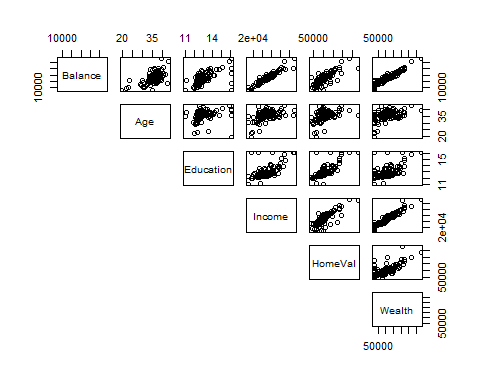
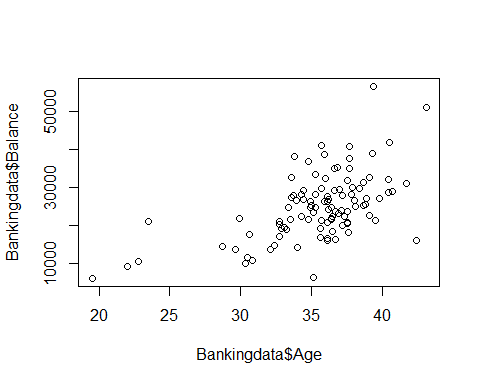
#problem 1(A)

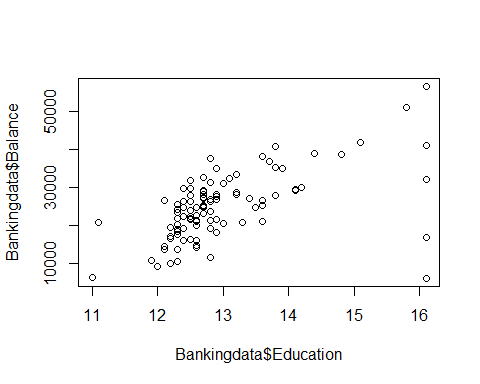
# Load the data  
Bankingdata <- read.table("Bankingfull.txt", header = TRUE)  
  
# Scatterplot matrix  
pairs(Bankingdata[,c("Balance", "Age", "Education", "Income", "HomeVal", "Wealth")], lower.panel=NULL)



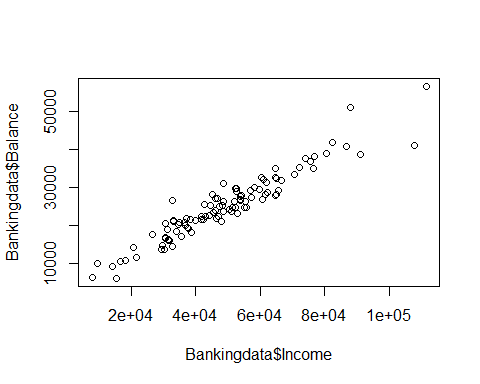
# Individual scatterplots  
plot(Bankingdata$Balance ~ Bankingdata$Age)



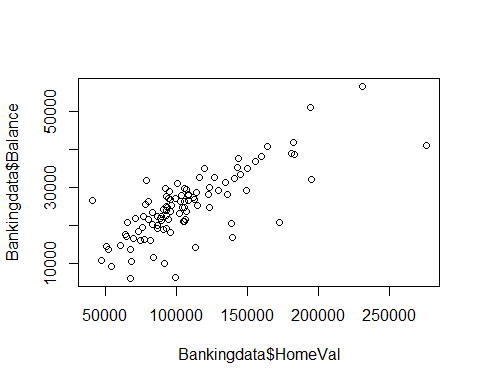
plot(Bankingdata$Balance ~ Bankingdata$Education)



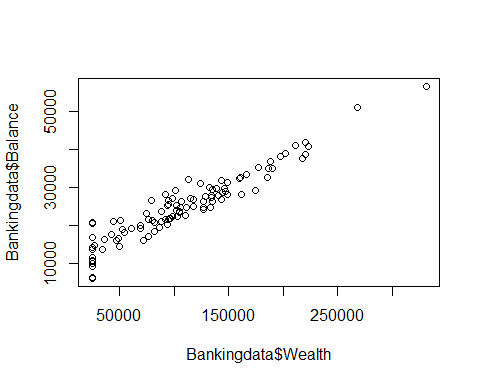
plot(Bankingdata$Balance ~ Bankingdata$Income)



plot(Bankingdata$Balance ~ Bankingdata$HomeVal)



plot(Bankingdata$Balance ~ Bankingdata$Wealth)



Explanation:

Balance vs Age: Reasonably linear positive association, but more scattered than some of the other relationships

Balance vs Education: Fairly linear trend but narrower range of values compared to other variables

Balance vs Income: Strong linear positive relationship

Balance vs Home Value: Strong linear positive relationship

Balance vs Wealth: Very strong linear positive relationship

In summary, the scatterplots suggest reasonably linear relationships between Balance and the other variables, with the strongest linear associations for Income, Home Value, and Wealth. The relationship between Balance and Age appears more scattered and less linear compared to the others.

