

# Screen Math data with elementary tests

```
/* readmath.sas Just read the data and do basic transformations */
options linesize=79 noovp formdlim='_';
title 'Gender, Ethnicity and Math performance';

proc format;
value ynfmt 0 = 'No' 1 = 'Yes';
value crsfmt 4 = 'No Resp';
value nfmt
1 = 'Asian'
2 = 'Eastern European'
3 = 'European not Eastern'
4 = 'Middle-Eastern and Pakistani'
5 = 'East Indian'
6 = 'Other and DK' ;

data math;
infile 'exploremath.data';
input id course precalc calc gpa calculus english mark lang $ sex $
nation1 nation2 sample;

/* Computed Variables: totscore, passed, grade, hsgpa, hscal, hsengl,
tongue, ethnic */

totscore = precalc+calc;
if (50<=mark<=100) then passed=1; else passed=0;
/* Some missing final marks were zero, and 998=SDF and 999=WDR */
if mark=0 then grade=.;
else if mark > 100 then grade=.;
else grade=mark;
/* Missing HS marks were zeros */
if 65 le gpa le 100 then hsgpa = gpa; /* Else missing is automatic */
if 0 < calculus < 101 then hscal = calculus;
if 0 < english < 101 then hsengl = english;
/* There were just a few French speakers */
if lang='French' then tongue='Other '; else tongue=lang;
label tongue = 'Mother Tongue (Eng or Other)';
/* Rater 1 knows Middle Eastern names -- otherwise believe Rater 2 */
if nation1=4 then ethnic=nation1; else ethnic=nation2;

label
precalc = 'Number precalculus correct'
calc = 'Number calculus correct'
totscore = 'Total # right on diagnostic test'
passed = 'Passed the course'
grade = 'Final mark (if any)'
hsgpa = 'High School GPA'
hscal = 'HS Calculus'
hsengl = 'HS English'
lang = 'Mother Tongue'
nation1 = 'Nationality of name acc to rater1'
nation2 = 'Nationality of name acc to rater2'
tongue = 'Mother Tongue (Eng or Other)'
ethnic = 'Judged Nationality of name';

format course crsfmt.; format passed ynfmt.; format nation1 nation2 ethnic nfmt.;
```

```

/* basicmath.sas */
title2 'Explore math data with elementary tests';
%include 'readmath.sas';

/* It's not the primary question, but are marks better on the precalculus
items of the diagnostic test, or the calculus items? There are 9 precalculus
and 11 calculus questions; convert to percentages. The data step
continues ... */

diff = (100 * precalc/9) - (100 * calc/11);
label diff = 'Percentage correct: Precalc minus calc';

/* And a couple more useful variables */
if course=4 then course2=.; else course2=course; /* Eliminate 'No Resp' */
if 0 le grade le 60 then gsplit='60orLess';
  else if 60 lt grade le 100 then gsplit='Over60';
  /* Got median=60 from proc univariate */
label gsplit = 'Median split on final grade';

proc freq; tables grade*gsplit / norow nocol nopercnt missing;

proc means n mean std t probt clm;
  title2 'Are precalculus questions easier?';
  var diff;

/* Do the following quantitative variables have a significant linear
relationship with grade? What percent of the variation does each explain?
  * High school GPA
  * High school Calculus mark
  * High school English mark
  * Number precalculus correct on diagnostic test
  * Number calculus correct on diagnostic test
  * Total number correct on diagnostic test
*/

proc corr nosimple;
  title2 'Predict grade from quantitative variables';
  var grade hsgpa hscal hsengl precalc calc totscore;

proc corr spearman nosimple;
  title2 'Should we worry about normality?';
  var grade;
  with hsgpa hscal hsengl precalc calc totscore;

proc plot;
  title2 'University Calculus Grade by HS GPA';
  plot grade * hsgpa;

proc reg;
  title2 'Give an equation for predicting calculus grade from HS GPA';
  model grade = hsgpa;

```

```

proc glm;
  title2 'Do average marks differ significantly in the three courses?';
  class course2;
  model grade = course2;
  means course2;
  /* Also, what proportion of the variation in grade is explained by
     course? */

proc glm;
  title2 'Is there a sex difference in average marks?';
  class sex;
  model grade = sex;
  means sex;
  /* Also, what proportion of the variation in grade is explained by
     sex? */

proc ttest;
  title2 'Could we conclude NO sex difference?';
  class sex;
  var grade;
  /* Find confidence interval for difference between means. */

proc glm;
  title2 'Do average marks depend on mother tongue?';
  class tongue;
  model grade = tongue;
  means tongue;
  /* Also, what proportion of the variation in grade is explained by
     mother tongue? */

proc glm;
  title2 'Do average marks depend on ethnic background?';
  class ethnic;
  model grade = ethnic;
  means ethnic;
  means ethnic / tukey bon scheffe;
  /* Also, what proportion of the variation in grade is explained by
     ethnic background? */

proc freq;
  title2 'A few Chisquare tests to predict passed';
  tables (course2 sex ethnic tongue) * passed / nocol nopercnt chisq;

proc freq;
  title2 'Median tests';
  tables (course2 sex ethnic tongue) * gsplit / nocol nopercnt chisq;

```

Skipping the huge table of grade by gsplit ...

