H_0 : *the population follows* a normal distribution

Vs

*H*₁: *the population does not follow* a normal distribution

However, we find the question he said that the population follows a normal distribution, so is not necessary to make this test.

Now, 90% Confidence interval of the mean can be found in two ways:

1) The first method:

ta *∪	ntitled1	[DataSet	0] - IBM	SPSS Statistics	Data Editor		-					
<u>F</u> ile	<u>E</u> dit	View	<u>D</u> ata	Transform	<u>A</u> nalyze	Direct <u>M</u> arket	ing <u>G</u> raph	s	<u>U</u> tilities	Add- <u>o</u> ns	Window	<u>H</u> elp
10 : F	ruitShap	e	.976		Repo D <u>e</u> sc Ta <u>b</u> le	rts riptive Statistic es	5 I	•) * ,			
		FruitS	hape	var	Com	pare Means			M Means			
	1		1.07		Gene	ral Linear Mod	el I	•	1 One-S	ample T Tr	set	
	2		1.08		Gene	ralized Linear I	Models	•		andont Sor	aplac T Tact	
	3		1.08		Mixed	I Models		•		nuen <u>-</u> -oar	npies i rest.	
	4		1.05		Corre	elate		•	Paireo	-Samples	I Test	
	5		1.06		Regr	ession		•	one-W	ay ANOVA		
	6		1.02		Logli	near		•				
	7		1.04		Neur	al Networks		•				
	8		1.05		Class	sify						
	9		1.05		Dime	nsion Reduction	on I	•				
	10		.98		Scale)		•				
	11				Nonp	arametric Test	s I	•				_
	12				Fored	asting		•				
	13				Survi	val		•				
<u> </u>	14				Multip	ole Response		•				
	16				Missi	ng Value Analy	sis					_
	17				Multir		,					_
	18				Com	plex Samples						_
	19				E Simu	lation						
	20				Quali	ty Control						
	21					Curvo						
1	22				Z ROC	Guive						
	23											



+ T-Test

[DataSet0]

One-Sample Statistics

	Ν	Mean	Std. Deviation	Std. Error Mean
FruitShape	10	1.0465	.03103	.00981

One-Sample Test

			Τe	est Value = 0				
				Mean	90% Confidence Interval of the Difference			
	t	df	Sig. (2-tailed)	Difference	Lower	Upper		
FruitShape	106.632	9	.000	1.04650	1.0285	1.0645		
					 [] []		

C.I for the mean

2) The second method:

