

UNIVERSITI SAINS MALAYSIA

Peperiksaan Semester Pertama  
Sidang Akademik 2004/2005

Oktober 2004

**PLG 500 - Penaakulan Statistik Dalam Pendidikan**  
**(Statistical Reasoning in Education)**

Masa : 2 jam  
(Duration : 2 hours)

Sila pastikan bahawa kertas peperiksaan ini mengandungi DUA PULUH SATU muka surat yang bercetak sebelum anda memulakan peperiksaan ini.

*(Before you begin this examination, please note that this examination paper contains TWENTY ONE printed pages).*

Sila pastikan juga bersama-sama kertas ini disertakan **LAMPIRAN I, II, III, IV, V, VI dan VII.**

*(Please ensure that appendixes I, II, III, IV, V, VI and VII are attached to this examination paper).*

**ARAHAN :**

**BAHAGIAN A** (24 markah)

Jawab **SEMUA** soalan **BAHAGIAN A** pada ruang yang disediakan.

**BAHAGIAN B** (76 markah)

Jawab **TIGA (3)** soalan sahaja. Jawab soalan 7 dan soalan 8. Pilih **SATU (1)** soalan sahaja daripada soalan 9 atau soalan 10.

Kertas soalan ini akan dikutip bersama dengan buku jawapan.

**INSTRUCTION:**

**SECTION A** (24 marks)

Answer **ALL** questions in **SECTION A** on the space provided.

**SECTION B** (76 marks)

Answer **THREE (3)** questions only. Answer questions 7 and question 8. Choose **ONE (1)** question from question 9 or question 10.

This booklet will be collected together with the answer sheets.

...2/-

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**BAHAGIAN A** (24 markah)

Jawab **SEMUA** soalan pada ruang yang disediakan.

1. Apakah koefisien korelasi yang paling sesuai untuk mengukur hubungan antara dua pembolehubah jika pembolehubah-pembolehubah itu diukur dalam skala seperti berikut?

(2 markah)

- a) Kedua pembolehubah diukur dalam *skala interval* : \_\_\_\_\_
- b) Kedua pembolehubah diukur dalam *skala ordinal* : \_\_\_\_\_
- c) Kedua pembolehubah adalah *dikotomi diskret* : \_\_\_\_\_
- d) Satu pembolehubah diukur dalam *skala interval*  
dan yang lain adalah *dikotomi diskret* : \_\_\_\_\_

2. 'Central limit theoreme' menyatakan tiga sifat taburan persampelan min-min sampel. Nyatakan ketiga-tiga sifat itu.

(1.5 markah)

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_

3. Nyatakan **EMPAT (4)** kemungkinan keputusan dalam pengujian hipotesis.

(2 markah)

- a) \_\_\_\_\_  
\_\_\_\_\_
- b) \_\_\_\_\_  
\_\_\_\_\_
- c) \_\_\_\_\_  
\_\_\_\_\_
- d) \_\_\_\_\_  
\_\_\_\_\_

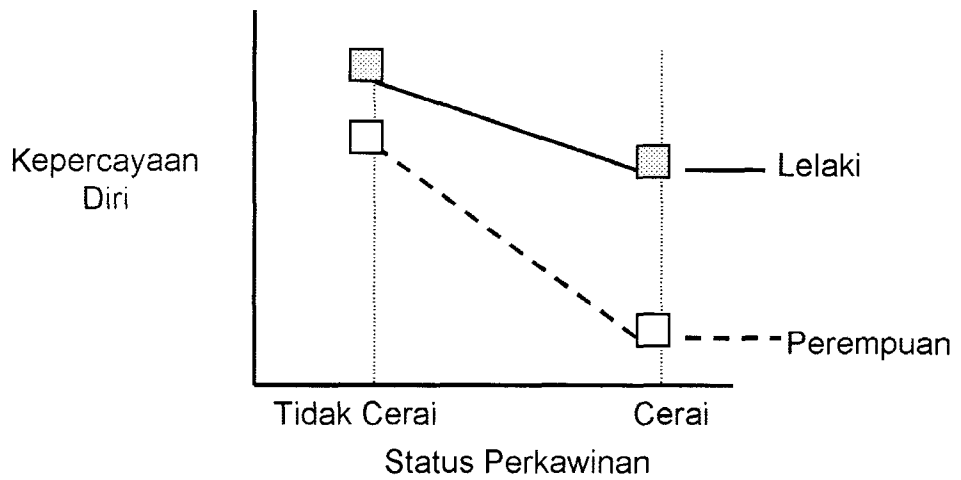
ANGKA GILIRAN : .....  
(INDEX NUMBER) :