Gender, Ethnicity and Math performance 5  
 Are precalculus questions easier?

The MEANS Procedure

Analysis Variable : diff Percentage correct: Precalc minus calc

Lower 95% N	Upper 95% Mean	Std Dev	t Value	Pr >  t	CL for Mean	CL for Mean
480	18.7415825	21.2553367	19.32	<.0001	16.8352695	20.6478955

Gender, Ethnicity and Math performance 6  
 Predict grade from quantitative variables

The CORR Procedure

7 Variables: grade hsgpa hscalc hsengl precalc calc  
 totscore

Pearson Correlation Coefficients  
 Prob > |r| under H0: Rho=0  
 Number of Observations

	grade	hsgpa	hscalc	hsengl
grade Final mark	1.00000 <.0001 393	0.58129 <.0001 337	0.53272 <.0001 332	0.16441 0.0022 345
hsgpa High School GPA	0.58129 <.0001 337	1.00000 <.0001 466	0.62249 <.0001 437	0.54327 <.0001 464
hscalc HS Calculus	0.53272 <.0001 332	0.62249 <.0001 437	1.00000 <.0001 448	0.08498 0.0749 440
hsengl HS English	0.16441 0.0022 345	0.54327 <.0001 464	0.08498 0.0749 440	1.00000 480

Pearson Correlation Coefficients  
 Prob > |r| under H0: Rho=0  
 Number of Observations

	precalc	calc	totscore
grade Final mark	0.37834 <.0001 346	0.36247 <.0001 346	0.42847 <.0001 346

hsgpa	0.33965	0.33876	0.39002
High School GPA	<.0001	<.0001	<.0001
	396	396	396
hscal	0.36684	0.43774	0.47262
HS Calculus	<.0001	<.0001	<.0001
	384	384	384
hsengl	0.06543	0.04272	0.05995
HS English	0.1893	0.3917	0.2293
	404	404	404

Gender, Ethnicity and Math performance  
 Predict grade from quantitative variables

7

The CORR Procedure

Pearson Correlation Coefficients

Prob > |r| under H0: Rho=0

Number of Observations

	grade	hsgpa	hscal	hsengl
precalc	0.37834	0.33965	0.36684	0.06543
Number precalculus correct	<.0001	<.0001	<.0001	0.1893
	346	396	384	404
calc	0.36247	0.33876	0.43774	0.04272
Number calculus correct	<.0001	<.0001	<.0001	0.3917
	346	396	384	404
totscore	0.42847	0.39002	0.47262	0.05995
Total # right on diagnostic test	<.0001	<.0001	<.0001	0.2293
	346	396	384	404

Pearson Correlation Coefficients

Prob > |r| under H0: Rho=0

Number of Observations

	precalc	calc	totscore
precalc	1.00000	0.50135	0.81309
Number precalculus correct		<.0001	<.0001
	480	480	480
calc	0.50135	1.00000	0.91133
Number calculus correct	<.0001		<.0001
	480	480	480
totscore	0.81309	0.91133	1.00000
Total # right on diagnostic test	<.0001	<.0001	
	480	480	480

Gender, Ethnicity and Math performance  
Should we worry about normality?