EM Year Data Data for an Address Year Big dist Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for an Address Image for address <	*Un	titled1 [(DataSet(0] - IBM S	PSS Statistics	Data Editor	_										
Reports Reports Reports Reports Reports Reports Reports Reports Reports Reports Repo	le	Edit	View	<u>D</u> ata	Transform	<u>A</u> nalyze	Direct <u>M</u> arketing	<u>G</u> raphs	<u>U</u> tilities	Add- <u>o</u> ns	Wir						
USBADE Descriptives FurdShape Compare Means 1 107 General Lines Model Becomedia Lines Model 3 106 General Lines Model Becomedia Lines Model 5 106 General Lines Model Becomedia Lines Model 5 106 General Lines Model Becomedia Lines Model 5 106 Begression Begression 1 107 1.06 Constant Meducion 9 106 1.06 Classify 9 106 1.06 Classify 9 106 1.06 Classify 9 106 1.06 Classify 1.07 Sigle 1.08 Precabing 1.09 Classify 1.00 Classify 1.00 General Means 1.01 General Means 1.02 Multiple Imputation 1.03 General Lines 1.04 Reseric Lines <td></td> <td></td> <td></td> <td></td> <td></td> <td>Repo</td> <td>ts</td> <td>*</td> <td>\ 💥</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						Repo	ts	*	\ 💥								
uithtee Tables > FuelSage var Cogges relations Cogges relations 1 1.06 Generalized Linear Model Cogges relations 2 1.06 Generalized Linear Model Cogges relations 3 1.06 Generalized Linear Model Cogges relations 4 1.05 Generalized Linear Model Cogges relations 5 1.06 Generalized Linear Model Cogges relations 5 1.06 Generalized Linear Model Cogges relations 5 1.06 Generalized Linear Model Cogges relations 6 1.02 Lightear Compace Samples 1 .98 Generalized Cond Compace Samples 2 Images Condu Compace Samples Compace Samples 3 .0 .0 .0 .0 4 .0 .0 .0 .0 5 .0 .0 .0 .0 6 .0 .0 .0 .0 7 .0 Multiple Regenes .0 .0 8 </td <td>-</td> <td></td> <td></td> <td></td> <td></td> <td>D<u>e</u>sci</td> <td>iptive Statistics</td> <td>•</td> <td>123 Freque</td> <td>ncies</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	-					D <u>e</u> sci	iptive Statistics	•	123 Freque	ncies							
Compete Variation	: Fr	uitShap	e			Ta <u>b</u> le	S	•	Descri	ptives							
1 107 General Linear Model 3 108 Generalized Linear Models 4 108 Generalized Linear Models 5 108 Generalized Linear Models 7 104 Segression 8 105 Consultation 9 106 Generalized Linear Models 9 108 Benon 10 Segle Periods 11 Segle Periods 12 Generalized Ville Analysis Periods 13 Generalized Ville Analysis Periods 14 Generalized Ville Analysis Periods 15 Generalized Ville Analysis Periods 16 Watepie Response Periods<			FruitS	hape	var	Co <u>m</u> p	are Means	•	A Explor	e							
2 1.08 Generatized Linear Models Inder Analysis 4 1.06 Generatized Linear Models IDER Analysis 4 1.06 Generatized Linear Models IDER Analysis 5 1.06 Generatized Linear Models IDER Analysis 5 1.06 Generatized Linear Models IDER Analysis 5 1.06 Generatized Linear Models IDER Analysis 7 1.04 Neural Networks IDER Analysis 9 1.05 Classify IDER Analysis 9 1.05 Generatized Reduction IDER Analysis 1 Material Reduction Scale IDER Analysis 2 Forecasting IDER Analysis IDER Analysis 4 Material Reduction IDER Analysis IDER Analysis 9 IDER Signatation IDER Analysis IDER Analysis 10 Generatized Samples IDER Analysis IDER Analysis 10 Generatized Samples IDER Analysis IDER Analysis 11 Generatized Samples IDER Analysis IDER Analysis 12 Foreatin	_1	1		1.07		<u>G</u> ene	al Linear Model	*	Cross	abs							
3 1.08 Mered Models Dur Margass 4 1.05 Gorrelate Bado 5 1.06 Regression	2	2		1.08		Gene	alized Linear Mod	els 🕨		Apolyoio							
4 1.05 Correlate P PP Dis 5 1.05 Loginear P PP Dis 7 1.04 Neural Neboris P 8 1.05 Dimension Reduction P 9 1.05 Dimension Reduction P 22 Porcessing P P 3 Sigle Porcessing P 4 Survial P P 3 Sigle Response P P 6 4 Multiple Response P 6 4 Signuation P 9 4 Signuation P 1 Garagity Control P P 2 Imaginary Control P P 3 Imaginary Control P P 1 Imaginary Control P P 3 Imaginary Control P P 3 Imaginary Control P P 1 Imaginary Control P P P 2 Imaginary Control P <td>3</td> <td>3</td> <td></td> <td>1.08</td> <td></td> <td>Mi<u>x</u>ed</td> <td>Models</td> <td>•</td> <td></td> <td>Analysis</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	3	3		1.08		Mi <u>x</u> ed	Models	•		Analysis							
