

# KOLMOGOROV AND SMIRNOV TEST



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CHECKING THE NORMALITY OF THE DISTRIBUTION OF A VARIABLE IS VERY IMPORTANT BECAUSE PARAMETRIC STATISTICS REQUIRE THE NORMALITY CONDITION OF THE POPULATION AS A PREREQUISITE. KOLMOGOROV AND SMIRNOV TEST IS USED TO TEST THE NORMALITY CONDITION OF THE DATA.

# KOLMOGOROV AND SMIRNOV TEST

## INTRODUCTION

STATISTICAL TESTS ARE USED TO ANALYZE SOME ASPECTS OF A SAMPLE SELECTED FROM A POPULATION. THE RESULTS OF THE SAMPLE TESTS ARE THEN USED TO GENERALIZE THE POPULATION; IN OTHER WORDS, THE SAMPLE RESULTS ARE REQUIRED TO REPRESENT THE PARAMETERS OF THE POPULATION. PARAMETRIC STATISTICAL TESTS ARE USED IN THE PROBLEM WHEN THE SAMPLE MEETS THIS REQUIREMENT. THE USE OF PARAMETRIC STATISTICS REQUIRES THAT THE SAMPLE DATA SHOULD BE NORMALLY DISTRIBUTED. SO, CHECKING THE NORMALITY OF THE DISTRIBUTION OF A VARIABLE IS VERY IMPORTANT BECAUSE PARAMETRIC STATISTICS REQUIRE THE NORMALITY CONDITION OF THE POPULATION AS A PREREQUISITE. KOLMOGOROV AND SMIRNOV TEST IS USED TO TEST THE NORMALITY CONDITION OF THE DATA.

## PROBLEM

THE DISTRIBUTION OF MARKS OF 12 COLLEGE STUDENTS SELECTED AT RANDOM IS AS FOLLOWS.

TABLE-1: SAMPLE DATA

SERIAL No.	1	2	3	4	5	6	7	8	9	10	11	12
MARKS	26	12	56	70	62	12	35	5	14	28	29	45

WE WANT TO TEST THE NORMALITY CONDITION OF THE DISTRIBUTION. THE HYPOTHESES FOR THE PROBLEM ARE:

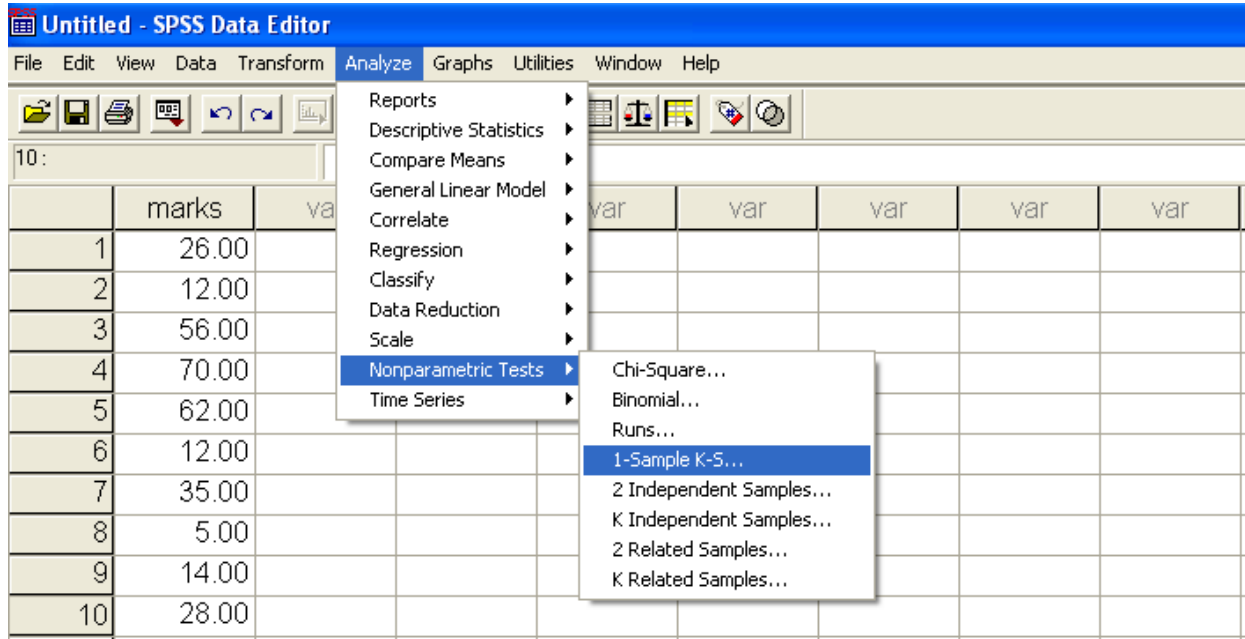
THE HYPOTHESES FOR THE ANALYSIS ARE:

NULL HYPOTHESIS- $H_0$ : THE DISTRIBUTION OF MARKS IS NORMAL.