So based on the visual patterns, I would conclude there are reasonably linear associations between Balance and the other variables in the data set, with Income, HomeVal and Wealth having the strongest linear relationships

#problem 1(B)

cor(Bankingdata[,c("Balance", "Age", "Education", "Income", "HomeVal", "Wealth")])

## Balance Age Education Income HomeVal Wealth  
## Balance 1.0000000 0.5654668 0.5548807 0.9516845 0.7663871 0.9487117  
## Age 0.5654668 1.0000000 0.1734071 0.4771474 0.3864931 0.4680918  
## Education 0.5548807 0.1734071 1.0000000 0.5753940 0.7535211 0.4694130  
## Income 0.9516845 0.4771474 0.5753940 1.0000000 0.7953552 0.9466654  
## HomeVal 0.7663871 0.3864931 0.7535211 0.7953552 1.0000000 0.6984778  
## Wealth 0.9487117 0.4680918 0.4694130 0.9466654 0.6984778 1.0000000

Explanation: Balance has a very strong positive correlation with Income (0.9516845) and Wealth (0.9487117). This indicates a strong linear relationship between Balance and these two variables.

Balance also has a moderately strong positive correlation with HomeVal (0.7663871). So there is a fairly strong association here as well.

The correlations between Balance and Age (0.5654668) and Education (0.5548807) are positive but more moderate in strength.

Income and Wealth have a very high correlation (0.95), indicating they are capturing very similar information. This multicollinearity should be considered in modeling.

In summary, Income, Wealth and HomeVal appear to have the strongest linear associations with Balance based on the correlation analysis. Age and Education have positive but weaker correlations. There is a high degree of multicollinearity between Income and Wealth that needs to be accounted for in the regression modeling.

#problem 1(c)

model1 <- lm(Balance ~ Age + Education + Income + HomeVal + Wealth, data = Bankingdata)  
summary(model1)

##   
## Call:  
## lm(formula = Balance ~ Age + Education + Income + HomeVal + Wealth,   
## data = Bankingdata)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -5376.9 -1110.8 -77.2 872.3 7732.3   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -1.071e+04 4.261e+03 -2.514 0.013613 \*   
## Age 3.187e+02 6.099e+01 5.225 1.01e-06 \*\*\*  
## Education 6.219e+02 3.190e+02 1.950 0.054135 .   
## Income 1.463e-01 4.078e-02 3.588 0.000527 \*\*\*  
## HomeVal 9.183e-03 1.104e-02 0.832 0.407505   
## Wealth 7.433e-02 1.119e-02 6.643 1.85e-09 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 2056 on 96 degrees of freedom  
## Multiple R-squared: 0.9469, Adjusted R-squared: 0.9441   
## F-statistic: 342.4 on 5 and 96 DF, p-value: < 2.2e-16

library(car)

## Loading required package: carData

vif(model1)

## Age Education Income HomeVal Wealth   
## 1.342764 2.456706 14.901724 4.382999 10.714276

cor(Bankingdata[,c("Balance", "Age", "Education", "Income", "HomeVal", "Wealth")])

## Balance Age Education Income HomeVal Wealth  
## Balance 1.0000000 0.5654668 0.5548807 0.9516845 0.7663871 0.9487117  
## Age 0.5654668 1.0000000 0.1734071 0.4771474 0.3864931 0.4680918  
## Education 0.5548807 0.1734071 1.0000000 0.5753940 0.7535211 0.4694130  
## Income 0.9516845 0.4771474 0.5753940 1.0000000 0.7953552 0.9466654  
## HomeVal 0.7663871 0.3864931 0.7535211 0.7953552 1.0000000 0.6984778  
## Wealth 0.9487117 0.4680918 0.4694130 0.9466654 0.6984778 1.0000000

model2 <- lm(Balance ~ Age + Education + HomeVal + Wealth, data = Bankingdata)  
summary(model2)

##   
## Call:  
## lm(formula = Balance ~ Age + Education + HomeVal + Wealth, data = Bankingdata)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -7586.5 -1090.2 29.8 914.2 7670.9   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -1.187e+04 4.501e+03 -2.636 0.00976 \*\*   
## Age 3.408e+02 6.428e+01 5.301 7.22e-07 \*\*\*  
## Education 7.704e+02 3.351e+02 2.299 0.02363 \*   
## HomeVal 2.485e-02 1.074e-02 2.314 0.02277 \*   
## Wealth 1.102e-01 5.317e-03 20.727 < 2e-16 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 2178 on 97 degrees of freedom  
## Multiple R-squared: 0.9398, Adjusted R-squared: 0.9373   
## F-statistic: 378.5 on 4 and 97 DF, p-value: < 2.2e-16

Explanation: Age: VIF = 1.342764

Education: VIF = 2.456706

Income: VIF = 14.901724

HomeVal: VIF = 4.382999

Wealth: VIF = 10.714276

Yes, there is multicollinearity with Income and Wealth.

The VIF values indicate the extent to which each variable's variance is inflated due to multicollinearity. Generally, VIF values less than 5 are considered acceptable, while values above 10 are a cause for concern. In your data:

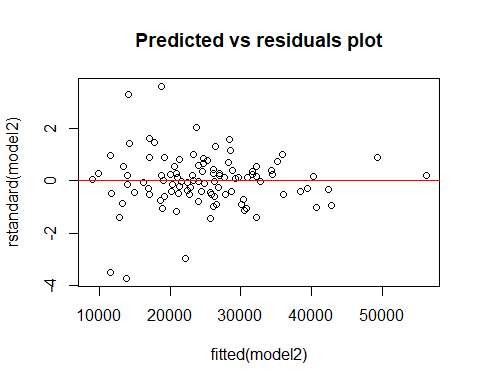
Age and Education have VIF values below 5, indicating that they are not strongly correlated with other independent variables.