4. Huraikan cara memeriksa untuk memastikan setiap andaian dalam ANOVA Satu Hala dipatuhi.

(5 markah)

- a) \_\_\_\_\_  
\_\_\_\_\_
- b) \_\_\_\_\_  
\_\_\_\_\_
- c) \_\_\_\_\_  
\_\_\_\_\_
- d) \_\_\_\_\_  
\_\_\_\_\_
- e) \_\_\_\_\_  
\_\_\_\_\_

5. 'Mean plot' daripada hasil satu penyelidikan adalah seperti berikut.



Berdasarkan *mean plot* ini:

a) Nyatakan tajuk penyelidikan ini.

(2.5 markah)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

ANGKA GILIRAN : .....  
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b) Nyatakan pembolehubah bebas dan pembolehubah bersandarnya.  
(3 markah)

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c) Nyatakan hypotesis nul dan hipotesis alternatifnya.  
(1.5 markah)

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d) Huraikan kesan pembolehubah bebas dan interaksi terhadap pembolehubah bersandar.  
(4.5 markah)

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6. Nyatakan **DUA (2)** kelebihan analisis regresi berbanding dengan analisis korelasi.  
(2 markah)

a) 

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b) 

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ANGKA GILIRAN : .....  
(INDEX NUMBER) :

### BAHAGIAN B

Jawab **TIGA (3)** soalan sahaja. Jawab soalan 7 dan soalan 8. Pilih **SATU (1)** soalan sahaja daripada soalan 9 atau soalan 10.

7. Seorang guru berminat untuk mengetahui kesan daripada tiga kaedah mengajar (*team teaching*, *traditional teaching* dan *self-teaching*) dan pencapaian tinggi dan rendah dalam subjek matematik. Tiga kumpulan pelajar Tingkatan Lima yang mempunyai kemampuan yang sama dalam matematik telah dipilih secara rawak. Kumpulan pertama diajar dengan menggunakan kaedah *team teaching*, kumpulan kedua diajar menggunakan *kaedah traditional teaching* dan kumpulan ketiga diajar menggunakan kaedah *self-teaching*. Pada akhir semester pelajar diberikan satu *standardized test*. Enam markah pelajar pencapaian tinggi dan enam pelajar pencapaian rendah dari setiap kumpulan kaedah mengajar dipilih secara rawak. Markah di analisis dengan menggunakan program komputer SPSS. Berdasarkan output SPSS ANOVA univariate yang dipaparkan pada halaman 6 dan 7 dan dengan  $\alpha = 0.05$ :
- a) Nyatakan pembolehubah bebas dan pembolehubah bersandar di dalam penyelidikan ini (2 markah)
  - b) Nyatakan andaian yang diuji di *dalam SPSS output* dan huraikan langkah pengujiannya. (2 markah)
  - c) Nyatakan hipotesis nol dan hipotesis alternatif untuk Baris, Lajar, dan Interaksi. (4 markah)
  - d) Apakah *point estimate* untuk setiap min populasi yang dinyatakan di dalam hipotesis bagi Baris dan hipotesis bagi Lajar? (6 markah)
  - e) Bina satu '*mean plot*' untuk menunjukkan ada tidaknya interaksi (6 markah)
  - f) Apakah keputusannya? Huraikan. (6 markah)