5 1.06 Begession Image P Plots 7 1.04 Lgginear Image Plots 9 1.05 Dimension Reduction Image Plots 1 1.05 Dimension Reduction Image Plots 2 9 1.05 Dimension Reduction Image Plots 2 9 1.05 Dimension Reduction Image Plots 3 9 1.05 Dimension Reduction Image Plots 2 9 1.05 Dimension Reduction Image Plots 3 9 1.05 Dimension Reduction Image Plots 3 9 1.05 Multiple Imports Image Plots 4 9 0.00 Quality Control Image Plots 1 0 0 Quality Control Image Plots 2 0 0 0 Dimes Plots 2 0 0 0 Dimes Plots 2 0 0 0 Dimes Plots 3 0	4	1		1.05		<u>C</u> orre	ate	•	Ratio								
8 1.02 Loginear > >		5		1.06		<u>R</u> egre	ssion	•	2-P PI	ots							
4 1.04 Nurral Networks > 9 1.05 Classify > 9 1.05 Gimension Reduction > Scale Nurral Networks > > 1 Scale > > 2 - Forecasing > > 3 - Gumension Reduction > Scale > 3 - Gumension Reduction > Scale > 3 - Gumension Reduction > Scale > 3 - Gumension Reduction > Scale > Scale > 44 - Multiple Response > Multiple Imputation > Calculation of the calculation of the calculation of the calculation of the confidence interval and find the statistical measures 1 - @ ROC Curge > Statistical measures 3 - - - Statistical measures 2 - - - </td <td>6</td> <td>j 7</td> <td></td> <td>1.02</td> <td></td> <td>L<u>o</u>glir</td> <td>ear</td> <td>•</td> <td>🛃 <u>Q</u>-Q PI</td> <td>ots</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	6	j 7		1.02		L <u>o</u> glir	ear	•	🛃 <u>Q</u> -Q PI	ots							
Interstor Reduction Segies Nenparametric Tests Forecasting Survival Multiple Response Complex Samples Control Complex Samples Control Complex Samples Control Reduction Reduction Complex Samples Control Reduc	_	/		1.04		Neura	l Net <u>w</u> orks	•									
3 1.00 gimession Reduction 1 Monparametric Tests 2 Forecasting 3 Gumble Response 4 Wutpile Response 4 Wutpile Response 9 Gumble Response <td>-</td> <td>5</td> <td></td> <td>1.05</td> <td></td> <td>Class</td> <td>ify</td> <td>•</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	-	5		1.05		Class	ify	•									
3 Scale 2 Nonparametric Tests 3 Survival 4 Mutple Response 6 Watsing Value Analysis 7 Mutple Imputation 9 If; symulation 0 Quality Control 2 ROC Curg 3 ROC Curg 3 It helps in the calculation of the confidence interval and find the statistical measures 1 ROC Curg 3 ROC Curg 3 It helps in the calculation of the confidence interval and find the statistical measures 1 ROC Curg 3 It helps in the calculation of the confidence interval confidence interval	1	0		1.05		<u>D</u> ime	nsion Reduction	•									
2 Nonparametric Tests 3 Forecasting 3 Survial 4 Survial 5 Mutple Response 6 Wutple Imputation 7 Mutple Imputation 9 By Simulation 9 By Simulation 9 By Simulation 11 Roc Curye 3 Roc Curye 3 Roc Curye 3 Survival 12 Roc Curye 3 Survival 12 Roc Curye 3 Survival 13 Survival 14 Roc Curye 3 Survival 13 Survival 14 Roc Curye 15 February 16 Survival 17 Survival 18 Survival 19 Survival 10 Survival 11 Survival 12 Survival 14 Survival	1	1		.90		Sc <u>a</u> le		•									
3 Forecasting 4 Survival 5 Withple Response 6 Wasting Value Analysis 7 Multiple Imputation 8 Complex Samples 9 Guaithy Control 14 Roc Curge 3 Roc Curge 4 Roc Curge 5 Roc Curge 6 Roc Curge 7 Roc Curge 8 Roc Curge 9 Roc Curge 10 <td>1</td> <td>2</td> <td></td> <td></td> <td></td> <td>Nonp</td> <td>arametric Tests</td> <td>•</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	1	2				Nonp	arametric Tests	•									
4 Surved 5 Multiple Response 6 Multiple Inputation 7 Omplex Samples 9 Omplex Samples 9 ROC Curye. 3 Image: Simulation and simulatin and simulation and simulation and simulation	1	3				Forec	asting	•									