Income, Wealth, and HomeVal, on the other hand, have high VIF values. Income and Wealth have VIF values considerably higher than 10, which is a strong indication of multicollinearity.

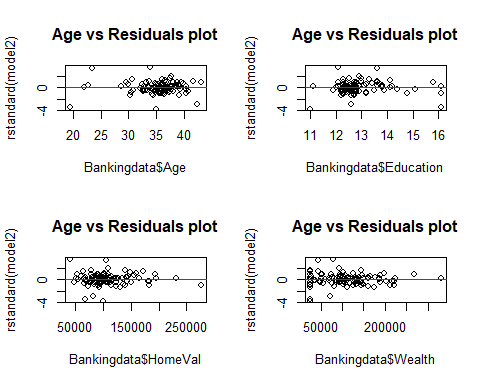
High VIF values for Income, Wealth suggest that there might be a problem of multicollinearity among these variables in your regression model. This could lead to issues with the stability and interpretation of coefficient estimates for these variables.

#problem 1(D)

#standardized residuals vs fitted values plot  
plot(fitted(model2), rstandard(model2), main="Predicted vs residuals plot")  
abline(a=0, b=0, col='red')



#standardized residuals vs predictors plot  
par(mfrow = c(2, 2))  
plot(Bankingdata$Age,rstandard(model2),main="Age vs Residuals plot")  
abline(a=0, b=0, col='red')  
plot(Bankingdata$Education,rstandard(model2),main="Age vs Residuals plot")  
abline(a=0, b=0, col='red')  
plot(Bankingdata$HomeVal,rstandard(model2),main="Age vs Residuals plot")  
abline(a=0, b=0, col='red')  
plot(Bankingdata$Wealth,rstandard(model2),main="Age vs Residuals plot")  
abline(a=0, b=0, col='red')



# Normal plot of residuals  
qqnorm(model2$residuals)  
qqline(model2$residuals)  
  
influence.measures(model1)