8

The CORR Procedure

6 With Variables: hsgpa hscalc hsengl precalc calc totscore  
1 Variables: grade

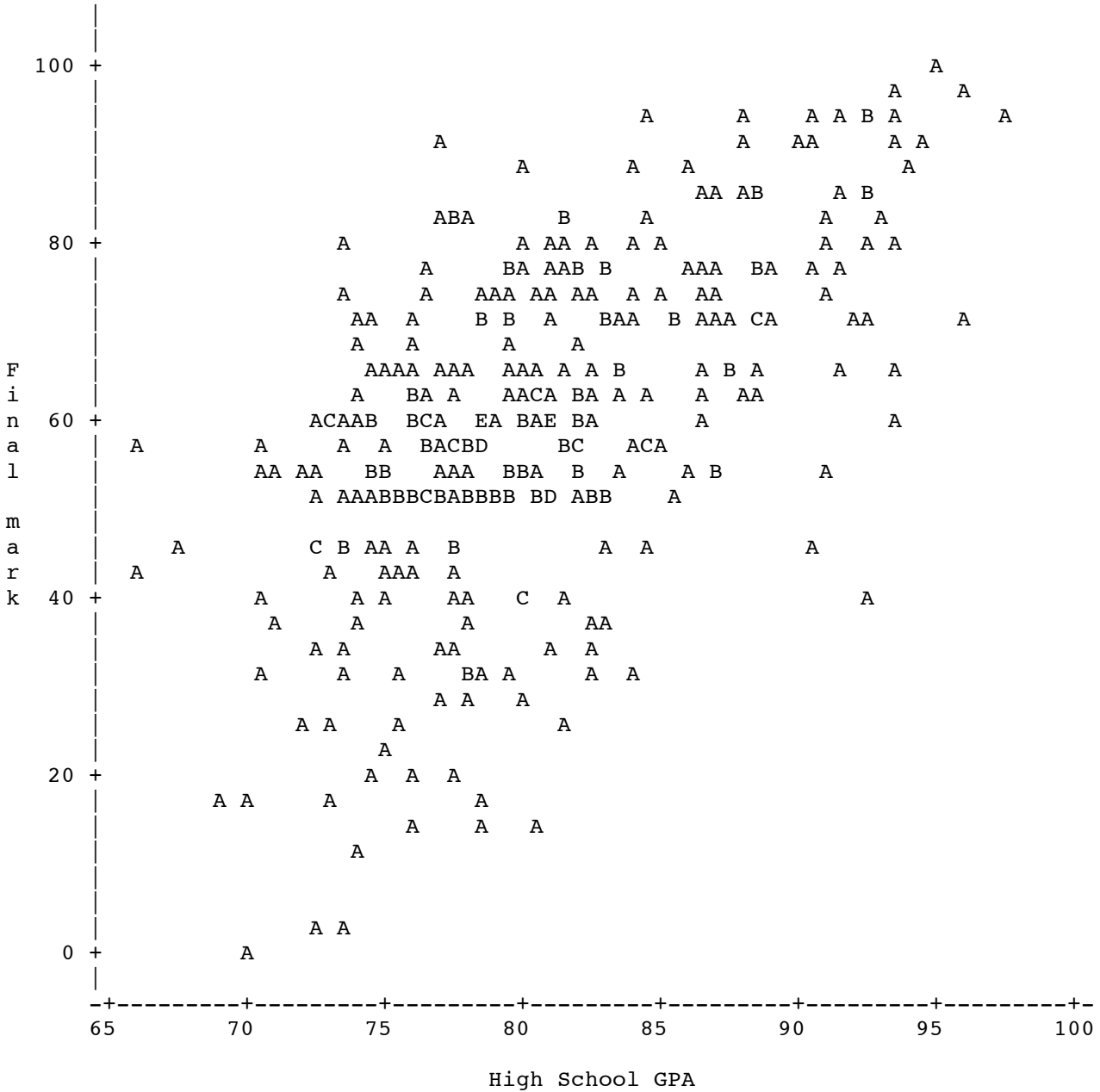
Spearman Correlation Coefficients

Prob > |r| under H0: Rho=0  
Number of Observations

	grade
hsgpa High School GPA	0.55825 <.0001 337
hscalc HS Calculus	0.58847 <.0001 332
hsengl HS English	0.17970 0.0008 345
precalc Number precalculus correct	0.35195 <.0001 346
calc Number calculus correct	0.34462 <.0001 346
totscore Total # right on diagnostic test	0.39039 <.0001 346

Gender, Ethnicity and Math performance  
 University Calculus Grade by HS GPA

Plot of grade\*hs GPA. Legend: A = 1 obs, B = 2 obs, etc.



NOTE: 242 obs had missing values.

Gender, Ethnicity and Math performance  
Give an equation for predicting calculus grade from HS GPA

10

The REG Procedure  
Model: MODEL1  
Dependent Variable: grade Final mark

Number of Observations Read	579
Number of Observations Used	337
Number of Observations with Missing Values	242

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	39116	39116	170.97	<.0001
Error	335	76644	228.78925		
Corrected Total	336	115760			

Root MSE	15.12578	R-Square	0.3379
Dependent Mean	59.28190	Adj R-Sq	0.3359
Coeff Var	25.51501		

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	Intercept	1	-84.85069	11.05385	-7.68	<.0001
hsgpa	High School GPA	1	1.78889	0.13681	13.08	<.0001



---

Gender, Ethnicity and Math performance 11  
 Do average marks differ significantly in the three courses?

