Quick Questions 18   Analysis of Variance

I. Copy the formulas and expressions on the right into this ANOVA summary chart.

Variance Analysis Summary Table				
Variance Sources	df	Sum of the Squares	Mean Squares	ANOVA
Between Treatments	t - 1	SS_T	$MS_T = \frac{SS_T}{t-1}$	
Within Treatments (error)	N - t	SS_E	$MS_E = \frac{SS_E}{N-t}$	$F = \frac{MS_T}{MS_E}$
Total Variance	N - 1	SS_{TOTAL}		

SS_T	$F = \frac{MS_T}{MS_E}$
N - t	SS_{TOTAL}
$MS_T = \frac{SS_T}{t-1}$	t - 1
$MS_E = \frac{SS_E}{N-t}$	SS_E
N − 1	

II. Answer the following fill in the blank questions.

   A. Analysis of variance requires the populations be ___normally___ distributed.

   B. When using the F distribution, the numerator is always the __larger__ of the 2 variances.

   C. When doing ANOVA, the numerator of the F distribution measures variance __between__ the treatments.

   D. When doing ANOVA, the denominator of the F distribution measures variance __within__ the treatments.

III. Complete the following ANOVA study concerning grade point averages randomly selected by a local college.
   A. Begin by completing this chart. Those using statistics software should skip to part D.

	Analysis of College Grades Based Upon High School Grades						Row Totals Required for Calculations
	High H.S. Grades T_1		Medium H.S. Grades T_2		Low H.S. Grades T_3		
	College Grades(X_1)	X_1^2	College Grades(X_2)	X_2^2	College Grades(X_3)	X_3^2	
	3.4	11.56	3.2	10.24	2.1	4.41	
	3.5	12.25	2.8	7.84	2.5	6.25	
	3.1	9.61	3.0	9.00	2.7	7.29	
ΣX_T	10.0		9.0		7.3		$\Sigma x = 26.3$
$(\Sigma X_T)^2$	100.0		81.0		53.29		
n	3.0		3.0		3.0		N = 9
$\frac{(\Sigma X_T)^2}{n}$	33.33		27.0		17.76		$\Sigma[\frac{(\Sigma X_T)^2}{n}] = 78.09$
Σx_T^2		33.42		27.08		17.95	$\Sigma x^2 = 78.45$