## Influence measures of  
## lm(formula = Balance ~ Age + Education + Income + HomeVal + Wealth, data = Bankingdata) :  
##   
## dfb.1\_ dfb.Age dfb.Edct dfb.Incm dfb.HmVl dfb.Wlth dffit cov.r  
## 1 1.44e-02 0.141698 -0.045220 -1.40e-01 -4.69e-03 6.09e-02 -0.401016 1.009  
## 2 -1.04e-03 0.001271 0.001145 -1.40e-03 -4.52e-04 -2.31e-04 -0.006011 1.123  
## 3 -3.98e-03 -0.006358 0.004949 1.08e-02 -4.38e-03 -3.15e-04 0.045467 1.087  
## 4 3.32e-02 -0.026417 -0.031572 2.31e-02 1.99e-02 -1.36e-02 0.063611 1.098  
## 5 -8.46e-02 0.069787 0.079127 -7.08e-02 -5.12e-02 4.83e-02 -0.187651 1.000  
## 6 4.73e-02 -0.068241 -0.031461 2.01e-02 3.44e-02 7.50e-03 0.135216 1.080  
## 7 7.25e-03 -0.004807 -0.000838 4.26e-03 -1.93e-02 -6.12e-03 -0.050891 1.115  
## 8 9.94e-04 0.030257 -0.006623 -3.18e-02 6.19e-03 -7.46e-04 -0.131029 1.065  
## 9 -2.27e-01 0.427170 0.281198 -6.75e-01 -6.62e-01 7.77e-01 -1.504636 1.159  
## 10 5.06e-04 -0.000232 -0.000435 3.17e-04 -7.06e-05 -3.82e-04 -0.000948 1.152  
## 11 -1.86e-02 0.008763 0.017808 8.65e-04 -1.03e-02 -3.65e-04 0.023266 1.103  
## 12 -5.82e-01 0.307762 0.532335 -5.89e-01 1.90e-02 6.62e-01 1.008194 1.024  
## 13 1.23e-02 0.005581 -0.011629 -5.81e-02 1.57e-03 9.02e-02 0.127982 1.087  
## 14 3.31e-02 -0.018210 -0.033511 -2.21e-03 3.36e-02 8.27e-03 0.065129 1.084  
## 15 -1.22e-01 0.068643 0.098425 -2.01e-02 3.98e-02 -2.78e-02 0.187363 1.257  
## 16 1.23e-01 -0.154278 -0.083599 6.57e-03 9.20e-02 4.49e-02 0.259152 1.051  
## 17 2.55e-02 -0.015878 -0.013040 -8.95e-02 1.57e-02 1.00e-01 -0.139267 1.045  
## 18 -8.68e-04 0.000292 0.000888 8.96e-04 -7.62e-04 -1.36e-03 -0.002205 1.148  
## 19 3.73e-03 0.000688 -0.005046 6.69e-03 5.98e-04 -6.06e-03 0.017490 1.077  
## 20 1.94e-02 0.025601 -0.035573 -3.60e-02 3.37e-02 4.16e-02 0.088417 1.087  
## 21 -1.15e-01 -0.051729 0.141176 -1.77e-01 5.81e-02 2.63e-01 0.460993 1.272  
## 22 1.07e-02 0.010698 -0.015534 7.69e-03 5.19e-03 -1.00e-02 0.070501 1.046  
## 23 -1.31e-02 0.004928 0.012667 -1.62e-02 2.32e-03 1.31e-02 -0.036186 1.074  
## 24 -4.89e-04 -0.018148 0.013295 -4.78e-02 8.56e-03 5.30e-02 -0.065295 1.101  
## 25 -2.94e-02 0.055365 0.003759 -9.41e-02 9.83e-02 3.51e-02 -0.173955 1.047  
## 26 3.82e-02 0.037244 -0.061877 -1.08e-01 1.09e-01 7.26e-02 -0.154917 1.124  
## 27 1.07e-01 -0.156444 -0.041681 -8.18e-02 1.03e-01 5.61e-02 -0.247607 0.982  
## 28 -3.39e-02 0.068176 0.014200 -3.24e-02 -2.05e-02 3.27e-02 0.102809 1.065  
## 29 -1.29e-01 0.099123 0.100061 3.27e-02 -6.30e-02 -7.72e-02 -0.206319 1.021  
## 30 8.39e-03 0.005506 -0.014142 1.87e-04 1.16e-02 -1.56e-04 0.024268 1.094  
## 31 -7.40e-02 0.066618 0.052574 -3.99e-02 -6.14e-04 1.49e-02 -0.118188 1.052  
## 32 4.24e-02 -0.014143 -0.043280 5.38e-03 4.01e-02 -1.37e-02 0.076773 1.060  
## 33 2.11e-02 -0.040164 -0.011755 2.19e-02 2.07e-02 -2.67e-02 -0.073591 1.073  
## 34 -2.01e-02 0.011458 0.017720 -1.63e-02 4.04e-03 8.13e-03 -0.038196 1.083  
## 35 -5.56e-03 0.002481 0.007345 6.54e-03 -1.91e-02 1.28e-03 0.029232 1.084  
## 36 -6.41e-02 0.053506 0.051132 -6.54e-02 -1.43e-02 6.57e-02 -0.111365 1.073  
## 37 -2.77e-04 -0.005448 0.002271 -1.79e-03 2.56e-03 1.62e-03 -0.013089 1.081  
## 38 4.29e-01 -1.117171 0.099656 1.14e-01 2.10e-01 -1.84e-01 1.341878 0.568  
## 39 -4.17e-02 0.031810 0.030258 5.50e-02 -4.03e-02 -5.82e-02 0.083964 1.110  
## 40 4.09e-03 -0.003712 -0.002980 1.98e-03 4.81e-04 -6.03e-04 0.006525 1.091  
## 41 -2.03e-01 0.303770 0.108999 -1.44e-01 -6.85e-02 1.29e-01 0.374449 0.964  
## 42 -5.14e-02 0.024681 0.026514 8.94e-02 6.32e-02 -1.42e-01 0.240737 1.031  
## 43 -5.82e-02 0.033532 0.041188 4.82e-03 2.36e-02 -4.23e-02 -0.138345 1.031  
## 44 1.19e-02 -0.023006 -0.005855 -2.21e-02 2.88e-02 1.80e-02 -0.068284 1.060  
## 45 1.14e-02 0.043395 -0.028474 -4.89e-02 1.31e-02 5.87e-02 0.114913 1.061  
## 46 -2.99e-02 0.006736 0.028950 1.84e-02 -3.32e-02 -1.05e-02 -0.055662 1.075  
## 47 2.45e-02 -0.025768 -0.013811 -1.43e-02 3.62e-03 3.03e-02 0.052648 1.125  
## 48 2.49e-02 -0.007522 -0.026475 -9.69e-03 2.59e-02 4.39e-03 -0.034725 1.121  
## 49 -1.95e-01 0.146293 0.159564 3.91e-02 -1.03e-01 -1.06e-01 -0.302665 0.983  
## 50 -1.25e-02 -0.005384 0.015653 1.31e-02 -7.82e-03 -1.79e-02 -0.039150 1.084  
## 51 -8.81e-05 0.004076 -0.000582 4.65e-04 -1.39e-03 -2.29e-03 0.014599 1.078  
## 52 -5.06e-02 0.169112 -0.021819 9.95e-03 4.71e-02 -7.44e-02 0.297962 0.809  
## 53 3.17e-03 -0.007276 -0.001027 -8.87e-03 2.07e-03 1.48e-02 -0.026334 1.086  
## 54 4.19e-02 -0.013386 -0.024262 -7.05e-02 -2.70e-02 1.18e-01 0.184043 1.033  
## 55 -1.58e-03 0.000808 0.000945 2.68e-04 6.07e-04 -7.30e-04 -0.004336 1.080  
## 56 -1.32e-01 0.134951 0.095826 -7.86e-03 -6.98e-02 -8.73e-03 0.177946 1.059  
## 57 -4.28e-02 -0.007646 0.042698 9.16e-03 2.70e-02 -3.95e-02 -0.142439 1.022  
## 58 -1.50e-03 0.000225 0.001136 -7.49e-04 1.79e-03 -1.82e-04 -0.005276 1.084  
## 59 3.09e-01 -0.106316 -0.318367 7.80e-02 1.89e-02 3.10e-02 -0.420498 1.335  
## 60 3.22e-02 -0.056585 -0.016635 3.89e-02 2.34e-02 -4.86e-02 -0.091279 1.112  
## 61 3.54e-04 -0.000246 -0.000233 -7.33e-05 1.36e-04 6.65e-05 0.000658 1.081  
## 62 -1.43e-02 0.020238 0.002601 2.12e-01 -1.95e-01 -1.39e-01 0.273710 1.138  
## 63 5.56e-02 -0.097924 -0.016171 -8.03e-02 2.43e-02 1.26e-01 -0.192749 1.047  
## 64 6.30e-02 -0.148519 -0.018839 9.08e-02 2.16e-02 -8.31e-02 -0.220612 0.993  
## 65 -1.92e-02 0.014059 0.008626 9.95e-03 5.59e-03 -1.41e-02 -0.047190 1.080  
## 66 -2.47e-02 0.022016 0.023201 1.03e-03 -2.52e-02 -3.86e-03 0.047688 1.085  
## 67 8.98e-03 -0.056487 0.010519 -3.69e-02 5.01e-02 2.87e-02 -0.131866 1.024  
## 68 -6.99e-02 0.054863 0.060064 -4.55e-03 -4.26e-02 -1.68e-03 0.086608 1.102  
## 69 -1.00e-03 -0.002212 0.003432 -1.53e-02 3.92e-03 1.59e-02 -0.017384 1.165  
## 70 -2.69e-03 0.002176 0.000937 5.47e-03 -1.69e-03 -5.60e-03 -0.007931 1.106  
## 71 1.86e-02 -0.051767 -0.005088 -2.90e-02 2.82e-02 5.22e-02 -0.121050 1.061  
## 72 -9.75e-02 0.165616 0.040158 -5.02e-04 -1.48e-02 -5.82e-02 0.216826 1.059  
## 73 2.56e-02 -0.068697 -0.020368 7.86e-02 2.99e-02 -7.17e-02 -0.163962 1.035  
## 74 6.81e-03 -0.004903 -0.004575 3.62e-03 8.42e-04 -4.61e-03 0.013852 1.084  
## 75 3.94e-02 -0.043998 -0.022551 2.24e-02 -1.86e-03 -1.35e-02 0.057482 1.112  
## 76 -2.13e-02 0.021802 0.007411 -5.78e-02 2.98e-02 6.69e-02 -0.106991 1.086  
## 77 1.98e-01 0.041451 -0.309775 2.69e-02 5.95e-01 -3.05e-01 0.761343 1.166  
## 78 -2.25e-03 -0.001111 -0.001721 2.63e-04 2.70e-02 -1.55e-02 -0.049559 1.093  
## 79 -3.07e-02 0.035360 -0.000892 -9.31e-03 5.80e-02 -7.13e-03 -0.131656 1.044  
## 80 5.95e-03 -0.013883 -0.001873 3.07e-04 2.87e-03 4.28e-03 -0.023559 1.087  
## 81 -4.34e-02 0.117777 0.005693 1.30e-02 -7.33e-02 -9.69e-03 0.180288 1.031  
## 82 7.41e-02 0.184764 -0.206904 -6.12e-02 4.79e-01 -2.15e-01 0.680434 0.972  
## 83 5.26e-03 -0.006301 -0.005784 8.23e-03 6.95e-03 -9.30e-03 -0.017788 1.102  
## 84 4.43e-01 -0.757211 -0.206404 3.58e-01 6.39e-02 -2.00e-01 -0.885229 0.717  
## 85 1.20e+00 1.170725 -2.280263 7.84e-01 9.78e-01 -8.13e-01 -2.945492 1.190  
## 86 -1.96e-02 0.044108 -0.014335 4.52e-02 -3.97e-02 -7.63e-03 -0.140374 1.081  
## 87 8.37e-02 -0.029941 -0.071901 -2.26e-02 8.16e-02 -1.98e-02 0.167761 1.022  
## 88 1.38e-02 -0.031420 -0.002999 -2.52e-02 1.32e-02 4.06e-02 -0.067818 1.102  
## 89 -2.86e-03 -0.001700 0.005817 1.50e-02 -1.34e-02 -1.65e-02 0.025712 1.123  
## 90 4.37e-03 -0.010302 -0.003730 3.53e-03 1.34e-02 -6.34e-03 -0.028985 1.086  
## 91 -1.69e-01 0.054529 0.328321 -3.58e-02 -7.37e-01 2.21e-01 1.002282 0.407  
## 92 2.99e-02 -0.044572 -0.007063 7.41e-02 -4.54e-02 -7.15e-02 0.113389 1.135  
## 93 3.47e-02 0.023556 -0.046954 -7.97e-03 8.15e-03 7.27e-03 0.077161 1.117  
## 94 8.61e-03 0.001841 -0.009706 -1.84e-02 2.76e-02 4.94e-03 0.035802 1.167  
## 95 -2.06e-02 0.035693 0.001109 -3.14e-02 3.01e-02 2.31e-02 -0.063878 1.134  
## 96 5.26e-03 -0.027581 0.001557 -9.45e-03 1.48e-02 1.99e-02 -0.063939 1.085  
## 97 7.73e-02 -0.118357 0.006491 2.11e-03 -4.48e-02 -1.68e-02 0.270720 0.948  
## 98 1.35e-01 -0.210742 -0.027131 -7.05e-02 6.29e-02 6.03e-02 0.262311 1.184  
## 99 -4.69e-02 0.027194 0.026783 1.23e-01 -9.98e-02 -8.68e-02 -0.154624 1.244  
## 100 1.00e-01 -0.153146 -0.019427 -5.39e-02 3.00e-02 5.50e-02 0.190970 1.227  
## 101 -1.75e-02 0.018383 -0.001471 1.49e-02 1.23e-02 -8.73e-03 -0.075269 1.100  
## 102 -7.35e-01 -0.132090 0.839884 1.18e+00 -1.33e+00 -7.48e-01 -1.707422 0.848  
## cook.d hat inf  
## 1 2.65e-02 0.0724   
## 2 6.09e-06 0.0518   
## 3 3.48e-04 0.0253   
## 4 6.81e-04 0.0367   
## 5 5.84e-03 0.0246   
## 6 3.07e-03 0.0407   
## 7 4.36e-04 0.0478   
## 8 2.88e-03 0.0321   
## 9 3.63e-01 0.3182 \*  
## 10 1.51e-07 0.0754   
## 11 9.12e-05 0.0358   
## 12 1.64e-01 0.1960 \*  
## 13 2.75e-03 0.0425   
## 14 7.13e-04 0.0271   
## 15 5.90e-03 0.1622 \*  
## 16 1.12e-02 0.0563   
## 17 3.24e-03 0.0261   
## 18 8.19e-07 0.0725   
## 19 5.15e-05 0.0129   
## 20 1.31e-03 0.0341   
## 21 3.55e-02 0.2050 \*  
## 22 8.33e-04 0.0109   
## 23 2.20e-04 0.0141   
## 24 7.17e-04 0.0392   
## 25 5.05e-03 0.0350   
## 26 4.03e-03 0.0709   
## 27 1.01e-02 0.0326   
## 28 1.77e-03 0.0256   
## 29 7.08e-03 0.0339   
## 30 9.92e-05 0.0282   
## 31 2.34e-03 0.0236   
## 32 9.89e-04 0.0168   
## 33 9.10e-04 0.0222   
## 34 2.46e-04 0.0208   
## 35 1.44e-04 0.0205   
## 36 2.08e-03 0.0311   
## 37 2.88e-05 0.0155   
## 38 2.67e-01 0.1232 \*  
## 39 1.19e-03 0.0493   
## 40 7.17e-06 0.0241   
## 41 2.30e-02 0.0535   
## 42 9.63e-03 0.0446   
## 43 3.19e-03 0.0216   
## 44 7.83e-04 0.0147   
## 45 2.21e-03 0.0267   
## 46 5.21e-04 0.0192   
## 47 4.67e-04 0.0564   
## 48 2.03e-04 0.0518   
## 49 1.51e-02 0.0439   
## 50 2.58e-04 0.0223   
## 51 3.59e-05 0.0135   
## 52 1.42e-02 0.0183 \*  
## 53 1.17e-04 0.0216   
## 54 5.64e-03 0.0324   
## 55 3.17e-06 0.0146   
## 56 5.29e-03 0.0408   
## 57 3.38e-03 0.0204   
## 58 4.69e-06 0.0174   
## 59 2.96e-02 0.2314 \*  
## 60 1.40e-03 0.0518   
## 61 7.29e-08 0.0147   
## 62 1.25e-02 0.1024   
## 63 6.20e-03 0.0392   
## 64 8.06e-03 0.0296   
## 65 3.75e-04 0.0205   
## 66 3.83e-04 0.0241   
## 67 2.90e-03 0.0185   
## 68 1.26e-03 0.0436   
## 69 5.09e-05 0.0860   
## 70 1.06e-05 0.0372   
## 71 2.45e-03 0.0279   
## 72 7.84e-03 0.0497   
## 73 4.48e-03 0.0284   
## 74 3.23e-05 0.0186   
## 75 5.56e-04 0.0461   
## 76 1.92e-03 0.0375   
## 77 9.54e-02 0.2057 \*  
## 78 4.13e-04 0.0306   
## 79 2.90e-03 0.0242   
## 80 9.35e-05 0.0218   
## 81 5.42e-03 0.0310   
## 82 7.52e-02 0.1175   
## 83 5.33e-05 0.0340   
## 84 1.22e-01 0.0886 \*  
## 85 1.33e+00 0.4856 \*  
## 86 3.30e-03 0.0422   
## 87 4.69e-03 0.0257   
## 88 7.74e-04 0.0403   
## 89 1.11e-04 0.0523   
## 90 1.41e-04 0.0216   
## 91 1.43e-01 0.0542 \*  
## 92 2.16e-03 0.0717   
## 93 1.00e-03 0.0529   
## 94 2.16e-04 0.0886   
## 95 6.87e-04 0.0646   
## 96 6.87e-04 0.0275   
## 97 1.20e-02 0.0302   
## 98 1.15e-02 0.1272   
## 99 4.02e-03 0.1513 \*  
## 100 6.13e-03 0.1438 \*  
## 101 9.53e-04 0.0399   
## 102 4.50e-01 0.2534 \*