The GLM Procedure

Class Level Information

Class	Levels	Values
course2	3	1 2 3
Number of Observations Read		579
Number of Observations Used		346

---

Gender, Ethnicity and Math performance 12  
 Do average marks differ significantly in the three courses?

The GLM Procedure

Dependent Variable: grade      Final mark

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	612.6624	306.3312	0.84	0.4317
Error	343	124775.1873	363.7761		
Corrected Total	345	125387.8497			

R-Square	Coeff Var	Root MSE	grade Mean
0.004886	32.03198	19.07291	59.54335

Source	DF	Type I SS	Mean Square	F Value	Pr > F
course2	2	612.6623710	306.3311855	0.84	0.4317

Source	DF	Type III SS	Mean Square	F Value	Pr > F
course2	2	612.6623710	306.3311855	0.84	0.4317

Gender, Ethnicity and Math performance 13  
 Do average marks differ significantly in the three courses?

The GLM Procedure

Level of course2	N	-----grade----- Mean	Std Dev
1	24	54.7500000	21.8955028
2	285	59.8105263	18.5206174
3	37	60.5945946	21.3000515

Gender, Ethnicity and Math performance 14  
 Is there a sex difference in average marks?

The GLM Procedure

Class Level Information

Class	Levels	Values
sex	2	Female Male

Number of Observations Read	579
Number of Observations Used	383

Gender, Ethnicity and Math performance 15  
 Is there a sex difference in average marks?

The GLM Procedure

Dependent Variable: grade Final mark

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	110.7945	110.7945	0.30	0.5870
Error	381	142806.7564	374.8209		
Corrected Total	382	142917.5509			

R-Square	Coeff Var	Root MSE	grade Mean
0.000775	33.00246	19.36029	58.66319

Source	DF	Type I SS	Mean Square	F Value	Pr > F
sex	1	110.7945190	110.7945190	0.30	0.5870

Source	DF	Type III SS	Mean Square	F Value	Pr > F
sex	1	110.7945190	110.7945190	0.30	0.5870

16

Gender, Ethnicity and Math performance  
Is there a sex difference in average marks?

The GLM Procedure

Level of sex	N	Mean	Std Dev
Female	193	58.1295337	18.4319923
Male	190	59.2052632	20.2598196

17

Gender, Ethnicity and Math performance  
Could we conclude NO sex difference?

The TTEST Procedure

Statistics

Variable	sex	N	Lower CL Mean	Mean	Upper CL Mean	Lower CL Std Dev	Std Dev
grade	Female	193	55.513	58.13	60.746	16.758	18.432
grade	Male	190	56.306	59.205	62.105	18.407	20.26
grade	Diff (1-2)		-4.966	-1.076	2.8146	18.078	19.36

Statistics

Variable	sex	Upper CL Std Dev	Std Err	Minimum	Maximum
grade	Female	20.48	1.3268	4	97
grade	Male	22.531	1.4698	1	99
grade	Diff (1-2)	20.84	1.9786		

T-Tests

Variable	Method	Variances	DF	t Value	Pr >  t
grade	Pooled	Equal	381	-0.54	0.5870
grade	Satterthwaite	Unequal	376	-0.54	0.5873

Equality of Variances

Variable	Method	Num DF	Den DF	F Value	Pr > F
grade	Folded F	189	192	1.21	0.1926

Gender, Ethnicity and Math performance  
Do average marks depend on mother tongue?

18

The GLM Procedure

Class Level Information

Class	Levels	Values
tongue	2	English Other
Number of Observations Read		579
Number of Observations Used		383

Gender, Ethnicity and Math performance  
Do average marks depend on mother tongue?

19

The GLM Procedure

Dependent Variable: grade Final mark

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	2064.4317	2064.4317	5.58	0.0186
Error	381	140853.1192	369.6932		
Corrected Total	382	142917.5509			

R-Square	Coeff Var	Root MSE	grade Mean
0.014445	32.77594	19.22741	58.66319

Source	DF	Type I SS	Mean Square	F Value	Pr > F
tongue	1	2064.431684	2064.431684	5.58	0.0186

Source	DF	Type III SS	Mean Square	F Value	Pr > F
tongue	1	2064.431684	2064.431684	5.58	0.0186

---

Gender, Ethnicity and Math performance 20  
Do average marks depend on mother tongue?