ANGKA GILIRAN : .....  
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**Descriptive Statistics**

Dependent Variable: Math Achievement

Brightness	Teaching Methods	Mean	Std. Deviation	N
Bright	Team Teaching	40.1667	3.4881	6
	Traditional Teaching	36.3333	3.8297	6
	Self Teaching	34.8333	3.2506	6
	Total	37.1111	4.0423	18
Dull	Team Teaching	38.6667	2.8048	6
	Traditional Teaching	33.8333	3.6560	6
	Self Teaching	26.5000	1.8708	6
	Total	33.0000	5.8107	18
Total	Team Teaching	39.4167	3.1176	12
	Traditional Teaching	35.0833	3.8009	12
	Self Teaching	30.6667	5.0332	12
	Total	35.0556	5.3556	36

**Levene's Test of Equality of Error Variance**

Dependent Variable: Math Achievement

F	df1	df2	Sig.
.865	5	30	.516

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: BRIGHTNE+METHODS+BRIGHTNE \* METHODS

**Descriptive Statistics**

Dependent Variable: Math Achievement

Teaching Methods	Brightness	Mean	Std. Deviation	N
Team Teaching	Bright	40.1667	3.4881	6
	Dull	38.6667	2.8048	6
	Total	39.4167	3.1176	12
Traditional Teaching	Bright	36.3333	3.8297	6
	Dull	33.8333	3.6560	6
	Total	35.0833	3.8009	12
Self Teaching	Bright	34.8333	3.2506	6
	Dull	26.5000	1.8708	6
	Total	30.6667	5.0332	12
Total	Bright	37.1111	4.0423	18
	Dull	33.0000	5.8107	18
	Total	35.0556	5.3556	36

ANGKA GILIRAN : .....  
 (INDEX NUMBER) :

**Tests of Between-Subjects Effects**

Dependent Variable: Math Achievement

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Model	44933.333 <sup>a</sup>	6	7488.889	723.176	.000
BRIGHTNE	152.111	1	152.111	14.689	.001
METHODS	459.389	2	229.694	22.181	.000
BRIGHTNE * METHODS	81.722	2	40.861	3.946	.030
Error	310.667	30	10.356		
Total	45244.000	36			

a. R Squared = .993 (Adjusted R Squared = .992)

**Multiple Comparisons**

Dependent Variable: Math Achievement

Tukey HSD

(I) Teaching Methods	(J) Teaching Methods	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Team Teaching	Traditional Teaching	4.3333*	1.3137	.007	1.0946	7.5721
	Self Teaching	8.7500*	1.3137	.000	5.5112	11.9888
Traditional Teaching	Team Teaching	-4.3333*	1.3137	.007	-7.5721	-1.0946
	Self Teaching	4.4167*	1.3137	.006	1.1779	7.6554
Self Teaching	Team Teaching	-8.7500*	1.3137	.000	-11.9888	-5.5112
	Traditional Teaching	-4.4167*	1.3137	.006	-7.6554	-1.1779

Based on observed means.

\*. The mean difference is significant at the .05 level.

ANGKA GILIRAN : .....  
(INDEX NUMBER) :