# print out only observations that may be influential  
summary(influence.measures(model2))

## Potentially influential observations of  
## lm(formula = Balance ~ Age + Education + HomeVal + Wealth, data = Bankingdata) :  
##   
## dfb.1\_ dfb.Age dfb.Edct dfb.HmVl dfb.Wlth dffit cov.r cook.d hat   
## 9 -0.07 0.15 0.08 -0.42 0.16 -0.56 1.35\_\* 0.06 0.25\_\*  
## 12 -0.22 0.10 0.19 -0.10 0.13 0.34 1.16\_\* 0.02 0.13   
## 15 -0.07 0.04 0.05 0.02 -0.06 0.11 1.25\_\* 0.00 0.16\_\*  
## 21 -0.02 -0.01 0.03 0.00 0.05 0.09 1.27\_\* 0.00 0.17\_\*  
## 38 0.41 -1.08\_\* 0.11 0.27 -0.18 1.30\_\* 0.66\_\* 0.30 0.12   
## 59 0.42 -0.14 -0.43 0.07 0.31 -0.57 1.28\_\* 0.07 0.22\_\*  
## 77 0.19 0.04 -0.30 0.65 -0.62 0.75\_\* 1.19\_\* 0.11 0.21\_\*  
## 84 0.46 -0.79 -0.18 0.24 0.29 -0.88\_\* 0.70\_\* 0.14 0.07   
## 85 1.36\_\* 1.50\_\* -2.62\_\* 1.67\_\* -0.30 -3.39\_\* 0.97 2.02\_\* 0.45\_\*  
## 91 -0.15 0.05 0.30 -0.76 0.39 0.93\_\* 0.54\_\* 0.15 0.05   
## 98 0.06 -0.10 -0.02 0.02 0.00 0.11 1.19\_\* 0.00 0.12   
## 100 0.01 -0.02 0.00 0.00 0.00 0.02 1.21\_\* 0.00 0.13   
## 102 -1.05\_\* -0.02 1.27\_\* -1.20\_\* 0.88 -1.56\_\* 0.56\_\* 0.42 0.13