The GLM Procedure

Level of tongue	N	-----grade----- Mean	Std Dev
English	289	57.3391003	19.2338287
Other	94	62.7340426	19.2075117

---

Gender, Ethnicity and Math performance 21  
Do average marks depend on ethnic background?

The GLM Procedure

Class Level Information

Class	Levels	Values
ethnic	6	Asian East Indian Eastern European European not Eastern Middle-Eastern and Pakistani Other and DK
		Number of Observations Read <span style="float: right;">579</span>
		Number of Observations Used <span style="float: right;">393</span>

---

Gender, Ethnicity and Math performance 22  
Do average marks depend on ethnic background?

The GLM Procedure

Dependent Variable: grade		Final mark			
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	3640.9573	728.1915	2.00	0.0772
Error	387	140613.0478	363.3412		
Corrected Total	392	144254.0051			
	R-Square	Coeff Var	Root MSE	grade Mean	
	0.025240	32.45180	19.06151	58.73791	

Source	DF	Type I SS	Mean Square	F Value	Pr > F
ethnic	5	3640.957278	728.191456	2.00	0.0772

Source	DF	Type III SS	Mean Square	F Value	Pr > F
ethnic	5	3640.957278	728.191456	2.00	0.0772

Gender, Ethnicity and Math performance 23  
Do average marks depend on ethnic background?

The GLM Procedure

Level of ethnic	N	-----grade----- Mean	Std Dev
Asian	87	60.0574713	20.9314253
East Indian	53	65.1886792	18.5317364
Eastern European	46	55.7608696	20.2771736
European not Eastern	142	56.2816901	17.8581353
Middle-Eastern and Pakistani	50	59.3600000	19.9691190
Other and DK	15	58.6000000	12.1526011

Gender, Ethnicity and Math performance 24  
Do average marks depend on ethnic background?

The GLM Procedure

Tukey's Studentized Range (HSD) Test for grade

NOTE: This test controls the Type I experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	387
Error Mean Square	363.3412
Critical Value of Studentized Range	4.05040

Comparisons significant at the 0.05 level are indicated by \*\*\*.

	ethnic Comparison	Difference Between Means
East Indian	- Asian	5.131
East Indian	- Middle-Eastern and Pakistani	5.829
East Indian	- Other and DK	6.589
East Indian	- European not Eastern	8.907
East Indian	- Eastern European	9.428
Asian	- East Indian	-5.131
Asian	- Middle-Eastern and Pakistani	0.697
Asian	- Other and DK	1.457
Asian	- European not Eastern	3.776
Asian	- Eastern European	4.297
Middle-Eastern and Pakistani	- East Indian	-5.829
Middle-Eastern and Pakistani	- Asian	-0.697
Middle-Eastern and Pakistani	- Other and DK	0.760
Middle-Eastern and Pakistani	- European not Eastern	3.078
Middle-Eastern and Pakistani	- Eastern European	3.599
Other and DK	- East Indian	-6.589
Other and DK	- Asian	-1.457
Other and DK	- Middle-Eastern and Pakistani	-0.760
Other and DK	- European not Eastern	2.318
Other and DK	- Eastern European	2.839
European not Eastern	- East Indian	-8.907
European not Eastern	- Asian	-3.776
European not Eastern	- Middle-Eastern and Pakistani	-3.078
European not Eastern	- Other and DK	-2.318
European not Eastern	- Eastern European	0.521
Eastern European	- East Indian	-9.428
Eastern European	- Asian	-4.297
Eastern European	- Middle-Eastern and Pakistani	-3.599
Eastern European	- Other and DK	-2.839
Eastern European	- European not Eastern	-0.521

The GLM Procedure

Tukey's Studentized Range (HSD) Test for grade

Comparisons significant at the 0.05 level are indicated by \*\*\*.