8. Dekan satu fakulti berminat untuk mengetahui sama ada jantina (gender), jarak pergi dan balik dari rumah ke kampus (*commuting distance from home to campus*) dan darjah persetujuan terhadap legalisasi penggunaan marijuana (*the agreement on the legalization of using marijuana*) mempunyai kesan terhadap *Grade Point Average (GPA)* pelajar. Satu penyelidikan telah dilakukan dan data yang diperlukan telah dikumpul daripada 30 pelajar yang dipilih secara rawak. Jantina pelajar adalah dalam bentuk kod dummy iaitu lelaki = 1 dan perempuan = 0. Jarak pergi dan balik dari rumah ke kampus diukur dalam km. Persetujuan terhadap legalisasi penggunaan marijuana dikod (*sangat tidak setuju = 1, tidak setuju = 2, tidak tahu = 3, setuju = 4, dan sangat setuju = 5*) GPA telah dikumpulkan pada akhir semester. Data dianalisis dengan menggunakan program komputer SPSS dan *output SPSS univariate regression* SPSS yang dipaparkan di halaman 9. Dengan  $\alpha = 0.05$ :
- a) Nyatakan andaian untuk *error terms* yang diperlukan dalam analisis regresi. (2 markah)
  - b) Nyatakan pembolehubah bebas dan pembolehubah bersandar dalam kajian ini. (2 markah)
  - c) Nyatakan persamaan regresinya. (2 markah)
  - d) Kira *predicted GPA* untuk pelajar perempuan bagi yang berulang alik 10 km antara rumah dan kampus dan tidak bertuju untuk menlegalisasikan penggunaan marijuana. (5 markah)
  - e) Apakah nilai a dan b dari *output SPSS*. Huraikan makna nilai-nilai tersebut. (2 markah)
  - f) Susunkan faktor-faktor yang mempengaruhi GPA mengikut kekuatan kesannya. (4 markah)
  - g) Huraikan makna nilai  $R^2$  (*R square*). (2 markah)
  - h) Huraikan makna nilai F dalam jadual ANOVA. (2 markah)
  - i) Huraikan kesimpulannya. (4 markah)



ANGKA GILIRAN : .....  
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**Variables Entered/Removed**

Model	Variables Entered	Variables Removed	Method
1	Agreement on the Legalization of Using Marijuana, Sex, Commuting Distance from Home to Campus in km		Enter

a. All requested variables entered.

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.701	.491	.432	.5141

**ANOVA**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.624	3	2.208	8.356	.000
	Residual	6.871	26	.264		
	Total	13.495	29			

**Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.289	.230		14.304	.000
	Sex	1.317E-02	.191	.010	.069	.945
	Commuting Distance from Home to Campus in km	-3.77E-02	.012	-.457	-3.189	.004
	Agreement on the Legalization of Using Marijuana	-.214	.069	-.448	-3.126	.004

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9. Seorang guru berminat untuk menjalankan analisis item terhadap peperiksaan akhir yang terdiri daripada 50 soalan benar-salah (*true-false items*). Dari kajian rintis didapati dua belas pelajar yang menjawab dengan betul item 1 memperolehi jumlah markah 40, 35, 50, 30, 44, 46, 42, 39, 55, 42, 58, dan 52 manakala lapan pelajar yang menjawab salah item 1 memperolehi jumlah markah 26, 25, 30, 34, 36, 20, 28 dan 16. Guru itu bercadang untuk memurnikan setiap item yang koefisien korerilasinya dengan jumlah markah keseluruhan kurang dari 0.8. Bagi item 1 dengan  $\alpha = 0.05$ :
- a) Nyatakan pembolehubah yang sedang dianalisis. (2 markah)
  - b) Nyatakan hipotesis nul dan hipotesis alternatif. (2 markah)
  - c) Nyatakan ujian statistik yang digunakan. (2 markah)
  - d) Nyatakan nilai kritikal daripada ujian statistik. (3 markah)
  - e) Kira koefisien korelasi antara markah item 1 dengan jumlah markah keseluruhan. (7 markah)
  - f) Kira nilai ujian statistiknya. (5 markah)
  - g) Jelaskan kesimpulannya. (4 markah)

10. Seorang guru berminat untuk mengetahui kesan tiga kaedah mengajar iaitu *team teaching*, *traditional teaching* dan *self-teaching*, terhadap *pencapaian matematik*. Tiga kumpulan pelajar Tingkatan Lima yang mempunyai kemampuan yang sama dalam matematik telah dipilih secara rawak. Kumpulan pertama diajar dengan menggunakan kaedah *team teaching*, kumpulan kedua diajar menggunakan *kaedah tradisional teaching* dan kumpulan ketiga diajar menggunakan kaedah *self-teaching*. Pada akhir semester pelajar diberikan satu *standardized test*. Lima markah dari setiap kumpulan dipilih secara rawak. Berikut adalah markah-markah yang terpilih.