5 Multiple Response 6 Multiple Response 7 Multiple Response 9 Generalization 10 Generalization 11 Generalization 22 Generalization 3 Generalization 3 Generalization 11 Generalization 12 Generalization 3 Generalization 13 Generalization 14 Generalization 15 Generalization 16 Generalization 17 Generalization 18 Generalization 19 Generalization 11 Generalization 12 Generalization 13 Generalization 14 Generalization 15 Generet 16 <t< td=""><td>1</td><td>4</td><td></td><td></td><td></td><td><u>S</u>urviv</td><td>al</td><td>•</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	1	4				<u>S</u> urviv	al	•									
6 Complex Samples → Complex S	1	5				M <u>u</u> ltip	le Response	•			_						
7 Multiple Imputation 8 Complex Samples 9 It helps in the calculation of the calculation of the confidence interval and find the statistical measures 1 Qualty Control 2 It helps in the calculation of the confidence interval and find the statistical measures 3 It helps in the calculation of the confidence interval and find the statistical measures 4 Percenter 9 It helps in the calculation of the confidence interval and find the statistical measures 3 It helps in the calculation of the confidence interval and find the statistical measures 6 Explore It helps in the calculation of the confidence interval and find the statistical measures 1 It helps in the calculation of the confidence interval and find the statistical measures 1 It helps in the calculation of the confidence interval and find the statistical measures 1 It helps in the calculation of the confidence interval and find the statistical measures 1 It helps in the calculation of the confidence interval and find the statistical measures 1 It helps in the calculation of the calculati	1	6				ジ Missir	g Value Analysis										
8 Complex Samples 9 Guality Control 0 Guality Control 2 ROC Curge 3 ROC Curge	1	7				Multip	le Imputation	•									
9 9 9 9 9 9 9 9 9 9 9 9 9 9	1	8				Comp	lex Samples	•					1	[t he	lps in t	he	
Quality Control Quality Control ROC Curye ROC Curye Cancel Help Confidence interval and find the statistical measures Factor List Percentiles Continue Cancel Help Pots Percentiles Continue Cancel Help Continue Cancel Help	1	9				Bimul	ation								lotion	ofthe	
Confidence interval and find the statistical measures	2	0				Qualit	y Control	•						Jaici	liation	or the	
and find the statistical measures	2	1				ROC	Curve							conf	idence	interva	al
statistical measures statistical measures	2	2					-						1	and f	find the	e	
Statistical incastics Statistical incastics Statistical incastics Statistical incastics Statistics	2	3												etatio	stical n	negentre	20
Image: Statistics of Piots Im							_										
Image: Statistics Image: Statistics	+																
Dependent List Statistics Prots Options Factor List Bootstrap Statistics Options Bootstrap Outliers Display Continue OK Paste Reset Cancel Help Help	t		Explore						×)			/					
Image: Statistics FuitShape Plots Options Factor List Bootstrap Image: Statistics Confidence Interval for Mean: 90 Image: Statistics Image: Statistics Image: Statist	-					Depen	dent List:	Statist	tics			/					
Factor List: Bootstrap Label Cases by: Display Both Statistics Piots OK Paste Reset Cancel Help Continue Cancel Help	+					Fr	uitShape	Plot	s	t		re: Statistics			×		
Factor List Bootstrap Image: Confidence Interval for Mean: 90 Image: Confidence								Optio	ns			scriptives					
Label Cases by: Label Cases by: Display © Both © Statistics © Plots OK Paste Reset Cancel Help	-				_	Eactor	LIST	Bootst	rap		<u></u> e	onfidence Inte	erval for	Mean:	90 %	6	
Label Cases by: Display Both O Statistics O Plots OK Paste Reset Cancel Help	+										<u>M</u> -e	estimators					
Display © Both © Statistics © Plots OK Paste Reset Cancel Help						Label	Cases by:	_			<u>O</u> u	tliers					
Display Continue Cancel Help	-										<u>P</u> e	centiles					
OK Paste Reset Cancel Help			Display-	0 01-1 ⁻							(Continue	Cancel	Н	lelp		
OK Paste Reset Cancel Help			Botu	U St <u>a</u> tis	arcs O Piots						_				_		
	-			C	OK <u>P</u> aste	<u>R</u> eset	Cancel Help										
	+																
	+																
					I					I							