	ethnic Comparison	Simultaneous 95% Confidence Limits
East Indian	- Asian	-4.382 14.644
East Indian	- Middle-Eastern and Pakistani	-4.934 16.592
East Indian	- Other and DK	-9.378 22.555
East Indian	- European not Eastern	0.119 17.695
East Indian	- Eastern European	-1.573 20.429
Asian	- East Indian	-14.644 4.382
Asian	- Middle-Eastern and Pakistani	-8.991 10.386
Asian	- Other and DK	-13.805 16.720
Asian	- European not Eastern	-3.657 11.209
Asian	- Eastern European	-5.656 14.249
Middle-Eastern and Pakistani	- East Indian	-16.592 4.934
Middle-Eastern and Pakistani	- Asian	-10.386 8.991
Middle-Eastern and Pakistani	- Other and DK	-15.312 16.832
Middle-Eastern and Pakistani	- European not Eastern	-5.899 12.056
Middle-Eastern and Pakistani	- Eastern European	-7.554 14.753
Other and DK	- East Indian	-22.555 9.378
Other and DK	- Asian	-16.720 13.805
Other and DK	- Middle-Eastern and Pakistani	-16.832 15.312
Other and DK	- European not Eastern	-12.503 17.140
Other and DK	- Eastern European	-13.393 19.071
European not Eastern	- East Indian	-17.695 -0.119
European not Eastern	- Asian	-11.209 3.657
European not Eastern	- Middle-Eastern and Pakistani	-12.056 5.899
European not Eastern	- Other and DK	-17.140 12.503
European not Eastern	- Eastern European	-8.741 9.783
Eastern European	- East Indian	-20.429 1.573
Eastern European	- Asian	-14.249 5.656
Eastern European	- Middle-Eastern and Pakistani	-14.753 7.554
Eastern European	- Other and DK	-19.071 13.393
Eastern European	- European not Eastern	-9.783 8.741



Comparisons significant at the 0.05 level are indicated by \*\*\*.

ethnic  
Comparison

East Indian	- Asian	
East Indian	- Middle-Eastern and Pakistani	
East Indian	- Other and DK	
East Indian	- European not Eastern	***
East Indian	- Eastern European	
Asian	- East Indian	
Asian	- Middle-Eastern and Pakistani	
Asian	- Other and DK	
Asian	- European not Eastern	
Asian	- Eastern European	
Middle-Eastern and Pakistani	- East Indian	
Middle-Eastern and Pakistani	- Asian	
Middle-Eastern and Pakistani	- Other and DK	
Middle-Eastern and Pakistani	- European not Eastern	
Middle-Eastern and Pakistani	- Eastern European	
Other and DK	- East Indian	
Other and DK	- Asian	
Other and DK	- Middle-Eastern and Pakistani	
Other and DK	- European not Eastern	
Other and DK	- Eastern European	
European not Eastern	- East Indian	***
European not Eastern	- Asian	
European not Eastern	- Middle-Eastern and Pakistani	
European not Eastern	- Other and DK	
European not Eastern	- Eastern European	
Eastern European	- East Indian	
Eastern European	- Asian	
Eastern European	- Middle-Eastern and Pakistani	
Eastern European	- Other and DK	
Eastern European	- European not Eastern	

We get exactly the same kind of output for the Bonferroni and Scheffe comparisons. Just display the pages corresponding to this one, showing which differences are significant by the follow-up tests.

The GLM Procedure

Bonferroni (Dunn) t Tests for grade

Comparisons significant at the 0.05 level are indicated by \*\*\*.

ethnic  
Comparison

East Indian	- Asian
East Indian	- Middle-Eastern and Pakistani
East Indian	- Other and DK
East Indian	- European not Eastern
East Indian	- Eastern European
Asian	- East Indian
Asian	- Middle-Eastern and Pakistani
Asian	- Other and DK
Asian	- European not Eastern
Asian	- Eastern European
Middle-Eastern and Pakistani	- East Indian
Middle-Eastern and Pakistani	- Asian
Middle-Eastern and Pakistani	- Other and DK
Middle-Eastern and Pakistani	- European not Eastern
Middle-Eastern and Pakistani	- Eastern European
Other and DK	- East Indian
Other and DK	- Asian
Other and DK	- Middle-Eastern and Pakistani
Other and DK	- European not Eastern
Other and DK	- Eastern European
European not Eastern	- East Indian
European not Eastern	- Asian
European not Eastern	- Middle-Eastern and Pakistani
European not Eastern	- Other and DK
European not Eastern	- Eastern European
Eastern European	- East Indian
Eastern European	- Asian
Eastern European	- Middle-Eastern and Pakistani
Eastern European	- Other and DK
Eastern European	- European not Eastern

The GLM Procedure

Scheffe's Test for grade

NOTE: This test controls the Type I experimentwise error rate, but it generally has a higher Type II error rate than Tukey's for all pairwise comparisons.

