> model15= lm(Test3~Test1+Test2 +Gender+Year + lnGPA + CrHrs +sqrCrHrs + Stick + ClassRow + CokePepsi + siblings + countries + sqrJobs +jobs+ DogCat)

> rstandard = rstandard(model15)

> leverages = hatvalues(model15)

> cooks = cooks.distance(model15)

> rstandard[order(rstandard)]

36 23 25 15 27 22 7

-2.50702842 -1.96009251 -1.71241591 -0.93636357 -0.93450031 -0.81444747 -0.55423126

2 28 34 11 19 21 26

-0.55398582 -0.41698215 -0.40312759 -0.39873843 -0.32270350 -0.31629533 -0.23843069

9 6 35 5 33 31 3

-0.10141604 -0.01168035 0.10141604 0.10528500 0.16929613 0.19113415 0.23963294

13 30 16 14 10 4 1

0.24599635 0.25182738 0.27880182 0.41166414 0.46261636 0.56314691 0.86556144

17 18 29 32 8 24 12

1.09966503 1.25909337 1.31715707 1.46785327 1.72729231 1.88442876 NaN

20

NaN

> leverages[order(leverages)]

25 4 23 22 3 18 7 26

0.3065547 0.3523467 0.3835984 0.3840451 0.3918877 0.3975792 0.4249472 0.4296137

31 29 24 14 33 1 13 21

0.4311925 0.4487724 0.4504502 0.4643788 0.4787908 0.4867327 0.4872349 0.4967646

17 15 2 11 30 16 36 5

0.5147099 0.5213397 0.5255145 0.5332198 0.5418834 0.5502876 0.5711024 0.5740181

34 19 27 8 32 10 28 6

0.5880871 0.5942190 0.6116289 0.6595708 0.6712533 0.6930204 0.6991648 0.7227345

35 9 12 20

0.8066780 0.8066780 1.0000000 1.0000000

> cooks[order(cooks)]

6 5 33 31 3 26

1.778134e-05 7.468571e-04 1.316430e-03 1.384690e-03 1.850294e-03 2.140935e-03

35 9 13 30 16 21

2.145864e-03 2.145864e-03 2.875063e-03 3.750643e-03 4.755718e-03 4.937818e-03

14 19 4 11 7 34

7.346333e-03 7.624867e-03 8.626627e-03 9.081134e-03 1.134957e-02 1.160089e-02

2 28 22 10 1 15

1.699531e-02 2.020486e-02 2.067900e-02 2.415730e-02 3.552326e-02 4.774770e-02

18 17 25 27 29 23

5.231298e-02 6.412863e-02 6.481632e-02 6.876540e-02 7.062206e-02 1.195463e-01

24 32 8 36 12 20

1.455356e-01 2.199684e-01 2.890256e-01 4.184551e-01 NaN NaN

#Like the other 3 models I built I found there is no cutoff points other than #36,12,20

#as it has 1.417 as the high leverage cutoff and 2.198 as the Cooks cutoff.

> step(model15,direction='backward',criterion='AIC')

