**/\*\*\*\*\*\*\*\*\*\*\*\* Exercise 14.11 & 14.12 \*\*\*\*\*\*\*\*\*\*\*/**

**data** icecream;

input ratings Sweetener$ milkfat$ air$;

datalines;

23 12% 10% 5%

24 12% 10% 5%

25 12% 10% 5%

36 12% 10% 10%

35 12% 10% 10%

36 12% 10% 10%

28 12% 10% 15%

24 12% 10% 15%

27 12% 10% 15%

27 12% 12% 5%

28 12% 12% 5%

26 12% 12% 5%

34 12% 12% 10%

38 12% 12% 10%

39 12% 12% 10%

35 12% 12% 15%

35 12% 12% 15%

34 12% 12% 15%

31 12% 15% 5%

32 12% 15% 5%

29 12% 15% 5%

33 12% 15% 10%

34 12% 15% 10%

35 12% 15% 10%

26 12% 15% 15%

27 12% 15% 15%

25 12% 15% 15%

24 16% 10% 5%

23 16% 10% 5%

28 16% 10% 5%

37 16% 10% 10%

39 16% 10% 10%

35 16% 10% 10%

26 16% 10% 15%

29 16% 10% 15%

25 16% 10% 15%

38 16% 12% 5%

36 16% 12% 5%

35 16% 12% 5%

34 16% 12% 10%

38 16% 12% 10%

36 16% 12% 10%

36 16% 12% 15%

37 16% 12% 15%

34 16% 12% 15%

34 16% 15% 5%

36 16% 15% 5%

39 16% 15% 5%

34 16% 15% 10%

36 16% 15% 10%

31 16% 15% 10%

28 16% 15% 15%

26 16% 15% 15%

24 16% 15% 15%

;

**run**;

/\*\*\*\*\* factorial structure ANOVA \*\*\*\*\*\*/

**proc** **glm** data= icecream;

class sweetener milkfat air;

model ratings = sweetener milkfat air sweetener\*milkfat milkfat\*air sweetener\*air sweetener\*milkfat\*air;

output out = resid r= res;

**run**;

/\*\*\* Profile plot for effect of milkfat & air on ratings for two levels of sweeteners \*\*\*/

**proc** **sort** data=icecream; by sweetener;

**proc** **glm** data= icecream;

class milkfat air;

by sweetener;

model ratings = milkfat|air;

**run**;

**quit**;

/**\*\*\*\*\* Ex 14.13 - Equal variances assumption check on residuals \*\*\*/**

**proc** **glm** data= resid;

class res ;

model ratings = res ;

means res / hovtest = levene ;

**run**;

/\*\*\*\* residuals normality assumption check \*\*\*\*/

**proc** **univariate** data = resid normal plot;

var res;

**run**;

/\*\*\*\* finding critical value of F \*\*\*\*/

**data** findf;

f\_critical = finv(**0.95**,**4**,**36**);

**run**;

**/\*\*\*\*\*\*\*\*\* Exercise 14.20 & 14.21 \*\*\*\*\*\*\*\*\*\*/**

**data** soy;

input yields Mn Cu;

datalines;

1558 20 1

1578 20 1

1590 20 3

1610 20 3

1558 20 5

1550 20 5

1328 20 7

1427 20 7

2003 50 1

2033 50 1

2020 50 3

2051 50 3

2003 50 5

2010 50 5

2010 50 7

2031 50 7

2490 80 1

2470 80 1

2620 80 3

2632 80 3

2490 80 5

2690 80 5

2887 80 7

2832 80 7

2830 110 1

2810 110 1

2860 110 3

2841 110 3

2830 110 5

2910 110 5

2960 110 7

2941 110 7

;

**run**;

/\*\*\* Profile plot for effect of cu & mn on soybean yield \*\*\*/

**proc** **glm** data= soy;

class cu mn;

model yields = cu|mn;

output out = resid1 r= res1;

**run**;

**quit**;

/\*\*\*\* finding critical value of F \*\*\*\*/

**data** findf\_;

f\_critical = finv(**0.95**,**9**,**16**);

**run**;