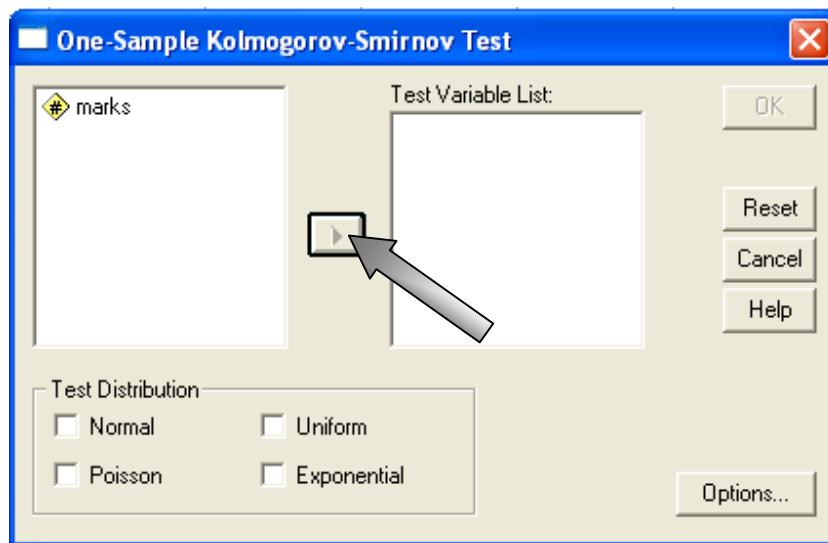
ALTERNATIVE HYPOTHESIS-  $H_1$ : THE DISTRIBUTION OF MARKS IS NOT NORMAL.

## PERFORMING THE ANALYSIS WITH SPSS

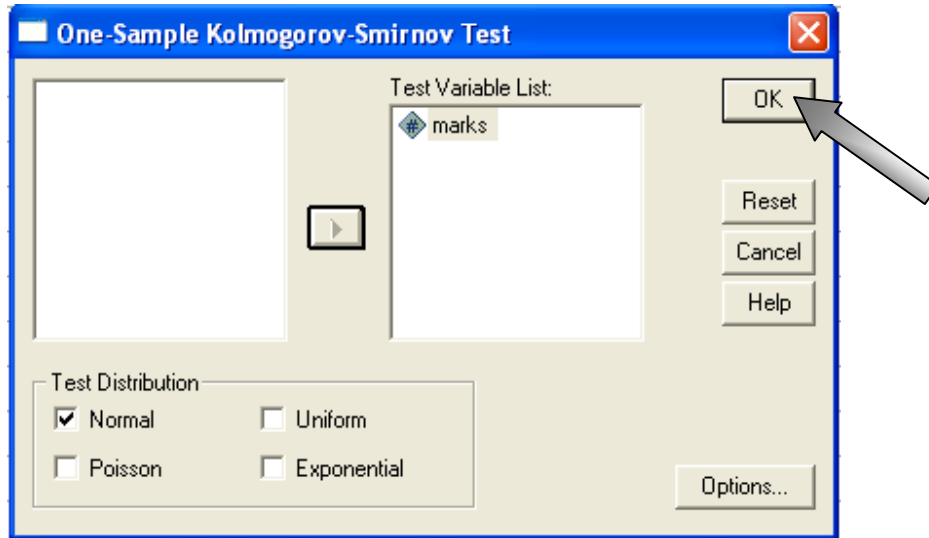
FOR SPSS VERSION 11, CLICK ON **ANALYZE** → **NON PARAMETRIC TEST** → **1-SAMPLE K-S**. THIS WILL BRING UP THE SPSS SCREEN DIALOGUE BOX AS SHOWN BELOW.



**AFTER CLICKING 1-SAMPLE K-S, THIS WILL BRING UP THE FOLLOWING SPSS SCREEN DIALOGUE BOX**



**SELECT THE VARIABLE MARKS AND CLICK IT TO MOVE TO TEST VARIABLE LIST AND CLICK NORMAL.**



FINALLY CLICK OK TO GET THE OUTPUT.

**SPSS OUTPUT**

THE SPSS OUTPUT IS AS FOLLOWS.

**One-Sample Kolmogorov-Smirnov Test**

		MARKS
N		12
Normal Parameters <sup>a,b</sup>	Mean	32.8333
	Std. Deviation	21.32789
Most Extreme Differences	Absolute	.155
	Positive	.155
	Negative	-.111
Kolmogorov-Smirnov Z		.536
Asymp. Sig. (2-tailed)		.936

- a. Test distribution is Normal.
- b. Calculated from data.

**DECISION**

REJECT THE NULL HYPOTHESIS IF P-VALUE (ASYMP.SIG. (2-TAILED)) ≤ 0.05

**INTERPRETATION**

THE P-VALUE IS 0.963 AND IT IS MORE THAN 0.05 (5% LEVEL OF SIGNIFICANCE), SO WE ACCEPT THE NULL HYPOTHESIS AND REJECT THE ALTERNATIVE HYPOTHESIS AT 5% LEVEL OF SIGNIFICANCE. IT IS CONCLUDED THAT THE MARK IS NORMALLY DISTRIBUTED.