Kaedah Mengajar		
<i>Team Teaching</i>	<i>Traditional Teaching</i>	<i>Self Teaching</i>
93.00	81.00	72.00
91.00	89.00	81.00
81.00	77.00	70.00
85.00	84.00	80.00
87.00	88.00	70.00

Dengan  $\alpha = 0.01$ :

- Apakah pembolehubah bebas dan pembolehubah bersandar dalam kajian ini? (2 markah)
- Nyatakan hipotesis nul dan hipotesis alternatif. (2 markah)
- Kirakan SSB, SSW, dan SST (9 markah)
- Kirakan varians di antara sampel dan varians di dalam sampel. (2 markah)
- Berapakah nilai kritikal daripada ujian statistiknya? (2 markah)
- Kira nilai ujian statistiknya. (2 markah)
- Bina dan lengkapkan satu jadual ANOVA. (2 markah)
- Apakah keputusan kajian? Jelaskan. (4 markah)

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TRANSLATION

SECTION A

Answer **ALL** questions and write your answers on the blank space provided.

1. What is the most appropriate correlation coefficient for measuring the relationship between two variables if the two variables are measured in the following scales?

(2 marks)

- a) both are measured on interval scales \_\_\_\_\_
- b) both are measured on ordinal scales \_\_\_\_\_
- c) both are discrete dichotomies \_\_\_\_\_
- d) one is measured in interval scale and the other is a discrete dichotomy \_\_\_\_\_

2. The central limit theorem states three properties of the sampling distribution of the sample means. State the three properties.

(1.5 marks)

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_

3. State **FOUR (4)** possible outcomes in hypothesis testing.

(2 marks)

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_
- d) \_\_\_\_\_

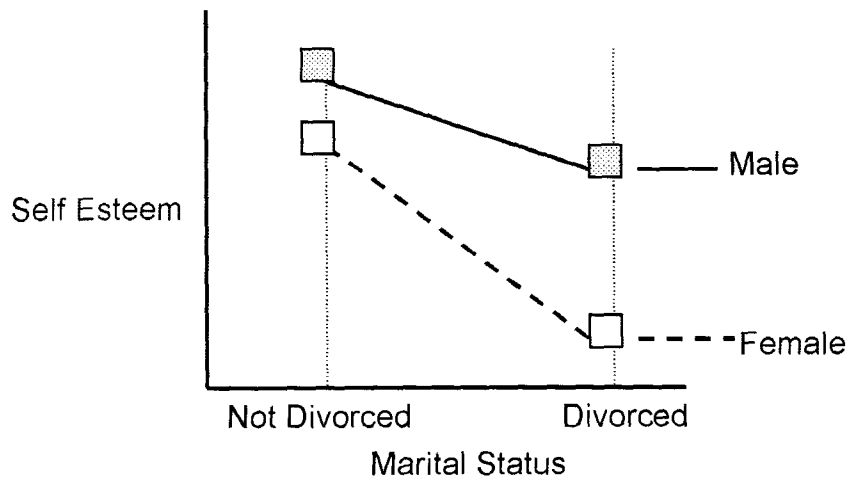
ANGKA GILIRAN : .....  
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4. Describe the examination procedure so that each assumption in the One-Way ANOVA is satisfied.

(5 marks)

- a) \_\_\_\_\_  
\_\_\_\_\_
- b) \_\_\_\_\_  
\_\_\_\_\_
- c) \_\_\_\_\_  
\_\_\_\_\_
- d) \_\_\_\_\_  
\_\_\_\_\_
- e) \_\_\_\_\_  
\_\_\_\_\_

5. The mean plot of a study is as follows.



Based on the mean plot:

a) State the topic of the study.