Case Processing Summary

		Cases											
	Va	lid	Miss	sing	Total								
	Ν	Percent	N	Percent	Ν	Percent							
FruitShape	10	50.0%	10	50.0%	20	100.0%							

Descriptives

					1
			Statistic	Std. Error	
FruitShape	Mean		1.0465	.00981	
	90% Confidence Interval	Lower Bound	1.0285		
	for Mean	Upper Bound	1.0645		\sim C.I for the mean
	5% Trimmed Mean		1.0483		
	Median		1.0515		
	Variance		.001		
	Std. Deviation		.03103		
	Minimum		.98		
	Maximum		1.08		
	Range		.11		
	Interquartile Range		.04		
	Skewness		-1.313	.687	
	Kurtosis		2.276	1.334	

Tests of Normality							
	Kolmogorov-Smirnov ^a			Shapiro-Wilk			
	Statistic	df	Sig.	Statistic	df	Sig.	
FruitShape	.194	10	.200	.907	10	.260	

*. This is a lower bound of the true significance.

┢

a. Lilliefors Significance Correction

As P - value > .1

So, we except H_0 : the population follows a normal distribution

Q3)

The phosphorus content was measured for independent samples of skim and whole

Whole: 94.95 95.15 94.85 94.55 94.55 93.40 95.05 94.35 94.70 94.90 Skim: 91.25 91.80 91.50 91.65 91.15 90.25 91.90 91.25 91.65 91.00 Assuming normal populations with equal variances

- a) Test whether the average phosphorus content of skim milk is less than the average phosphorus content of whole milk. Use α =0.01
- b) Find and interpret a 99% confidence interval for the difference in average phosphorus contents of whole and skim milk

to use the T- test for two sample, we need to make sure that

1) The independence of the two samples: It is very clear that there is no correlation between the values of the two samples.

2) The populations follow a normal distribution i.e.

*H*₀: *the two populations follow* a normal distribution

Vs

*H*₁: *the two populations do not follow* a normal distribution

However, we find the question he said that the populations follows a normal distribution, so is not necessary to make this test.

*To make sure no more.....

Data Ed	ditor					
Analy	ze D	Direct <u>M</u> a	arketing	<u>G</u> rap	hs	L
				r.		

	Variable	grouping	var
-	94.95	Whole	
-	95.15	Whole	
-	94.85	Whole	
-	94.55	Whole	
-	94.55	Whole	
-	93.40	Whole	
-	95.05	Whole	
-	94.35	Whole	
-	94.70	Whole	
-	94.90	Whole	
-	91.25	Skim	
-	91.80	Skim	
-	91.50	Skim	
-	91.65	Skim	
-	91.15	Skim	
-	90.25	Skim	
-	91.90	Skim	
-	91.25	Skim	
-	91.65	Skim	
-	91.00	Skim	
_			



FruitShape FruitShape VAR00001 Display Display Display Display OK	Dependent List Variable Plots Options Factor List Bootstrap Bootstrap Dependents together Image: Solution of the second
	Continue Cancel Help