Start: AIC=146.52

Test3 ~ Test1 + Test2 + Gender + Year + lnGPA + CrHrs + sqrCrHrs +

Stick + ClassRow + CokePepsi + siblings + countries + sqrJobs +

jobs + DogCat

Df Sum of Sq RSS AIC

- Stick 3 34.59 728.57 142.27

- Year 2 35.54 729.53 144.32

- siblings 1 0.60 694.59 144.55

- DogCat 1 12.84 706.83 145.18

- lnGPA 1 37.43 731.42 146.41

<none> 693.99 146.52

- ClassRow 1 47.77 741.76 146.92

- jobs 1 58.78 752.77 147.45

- countries 1 67.11 761.10 147.84

- sqrCrHrs 1 69.90 763.88 147.98

- CrHrs 1 70.28 764.27 147.99

- sqrJobs 1 80.25 774.23 148.46

- CokePepsi 2 133.72 827.71 148.87

- Gender 1 151.75 845.74 151.64

- Test2 1 218.87 912.86 154.39

- Test1 1 733.32 1427.30 170.48

Step: AIC=142.27

Test3 ~ Test1 + Test2 + Gender + Year + lnGPA + CrHrs + sqrCrHrs +

ClassRow + CokePepsi + siblings + countries + sqrJobs + jobs +

DogCat

Df Sum of Sq RSS AIC

- Year 2 42.04 770.61 140.29

- siblings 1 1.06 729.64 140.32

- DogCat 1 11.30 739.87 140.83

- lnGPA 1 34.89 763.46 141.96

<none> 728.57 142.27

- ClassRow 1 54.54 783.12 142.87

- countries 1 73.37 801.94 143.73

- CokePepsi 2 121.45 850.02 143.82

- jobs 1 81.79 810.36 144.10

- sqrJobs 1 113.70 842.27 145.49

- sqrCrHrs 1 114.59 843.17 145.53

- CrHrs 1 115.93 844.51 145.59

- Gender 1 152.96 881.53 147.13

- Test2 1 219.00 947.57 149.73

- Test1 1 724.42 1452.99 165.12

Step: AIC=140.29

Test3 ~ Test1 + Test2 + Gender + lnGPA + CrHrs + sqrCrHrs + ClassRow +

CokePepsi + siblings + countries + sqrJobs + jobs + DogCat

Df Sum of Sq RSS AIC

- siblings 1 1.50 772.11 138.36

- lnGPA 1 9.55 780.16 138.74

- DogCat 1 20.27 790.89 139.23

- CokePepsi 2 87.13 857.74 140.15

- countries 1 42.01 812.62 140.20

<none> 770.61 140.29

- jobs 1 44.21 814.83 140.30

- ClassRow 1 75.37 845.99 141.65

- sqrJobs 1 77.05 847.67 141.72

- sqrCrHrs 1 89.67 860.28 142.25

- CrHrs 1 90.83 861.45 142.30

- Gender 1 124.09 894.70 143.67

- Test2 1 260.46 1031.07 148.77

- Test1 1 690.38 1461.00 161.32

Step: AIC=138.36

Test3 ~ Test1 + Test2 + Gender + lnGPA + CrHrs + sqrCrHrs + ClassRow +

CokePepsi + countries + sqrJobs + jobs + DogCat

Df Sum of Sq RSS AIC

- lnGPA 1 10.52 782.63 136.85

- DogCat 1 18.78 790.89 137.23

- CokePepsi 2 86.26 858.38 138.18

<none> 772.11 138.36

- countries 1 45.43 817.54 138.42

- jobs 1 47.30 819.41 138.50

- ClassRow 1 73.98 846.10 139.66

- sqrJobs 1 80.75 852.86 139.94

- sqrCrHrs 1 102.45 874.56 140.85

- CrHrs 1 104.18 876.30 140.92

- Gender 1 124.42 896.53 141.74

- Test2 1 259.16 1031.27 146.78

- Test1 1 696.67 1468.79 159.51

Step: AIC=136.85

Test3 ~ Test1 + Test2 + Gender + CrHrs + sqrCrHrs + ClassRow +

CokePepsi + countries + sqrJobs + jobs + DogCat

Df Sum of Sq RSS AIC

- CokePepsi 2 79.23 861.87 136.32

- countries 1 39.48 822.12 136.62

- DogCat 1 40.24 822.87 136.65

- jobs 1 41.27 823.90 136.70

<none> 782.63 136.85

- ClassRow 1 64.96 847.59 137.72

- sqrJobs 1 73.25 855.89 138.07

- sqrCrHrs 1 93.96 876.60 138.93

- CrHrs 1 95.73 878.36 139.00

- Gender 1 115.41 898.05 139.80

- Test2 1 258.46 1041.10 145.12

- Test1 1 938.51 1721.15 163.22

Step: AIC=136.32

Test3 ~ Test1 + Test2 + Gender + CrHrs + sqrCrHrs + ClassRow +

countries + sqrJobs + jobs + DogCat

Df Sum of Sq RSS AIC

- jobs 1 15.91 877.77 134.98

- countries 1 17.52 879.38 135.04

- sqrJobs 1 37.86 899.73 135.87

<none> 861.87 136.32

- DogCat 1 58.89 920.75 136.70

- sqrCrHrs 1 62.55 924.42 136.84

- CrHrs 1 65.06 926.92 136.94