(2.5 marks)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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b) State the independent and dependent variables. (3 marks)

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c) State the null hypothesis and the alternative hypothesis. (1.5 marks)

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d) Describe the effects of the independent variables and the interaction on the dependent variable. (4.5 marks)

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6. Describe the advantages of using a regression analysis compare to using a correlation analysis. (2 marks)

a) 

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b) 

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**SECTION B**

Answer **THREE (3)** questions only. Answer questions 7 and question 8. Choose **ONE (1)** question from question 9 or question 10.

7. A teacher is interested in studying the effects of teaching methods (*team teaching, traditional teaching and self-teaching*) and students achievement (high and low) in the *mathematics subject*. Three groups of form five students that had equal abilities in mathematics were selected. The first group used the *team teaching method*, the second used *traditional teaching method* and the third used *self teaching method*. At the end of the semester, the students were given a *standardized test*. Six scores of high achievement students and 6 scores of low achievement students from each group were randomly selected. The scores were analyzed using the SPSS computer program. The *univariate ANOVA SPSS* output can be seen on page 16 and 17. With  $\alpha = 0.05$ :
- a) State the independent and dependent variables of this study?  
(2 marks)
  - b) State the assumption tested in the SPSS output and show the procedure in testing the assumption.  
(2 marks)
  - c) State the null hypothesis and the alternative hypothesis for Row, Column, and Interaction.  
(4 marks)
  - d) What is the point estimate of each of the population mean indicated in the row hypothesis and column hypothesis?  
(6 marks)
  - e) Draw a mean plot to indicate the existence of the interaction.  
(6 marks)
  - f) What are the findings? Explain.  
(6 marks)

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 (INDEX NUMBER) :

**Descriptive Statistics**

Dependent Variable: Math Achievement

Brightness	Teaching Methods	Mean	Std. Deviation	N
Bright	Team Teaching	40.1667	3.4881	6
	Traditional Teaching	36.3333	3.8297	6
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**Levene's Test of Equality of Error Variance**

Dependent Variable: Math Achievement

F	df1	df2	Sig.
.865	5	30	.516

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: BRIGHTNE+METHODS+BRIGHTNE \* METHODS

**Descriptive Statistics**

Dependent Variable: Math Achievement

Teaching Methods	Brightness	Mean	Std. Deviation	N
Team Teaching	Bright	40.1667	3.4881	6
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	Total	30.6667	5.0332	12
Total	Bright	37.1111	4.0423	18
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	Total	35.0556	5.3556	36



Tests of Between-Subjects Effects

Dependent Variable: Math Achievement

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Model	44933.333 <sup>a</sup>	6	7488.889	723.176	.000
BRIGHTNE	152.111	1	152.111	14.689	.001
METHODS	459.389	2	229.694	22.181	.000
BRIGHTNE * METHODS	81.722	2	40.861	3.946	.030
Error	310.667	30	10.356		
Total	45244.000	36			

a. R Squared = .993 (Adjusted R Squared = .992)

Multiple Comparisons

Dependent Variable: Math Achievement

Tukey HSD

(I) Teaching Methods	(J) Teaching Methods	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Team Teaching	Traditional Teaching	4.3333*	1.3137	.007	1.0946	7.5721
	Self Teaching	8.7500*	1.3137	.000	5.5112	11.9888
Traditional Teaching	Team Teaching	-4.3333*	1.3137	.007	-7.5721	-1.0946
	Self Teaching	4.4167*	1.3137	.006	1.1779	7.6554
Self Teaching	Team Teaching	-8.7500*	1.3137	.000	-11.9888	-5.5112
	Traditional Teaching	-4.4167*	1.3137	.006	-7.6554	-1.1779

Based on observed means.

\*. The mean difference is significant at the .05 level.