Explore

grouping

	Case Processing Summary							
			Cases					
		Va	lid	Miss	sing	Total		
	grouping	N	Percent	N	Percent	N	Percent	
Variable	Skim	10	100.0%	0	0.0%	10	100.0%	
	Whole	10	100.0%	0	0.0%	10	100.0%	

	groupin	g		Statistic	Std. Error		
Variable	Skim	Mean		91.3400	.15272		
	99% Confidence Interval	Lower Bound	90.8437		רו	C.I for the mear	
		for Mean	Upper Bound	91.8363			for the skim
		5% Trimmed Mean		91.3694			
		Median		91.3750			
		Variance		.233			
		Std. Deviation		.48293			
		Minimum		90.25			
		Maximum		91.90			
		Range		1.65			
		Interquartile Range		.57			
		Skewness		-1.241	.687		
		Kurtosis		2.035	1.334		
	Whole	Mean		94.6450	.15907		
		99% Confidence Interval	Lower Bound	94.1281			
		for Mean	Upper Bound	95.1619			
		5% Trimmed Mean		94.6861			
		Median		94.7750			
		Variance		.253			
						I	

Descriptives

	Range		1.65			
	Interquartile Range		.57		1	
	Skewness		-1.241	.687	1	
	Kurtosis		2.035	1.334	1	
Whole	Mean		94.6450	.15907	, I	
	99% Confidence Interval	Lower Bound	94.1281			C I for the mean
Double-click to	for Mean	Upper Bound	95.1619			C.1 for the mean
activate	5% Trimmed Mean		94.6861			for the whole
	Median		94.7750			for the whole
	Variance		.253			
	Std. Deviation		.50302			
	Minimum		93.40			
	Maximum		95.15			
	Range		1.75			
	Interquartile Range		.47		1	
	Skewness		-1.864	.687		
	Kurtosis		4.241	1.334	1	

Tests of Normality Kolmogorov-Smirnov^a Shapiro-Wilk Statistic Sig. Statistic df df Sig. grouping Variable Skim .147 10 .200 .902 10 .232 Whole 225 10 .163 .823 10 .028 *. This is a lower bound of the true significany a. Lilliefors Significance Correction

As P - value > .01 for both populations.

So, we except H_0 : the two populations follow a normal distribution

Now, the goal of the question:

a) $H_0: \mu_{whole} - \mu_{skim} = 0$ Vs $H_1: \mu_{whole} - \mu_{skim} > 0$ at $\alpha = .01$

and

b) 90% Confidence interval of $\mu_{whole} - \mu_{skim}$





FruitShape		Test Variable(s):	<u>O</u> ptions Bootstrap
VARUUUUT	*			
	•	Grouping Varia	ble:	
		Define Groups		
	OK Paste	Reset Cance	Help	





Q4) What is the relationship between the gender of the students and the assignment of a Pass or No Pass test grade? (Pass = score 70 or above).

	Pass	No Pass	Row Totals
Males	12	3	15
Females	13	2	15
Column Totals	25	5	30

 $H_0:$ the gender of the students is indep. of a Pass or No Pass test grade

Vs

 H_1 : the gender of the students is not indep. of a Pass or No Pass test grade

Count	PassOrNot	Gender	var
1.00	1.00	1.00	
2.00	1.00	1.00	
3.00	1.00	1.00	
4.00	1.00	1.00	
5.00	1.00	1.00	
6.00	1.00	1.00	
7.00	1.00	1.00	
8.00	1.00	1.00	
9.00	1.00	1.00	
10.00	1.00	1.00	
11.00	1.00	1.00	
12.00	1.00	1.00	
13.00	2.00	1.00	
14.00	2.00	1.00	
15.00	2.00	1.00	
16.00	1.00	2.00	
17.00	1.00	2.00	
18.00	1.00	2.00	
19.00	1.00	2.00	
20.00	1.00	2.00	
21.00	1.00	2.00	
22.00	1.00	2.00	
23.00	1.00	2.00	
24.00	1.00	2.00	
25.00	1.00	2.00	
26.00	1.00	2.00	
27.00	1.00	2.00	
28.00	1.00	2.00	
29.00	2.00	2.00	
30.00	2.00	2.00	