Alpha	0.05
Error Degrees of Freedom	387
Error Mean Square	363.3412
Critical Value of F	2.23731

Comparisons significant at the 0.05 level are indicated by \*\*\*.

ethnic  
Comparison

East Indian	- Asian
East Indian	- Middle-Eastern and Pakistani
East Indian	- Other and DK
East Indian	- European not Eastern
East Indian	- Eastern European
Asian	- East Indian
Asian	- Middle-Eastern and Pakistani
Asian	- Other and DK
Asian	- European not Eastern
Asian	- Eastern European
Middle-Eastern and Pakistani	- East Indian
Middle-Eastern and Pakistani	- Asian
Middle-Eastern and Pakistani	- Other and DK
Middle-Eastern and Pakistani	- European not Eastern
Middle-Eastern and Pakistani	- Eastern European
Other and DK	- East Indian
Other and DK	- Asian
Other and DK	- Middle-Eastern and Pakistani
Other and DK	- European not Eastern
Other and DK	- Eastern European
European not Eastern	- East Indian
European not Eastern	- Asian
European not Eastern	- Middle-Eastern and Pakistani
European not Eastern	- Other and DK
European not Eastern	- Eastern European
Eastern European	- East Indian
Eastern European	- Asian
Eastern European	- Middle-Eastern and Pakistani
Eastern European	- Other and DK
Eastern European	- European not Eastern

Gender, Ethnicity and Math performance  
 A few Chisquare tests to predict passed

The FREQ Procedure

Table of course2 by passed

course2	passed(Passed the course)		Total
	No	Yes	
1	44 74.58	15 25.42	59
2	149 39.95	224 60.05	373
3	8 20.51	31 79.49	39
Total	201	270	471

Frequency Missing = 108

Statistics for Table of course2 by passed

Statistic	DF	Value	Prob
Chi-Square	2	33.5096	<.0001
Likelihood Ratio Chi-Square	2	34.4171	<.0001
Mantel-Haenszel Chi-Square	1	31.6717	<.0001
Phi Coefficient		0.2667	
Contingency Coefficient		0.2577	
Cramer's V		0.2667	

Effective Sample Size = 471  
 Frequency Missing = 108

WARNING: 19% of the data are missing.

Table of sex by passed

sex	passed(Passed the course)		
Frequency	No	Yes	Total
Female	118 44.36	148 55.64	266
Male	138 48.42	147 51.58	285
Total	256	295	551

Frequency Missing = 28

Gender, Ethnicity and Math performance  
A few Chisquare tests to predict passed

34

The FREQ Procedure

Statistics for Table of sex by passed

Statistic	DF	Value	Prob
Chi-Square	1	0.9118	0.3396
Likelihood Ratio Chi-Square	1	0.9122	0.3395
Continuity Adj. Chi-Square	1	0.7559	0.3846
Mantel-Haenszel Chi-Square	1	0.9101	0.3401
Phi Coefficient		-0.0407	
Contingency Coefficient		0.0406	
Cramer's V		-0.0407	

Fisher's Exact Test

Cell (1,1) Frequency (F)	118
Left-sided Pr <= F	0.1923
Right-sided Pr >= F	0.8509
Table Probability (P)	0.0432
Two-sided Pr <= P	0.3484

Effective Sample Size = 551  
Frequency Missing = 28

Table of ethnic by passed

ethnic(Judged Nationality of name) Frequency Row Pct	passed(Passed the course)		Total
	No	Yes	
Asian	65 49.62	66 50.38	131
Eastern European	30 47.62	33 52.38	63
European not Eastern	88 45.13	107 54.87	195
Middle-Eastern and Pakistani	33 45.83	39 54.17	72
East Indian	31 39.74	47 60.26	78
Other and DK	27 67.50	13 32.50	40
Total	274	305	579

Gender, Ethnicity and Math performance  
A few Chisquare tests to predict passed

35

The FREQ Procedure

Statistics for Table of ethnic by passed

Statistic	DF	Value	Prob
Chi-Square	5	9.0500	0.1071
Likelihood Ratio Chi-Square	5	9.1556	0.1030
Mantel-Haenszel Chi-Square	1	0.0788	0.7789
Phi Coefficient		0.1250	
Contingency Coefficient		0.1241	
Cramer's V		0.1250	

Sample Size = 579

Table of tongue by passed

tongue(Mother Tongue (Eng or Other))		passed(Passed the course)		
Frequency				
Row Pct	No	Yes		Total
English	187 46.52	215 53.48		402
Other	69 46.31	80 53.69		149
Total	256	295		551

Frequency Missing = 28

Gender, Ethnicity and Math performance  
A few Chisquare tests to predict passed

36

The FREQ Procedure

Statistics for Table of tongue by passed

Statistic	DF	Value	Prob
Chi-Square	1	0.0019	0.9652
Likelihood Ratio Chi-Square	1	0.0019	0.9652
Continuity Adj. Chi-Square	1	0.0000	1.0000
Mantel-Haenszel Chi-Square	1	0.0019	0.9652
Phi Coefficient		0.0019	
Contingency Coefficient		0.0019	
Cramer's V		0.0019	