- Gender 1 70.77 932.63 137.16

- ClassRow 1 134.19 996.06 139.53

- Test2 1 285.69 1147.55 144.63

- Test1 1 860.08 1721.94 159.24

Step: AIC=134.98

Test3 ~ Test1 + Test2 + Gender + CrHrs + sqrCrHrs + ClassRow +

countries + sqrJobs + DogCat

Df Sum of Sq RSS AIC

- countries 1 14.04 891.81 133.55

- DogCat 1 45.51 923.29 134.80

<none> 877.77 134.98

- sqrCrHrs 1 58.14 935.91 135.29

- Gender 1 60.41 938.18 135.38

- CrHrs 1 60.62 938.40 135.38

- sqrJobs 1 91.72 969.50 136.56

- ClassRow 1 178.76 1056.54 139.65

- Test2 1 278.70 1156.48 142.91

- Test1 1 945.28 1823.06 159.29

Step: AIC=133.55

Test3 ~ Test1 + Test2 + Gender + CrHrs + sqrCrHrs + ClassRow +

sqrJobs + DogCat

Df Sum of Sq RSS AIC

- DogCat 1 47.53 939.34 133.42

<none> 891.81 133.55

- Gender 1 56.98 948.80 133.78

- sqrCrHrs 1 59.21 951.02 133.87

- CrHrs 1 61.68 953.49 133.96

- sqrJobs 1 92.12 983.93 135.09

- ClassRow 1 204.15 1095.97 138.97

- Test2 1 287.93 1179.74 141.62

- Test1 1 1002.96 1894.77 158.68

Step: AIC=133.42

Test3 ~ Test1 + Test2 + Gender + CrHrs + sqrCrHrs + ClassRow +

sqrJobs

Df Sum of Sq RSS AIC

- Gender 1 46.19 985.54 133.15

<none> 939.34 133.42

- sqrCrHrs 1 75.77 1015.12 134.21

- CrHrs 1 78.60 1017.95 134.31

- sqrJobs 1 98.90 1038.25 135.02

- ClassRow 1 172.66 1112.01 137.50

- Test2 1 270.69 1210.04 140.54

- Test1 1 1003.58 1942.92 157.58

Step: AIC=133.15

Test3 ~ Test1 + Test2 + CrHrs + sqrCrHrs + ClassRow + sqrJobs

Df Sum of Sq RSS AIC

- sqrCrHrs 1 45.69 1031.23 132.78

- CrHrs 1 48.47 1034.01 132.88

<none> 985.54 133.15

- sqrJobs 1 76.67 1062.20 133.84

- ClassRow 1 194.93 1180.47 137.65

- Test2 1 258.56 1244.10 139.53

- Test1 1 970.68 1956.22 155.83

Step: AIC=132.78

Test3 ~ Test1 + Test2 + CrHrs + ClassRow + sqrJobs

Df Sum of Sq RSS AIC

- sqrJobs 1 41.09 1072.3 132.19

- CrHrs 1 51.89 1083.1 132.55

<none> 1031.2 132.78

- ClassRow 1 216.98 1248.2 137.65

- Test2 1 285.32 1316.5 139.57

- Test1 1 985.09 2016.3 154.92

Step: AIC=132.19

Test3 ~ Test1 + Test2 + CrHrs + ClassRow

Df Sum of Sq RSS AIC

<none> 1072.3 132.19

- CrHrs 1 92.93 1165.2 133.18

- ClassRow 1 200.19 1272.5 136.35

- Test2 1 265.18 1337.5 138.14

- Test1 1 948.68 2021.0 153.00

Call:

lm(formula = Test3 ~ Test1 + Test2 + CrHrs + ClassRow)

Coefficients:

(Intercept) Test1 Test2 CrHrs ClassRow

30.5305 0.3706 0.4716 -1.2490 1.7333

> model19=lm(formula = Test3 ~ Test1 + Test2 + CrHrs + ClassRow)

> summary(model19)

Call:

lm(formula = Test3 ~ Test1 + Test2 + CrHrs + ClassRow)

Residuals:

Min 1Q Median 3Q Max

-13.367 -1.792 1.245 3.138 9.661

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 30.53054 21.08274 1.448 0.15762

Test1 0.37058 0.07076 5.237 1.09e-05 \*\*\*

Test2 0.47159 0.17032 2.769 0.00941 \*\*

CrHrs -1.24902 0.76201 -1.639 0.11130

ClassRow 1.73329 0.72049 2.406 0.02230 \*

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 5.881 on 31 degrees of freedom

Multiple R-squared: 0.6955, Adjusted R-squared: 0.6562

F-statistic: 17.7 on 4 and 31 DF, p-value: 1.166e-07

plot(residuals(model19) ~ fitted.values(model19), main="Residuals vs.Fitted Value")



> cor(cbind(Test1,Test2,CrHrs,ClassRow))

Test1 Test2 CrHrs ClassRow

Test1 1.000000000 0.4685290 0.008831843 -0.06798919

Test2 0.468528996 1.0000000 -0.251231740 -0.25107650

CrHrs 0.008831843 -0.2512317 1.000000000 0.11957516

ClassRow -0.067989188 -0.2510765 0.119575165 1.00000000

> #There is no high Collinearity