PSS Statistics	Data Editor				
<u>T</u> ransform	<u>Analyze</u> Direct <u>M</u> arketing	<u>G</u> raphs	<u>U</u> tilities	Add- <u>o</u> ns	V
	Reports	•	*		Ш
	Descriptive Statistics	•	123 <u>F</u> requ	encies	
	Ta <u>b</u> les	•	🔚 Desci	riptives	
VAR00001	Co <u>m</u> pare Means	•	A Explo	re	
	<u>G</u> eneral Linear Model	•	Cross	tahe	
	Generalized Linear Model	s 🕨	TURF Analysis		
	Mixed Models	•			
	<u>C</u> orrelate	•	Ratio.		
	Regression	•	<u>р</u> -Р Р	lots	
	L <u>o</u> glinear	•	🛃 <u>Q</u> -Q F	lots	
	Neural Networks	•	-	7.00	
	Classify	•	· ·	8.00	
	Dimension Reduction	•		9.00	
	Scale	•	•	10.00	_
	Nonparametric Tests	•	-	11.00	_
	Forecasting	•	-	12.00	_
	Survival	•		13.00	-
	Multiple Response	•		14.00	-
	Missing Value Analysis			15.00	+
	Multiple Imputation	•	-	17.00	+
	Complex Samples	•		18.00	
	Simulation			19.00	
	Quality Control		· ·	20.00	╞
		P		21.00	+
				22.00	╞
				23.00	+





Crosstabs

Case Processing Summary									
		Cases							
		Valid		Missing		Total			
		N	Percent	N	Percent	Ν	Percent		
Gender * PassC)rNot	30	100.0%	0	0.0%	30	100.0%		

Gender * PassOrNot Crosstabulation



Q5)

Ten Corvettes between 1 and 6 years old were randomly selected from last year's sales records in Virginia Beach, Virginia. The following data were obtained, where x denotes age, in years, and y denotes sales price, in hundreds of dollars.

х	6	6	6	4	2	5	4	5	1	2
у	125	115	130	160	219	150	190	163	260	260

a) Compute and interpret the linear correlation coefficient, r.

b) Determine the regression equation for the data.

c) Compute and interpret the coefficient of determination, r^2 .

d) Obtain a point estimate for the mean sales price of all 4-year-old Corvettes.

Enter the age values into one variable and the corresponding sales price values into another variable (see figure, below).

x	Y	var
6.00	125.00	
6.00	115.00	
6.00	130.00	
4.00	160.00	
2.00	219.00	
5.00	150.00	
4.00	190.00	
5.00	163.00	
1.00	260.00	
2.00	260.00	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	



a) Select Analyze \diamond Correlate \diamond Bivariate... (see figure, below).

Select "x" and "y" as the variables, select "Pearson" as the correlation coefficient, and click " "OK" (see the left figure, below).

Correlations

	Correlations								
		Х	Y						
Х	Pearson Correlation	1	968**						
	Sig. (2-tailed)		.000						
	Ν	10	10						
Y	Pearson Correlation	968	1						
	Sig. (2-tailed)	.000							
	Ν	10	10						

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation coefficient is -0.9679 which we can see that the relationship between x and y are -ve and strong.

b, c and d)

Since we eventually want to predict the price of 4-year-old Corvettes, enter the number "4" in the "x" variable column of the data window after the last row. Enter a "." for the corresponding "y" variable value (this lets SPSS know that we want a prediction for this value and not to include the value in any other computations) (see figure, below).

	_		
٦	х	Y	
-	6.00	125.00	
-	6.00	115.00	
-	6.00	130.00	
-	4.00	160.00	
-	2.00	219.00	
-	5.00	150.00	
-	4.00	190.00	
-	5.00	163.00	
-	1.00	260.00	
-	2.00	260.00	
-	4.00	-	
-	-	-	
-	-	-	

Select Analyze ◊ Regression ◊ Linear... (see figure).