Fisher's Exact Test

Cell (1,1) Frequency (F)	187
Left-sided Pr <= F	0.5552
Right-sided Pr >= F	0.5214
Table Probability (P)	0.0765
Two-sided Pr <= P	1.0000

Effective Sample Size = 551  
Frequency Missing = 28

The FREQ Procedure

Table of course2 by gsplit

course2      gsplit(Median split on final grade)

Frequency Row Pct	60orLess	Over60	Total
1	15 62.50	9 37.50	24
2	145 50.88	140 49.12	285
3	17 45.95	20 54.05	37
Total	177	169	346

Frequency Missing = 233

Statistics for Table of course2 by gsplit

Statistic	DF	Value	Prob
Chi-Square	2	1.6469	0.4389
Likelihood Ratio Chi-Square	2	1.6623	0.4356
Mantel-Haenszel Chi-Square	1	1.4261	0.2324
Phi Coefficient		0.0690	
Contingency Coefficient		0.0688	
Cramer's V		0.0690	

Effective Sample Size = 346

Frequency Missing = 233

WARNING: 40% of the data are missing.



Table of sex by gsplit

sex            gsplit(Median split on final grade)

Frequency	60orLess	Over60	Total
Female	106 54.92	87 45.08	193
Male	99 52.11	91 47.89	190
Total	205	178	383

Frequency Missing = 196

Gender, Ethnicity and Math performance  
Median tests

38

The FREQ Procedure

Statistics for Table of sex by gsplit

Statistic	DF	Value	Prob
Chi-Square	1	0.3054	0.5805
Likelihood Ratio Chi-Square	1	0.3055	0.5805
Continuity Adj. Chi-Square	1	0.2027	0.6526
Mantel-Haenszel Chi-Square	1	0.3046	0.5810
Phi Coefficient		0.0282	
Contingency Coefficient		0.0282	
Cramer's V		0.0282	

Fisher's Exact Test

Cell (1,1) Frequency (F)	106
Left-sided Pr <= F	0.7438
Right-sided Pr >= F	0.3263
Table Probability (P)	0.0701
Two-sided Pr <= P	0.6092

Effective Sample Size = 383  
Frequency Missing = 196

WARNING: 34% of the data are missing.

The FREQ Procedure

Table of ethnic by gsplit

ethnic(Judged Nationality of name)		gsplit(Median split on final grade)		Total
Frequency	Row Pct	60orLess	Over60	
Asian		41 47.13	46 52.87	87
Eastern European		27 58.70	19 41.30	46
European not Eastern		86 60.56	56 39.44	142
Middle-Eastern and Pakistani		30 60.00	20 40.00	50
East Indian		17 32.08	36 67.92	53
Other and DK		10 66.67	5 33.33	15
Total		211	182	393

Frequency Missing = 186

Statistics for Table of ethnic by gsplit

Statistic	DF	Value	Prob
Chi-Square	5	16.4443	0.0057
Likelihood Ratio Chi-Square	5	16.6079	0.0053
Mantel-Haenszel Chi-Square	1	0.1169	0.7324
Phi Coefficient		0.2046	
Contingency Coefficient		0.2004	
Cramer's V		0.2046	

Effective Sample Size = 393

Frequency Missing = 186

WARNING: 32% of the data are missing.

The FREQ Procedure

Table of tongue by gsplit

```
tongue(Mother Tongue (Eng or Other))
      gsplit(Median split on final grade)
Frequency|
Row Pct  |60orLess|Over60  | Total
-----+-----+-----+
English  |      165|      124 |    289
         |      57.09|      42.91 |
-----+-----+-----+
Other    |      40 |      54  |    94
         |      42.55|      57.45 |
-----+-----+-----+
Total    |      205|      178 |   383
```

Frequency Missing = 196

Statistics for Table of tongue by gsplit

Statistic	DF	Value	Prob
Chi-Square	1	6.0283	0.0141
Likelihood Ratio Chi-Square	1	6.0242	0.0141
Continuity Adj. Chi-Square	1	5.4579	0.0195
Mantel-Haenszel Chi-Square	1	6.0125	0.0142
Phi Coefficient		0.1255	
Contingency Coefficient		0.1245	
Cramer's V		0.1255	

Fisher's Exact Test

```
-----
Cell (1,1) Frequency (F)      165
Left-sided Pr <= F            0.9950
Right-sided Pr >= F           0.0098

Table Probability (P)          0.0047
Two-sided Pr <= P              0.0171
```

Effective Sample Size = 383  
 Frequency Missing = 196

WARNING: 34% of the data are missing.