8. The dean of a faculty is interested in finding out if gender, commuting distance from home to campus and the level of agreement on the legalization of using marijuana affect the students' Grade Point Average (GPA). A study was conducted and related data were collected from a random sample of 30 students. Gender was dummy coded with male = 1 and female = 0. Commuting distance from home to campus was measured in km. The agreement on using marijuana were coded with strongly disagree = 1, mildly disagree = 2, no opinion = 3, mildly agree = 4, and strongly agree = 5. The GPA was collected at the end of the semester. The data were analyzed using the SPSS computer program. The *univariate regression SPSS output* can be seen on page 19. With  $\alpha = 0.05$ :
- a) State the required assumptions for error terms in a regression analysis. (2 marks)
  - b) State the dependent and the independent variables of this study. (2 marks)
  - c) State the regression equation for this study. (2 marks)
  - d) Compute *predicted GPA* for a female student with 10 km of commuting distance from home to campus, and who disagrees with the legalization of using marijuana. (5 marks)
  - e) What are the values of *a* and *b* from the SPSS computer output. Describe the meaning of the values. (2 marks)
  - f) Arrange the factors that influence GPA according to their strength. (4 marks)
  - g) Describe the meaning of the value of  $R^2$  (R square). (2 marks)
  - h) Describe the meaning of the F value in the ANOVA table. (2 marks)
  - i) Describe the conclusions. (4 marks)

**Variables Entered/Removed**

Model	Variables Entered	Variables Removed	Method
1	Agreement on the Legalization of Using Marijuana, Sex, Commuting Distance from Home to Campus in km		Enter

a. All requested variables entered.

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.701	.491	.432	.5141

**ANOVA**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.624	3	2.208	8.356	.000
	Residual	6.871	26	.264		
	Total	13.495	29			

**Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.289	.230		14.304	.000
	Sex	1.317E-02	.191	.010	.069	.945
	Commuting Distance from Home to Campus in km	-3.77E-02	.012	-.457	-3.189	.004
	Agreement on the Legalization of Using Marijuana	-.214	.069	-.448	-3.126	.004

ANGKA GILIRAN : .....  
(INDEX NUMBER) :

9. A teacher is interested in conducting an item analysis on his final test that consists of 50 true-false questions. From a *pilot test*, it was found that 12 students had answered item 1 correctly and their total scores were 40, 35, 50, 30, 44, 46, 42, 39, 55, 42, 58 and 52 and eight students had answered item 1 incorrectly and their total scores were 26, 25, 30, 34, 36, 20, 28 and 16. The teacher plans to revise an item if the item score has a correlation with the total score at less than 0.8. For item 1, with  $\alpha = 0.05$ :
- a) State the variables being analyzed. (2 marks)
  - b) State the null and alternative hypotheses. (2 marks)
  - c) State the statistics-test used. (2 marks)
  - d) State the critical value of the statistics-test. (3 marks)
  - e) Compute the correlation coefficient between scores of item 1 and the total scores. (7 marks)
  - f) Compute the statistics-test value. (5 marks)
  - g) Explain the conclusion. (4 marks)

10. A teacher is interested in studying the effects of three teaching methods, *team teaching*, *traditional teaching* and *self-teaching*, on *mathematics achievement*. Three classes of Form Five students that had equal abilities in mathematics were selected. The first class used *team teaching method*, the second used *traditional teaching method* and the other used *self-teaching method*. At the end of the semester the students were given a *standardized test*. Five scores from each class were randomly selected. The following are the selected scores.

Teaching Methods		
<i>Team Teaching</i>	<i>Traditional Teaching</i>	<i>Self Teaching</i>
93.00	81.00	72.00
91.00	89.00	81.00
81.00	77.00	70.00
85.00	84.00	80.00
87.00	88.00	70.00

With  $\alpha = 0.05$ :

- What are the independent and the dependent variables of this study? (2 marks)
- State the null hypothesis and the alternative hypotheses. (2 marks)
- Compute the SSB, SSW, and SST. (8 marks)
- Compute the variance between and the variance within samples. (2 marks)
- What is the critical value of the test statistics? (3 marks)
- Compute the test statistics value. (2 marks)
- Create and complete an ANOVA table. (2 marks)
- What are the findings? Explain. (4 marks)