Select "y" as the dependent variable and "x" as the independent variable. Click "Statistics", select "Estimates" and "Confidence Intervals" for the regression coefficients, select "Model fit" to obtain r², and click "Continue". Click "Save…", select "Unstandardized" predicted values and click "Continue". Click "OK".

tist	ics Data Eo	litor	-				-	
n	<u>A</u> nalyze	Direct <u>M</u> arketing	<u>G</u> raphs	Utilities	Add- <u>o</u> ns	<u>W</u> indow	<u>H</u> elp	
_	Rep	orts	•	*				A
	D <u>e</u> s	criptive Statistics	►					14
	Ta <u>b</u> l	es	►					
ass	Com	pare Means	•	AR00004	Number	OfTask	Туре	esOfPre
	<u>G</u> en	eral Linear Model	•			9.00		
	Gen	erali <u>z</u> ed Linear Mode	els 🕨	-		12.00		
	Mi <u>x</u> e	d Models	•	-		14.00		
	<u>C</u> orr	elate	•	-		11.00		
	<u>R</u> eg	ression	•	Autom	natic Linear	Modeling		
	L <u>o</u> gi	inear	•	Linea	r			
	Neural Networks			Curve Estimation				
	Classify 🕨 🕨			🔣 Partial Least Squares				
	Dim	ension Reduction	•	Binary Logistic				
	Sc <u>a</u> l	e	•					
	<u>N</u> on	parametric Tests	•					
	Fore	casting	•					
	<u>S</u> urv	ival	•					
	M <u>u</u> lti	ple Response	•	Monlinear				
	💕 Miss	ing Value Analysis		Weight Estimation				
	Multiple Imputation			2-Stag	ge Least Sq	uares		
	Complex Samples			<u>O</u> ptim	al Scaling (CATREG)		
	Simulation					7.00		
	Qual	lity Control	•			8.00		
	ROC	Curve		· ·	•	-		
	1.00	2.00	-	-		-		
	1.00	2.00	-	-	·	-		

Inear Regression ✓ FruitShape ✓ VAR00001 ✓ Variable Image: Selection Variable ✓ VAR00003 ✓ Count ✓ PassOrNot ✓ Gender ✓ VAR00002 ✓ VAR00004 ✓ VAR00005 ✓ VAR00006 ✓ X ✓ VAR00005 ✓ VAR00006 ✓ VAR00006 ✓ VAR00006 ✓ VAR00006 ✓ VAR00006 ✓ VARO0006 ✓ VARO0006 ✓ VARO0006 ✓ VARO0006 ✓ VARO0006 ✓ VARO0006 ✓ X	Linear Regression: Statistics
---	-------------------------------

	12.00 1.00 14.00 1.00	. (tinear Regression: Save	X
Linear Regression Variable var	Dependent:	Statistics Plots Options Style Bootstrap	Predicted Values Unstandardized Standardized Adjusted S.E. of mean predictions Distances Mahalanobis Cook's Leverage values Prediction Intervals Mean Individual Coefficient statistics Create coefficient statistics Create a new dataset Dataset name: Write a new data file File	
		· · ·	✓ Include the covariance matrix Continue	el Help

Regression

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.968 ^a	.937	.929	14.24653

a. Predictors: (Constant), X

b. Dependent Variable: Y

ANOVA^a

Мо	del	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24057.891	1	24057.891	118.533	.000 ^b
	Residual	1623.709	8	202.964		
	Total	25681.600	9			

a. Dependent Variable: Y

b. Predictors: (Constant), X

Coefficients^a

		Unstandardized Coefficients		Standardized Coefficients			95.0% Confiden	ice Interval for B
Model		В	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	291.602	11.433		25.506	.000	265.238	317.966
	Х	-27.903	2.563	968	-10.887	.000	-33.813	-21.993

a. Dependent Variable: Y

				١
	Х	Y	PRE_1	
	6.00	125.00	124.18447	
	6.00	115.00	124.18447	
	6.00	130.00	124.18447	
-	4.00	160.00	179.99029	
	2.00	219.00	235.79612	
	5.00	150.00	152.08738	
-	4.00	190.00	179.99029	
-	5.00	163.00	152.08738	
	1.00	260.00	263.69903	
	2.00	260.00	235.79612	
-	4.00		179.99029	
-				
-				

From above, the regression equation is: y = 29160.1942 - (2790.2913)(x). The coefficient of determination is 0.9368; therefore, about 93.68% of the variation in y data is explained by x.