# Compute influence measures  
infl <- influence.measures(model2)  
infl

## Influence measures of  
## lm(formula = Balance ~ Age + Education + HomeVal + Wealth, data = Bankingdata) :  
##   
## dfb.1\_ dfb.Age dfb.Edct dfb.HmVl dfb.Wlth dffit cov.r cook.d  
## 1 1.76e-02 8.99e-02 -4.49e-02 -4.60e-02 -1.01e-01 -0.263443 1.067 1.39e-02  
## 2 5.76e-03 -7.02e-03 -6.00e-03 6.78e-03 2.05e-02 0.036130 1.106 2.64e-04  
## 3 -6.74e-03 -7.41e-03 8.97e-03 -1.57e-04 2.92e-02 0.061853 1.070 7.72e-04  
## 4 5.27e-02 -4.04e-02 -4.81e-02 5.29e-02 2.64e-02 0.098976 1.071 1.97e-03  
## 5 -6.09e-02 4.83e-02 5.41e-02 -6.61e-02 -2.55e-02 -0.133230 1.031 3.56e-03  
## 6 5.05e-02 -7.33e-02 -3.20e-02 5.08e-02 6.26e-02 0.147265 1.067 4.36e-03  
## 7 8.49e-03 -5.38e-03 -3.52e-04 -2.34e-02 -6.30e-03 -0.061957 1.101 7.75e-04  
## 8 2.50e-03 1.99e-02 -7.96e-03 -5.12e-03 -4.78e-02 -0.093290 1.070 1.75e-03  
## 9 -7.30e-02 1.50e-01 8.09e-02 -4.19e-01 1.61e-01 -0.557496 1.347 6.22e-02  
## 10 4.69e-02 -1.95e-02 -3.86e-02 5.79e-03 -2.13e-02 -0.086701 1.123 1.52e-03  
## 11 -2.14e-02 1.02e-02 2.07e-02 -1.24e-02 1.04e-03 0.026593 1.091 1.43e-04  
## 12 -2.24e-01 1.04e-01 1.91e-01 -9.68e-02 1.25e-01 0.339882 1.162 2.32e-02  
## 13 6.83e-03 -1.19e-04 -7.89e-03 -9.52e-03 3.48e-02 0.046533 1.086 4.37e-04  
## 14 2.98e-02 -1.66e-02 -3.05e-02 3.19e-02 1.26e-02 0.058246 1.076 6.85e-04  
## 15 -6.87e-02 3.81e-02 5.50e-02 1.97e-02 -5.80e-02 0.105940 1.251 2.27e-03  
## 16 1.19e-01 -1.49e-01 -8.04e-02 9.92e-02 1.09e-01 0.249541 1.057 1.24e-02  
## 17 1.68e-02 -1.30e-02 -1.29e-02 -1.11e-02 2.31e-02 -0.055286 1.059 6.16e-04  
## 18 -4.59e-02 1.88e-02 4.96e-02 -2.17e-02 -6.11e-02 -0.098548 1.112 1.96e-03  
## 19 6.14e-03 2.61e-03 -8.01e-03 6.72e-03 -3.33e-04 0.030735 1.060 1.91e-04  
## 20 8.73e-03 8.68e-03 -1.60e-02 8.35e-03 8.25e-03 0.031757 1.082 2.04e-04  
## 21 -2.14e-02 -1.47e-02 2.50e-02 -2.70e-03 4.92e-02 0.089409 1.274 1.61e-03  
## 22 1.02e-02 1.15e-02 -1.47e-02 8.98e-03 -6.97e-03 0.070163 1.040 9.90e-04  
## 23 -4.11e-03 1.15e-03 3.69e-03 -1.55e-03 -1.09e-03 -0.011210 1.065 2.54e-05  
## 24 -1.83e-03 1.35e-02 -4.18e-03 6.60e-03 -1.34e-02 0.026009 1.071 1.37e-04  
## 25 -1.24e-02 2.56e-02 -4.73e-03 3.69e-02 -6.07e-02 -0.081126 1.065 1.33e-03  
## 26 -9.75e-03 -5.54e-03 1.60e-02 -1.50e-02 1.13e-02 0.023211 1.092 1.09e-04  
## 27 8.91e-02 -1.30e-01 -4.14e-02 6.06e-02 -2.98e-02 -0.183541 1.023 6.73e-03  
## 28 -2.11e-02 4.37e-02 6.75e-03 -2.43e-02 5.60e-03 0.065363 1.068 8.62e-04  
## 29 -1.36e-01 1.07e-01 1.09e-01 -5.64e-02 -1.11e-01 -0.210790 1.018 8.86e-03  
## 30 8.19e-03 5.41e-03 -1.39e-02 1.24e-02 2.57e-05 0.023663 1.083 1.13e-04  
## 31 -5.04e-02 4.45e-02 3.38e-02 -1.26e-02 -3.27e-02 -0.078752 1.060 1.25e-03  
## 32 4.19e-02 -1.36e-02 -4.28e-02 4.58e-02 -1.98e-02 0.076305 1.052 1.17e-03  
## 33 2.45e-02 -4.78e-02 -1.13e-02 4.00e-02 -1.98e-02 -0.087979 1.054 1.56e-03  
## 34 -2.69e-03 1.40e-03 2.24e-03 -3.75e-04 -2.05e-03 -0.004916 1.071 4.88e-06  
## 35 -8.99e-03 4.68e-03 1.22e-02 -2.67e-02 2.35e-02 0.042204 1.069 3.60e-04  
## 36 -2.18e-02 1.73e-02 1.58e-02 -1.61e-02 5.90e-03 -0.033061 1.072 2.21e-04  
## 37 -5.54e-05 -2.20e-03 8.00e-04 7.87e-04 1.92e-05 -0.005047 1.069 5.15e-06  
## 38 4.10e-01 -1.08e+00 1.12e-01 2.70e-01 -1.78e-01 1.298258 0.663 3.02e-01  
## 39 -1.04e-01 8.51e-02 8.54e-02 -4.56e-02 -4.56e-02 0.143658 1.044 4.14e-03  
## 40 1.90e-02 -1.70e-02 -1.32e-02 6.64e-03 1.26e-02 0.029948 1.075 1.81e-04  
## 41 -1.42e-01 2.14e-01 6.71e-02 -1.00e-01 7.96e-04 0.254449 1.029 1.29e-02  
## 42 -6.90e-02 4.01e-02 4.55e-02 1.27e-01 -1.65e-01 0.264508 1.001 1.39e-02  
## 43 -5.65e-02 3.29e-02 4.06e-02 2.67e-02 -8.14e-02 -0.133062 1.033 3.55e-03  
## 44 9.58e-03 -1.79e-02 -6.20e-03 1.54e-02 -2.69e-03 -0.045548 1.059 4.19e-04  
## 45 9.02e-03 2.31e-02 -2.09e-02 -4.06e-03 2.00e-02 0.062015 1.067 7.76e-04  
## 46 -4.18e-02 1.15e-02 4.22e-02 -3.76e-02 1.78e-02 -0.070068 1.056 9.89e-04  
## 47 -2.40e-03 2.55e-03 1.47e-03 2.06e-04 -3.65e-03 -0.004728 1.111 4.52e-06  
## 48 -1.37e-02 4.56e-03 1.49e-02 -1.29e-02 5.09e-03 0.017804 1.106 6.41e-05  
## 49 -2.01e-01 1.53e-01 1.68e-01 -9.66e-02 -1.60e-01 -0.303137 0.991 1.82e-02  
## 50 -2.16e-02 -6.51e-03 2.79e-02 -4.61e-03 -2.23e-02 -0.058846 1.065 6.99e-04  
## 51 -1.29e-04 4.33e-03 -5.50e-04 -1.37e-03 -4.36e-03 0.015247 1.067 4.70e-05  
## 52 -4.88e-02 1.62e-01 -1.96e-02 5.27e-02 -1.39e-01 0.282503 0.862 1.54e-02  
## 53 -3.00e-05 6.40e-05 1.71e-05 1.22e-05 -1.19e-04 0.000193 1.074 7.53e-09  
## 54 3.33e-02 -1.45e-02 -2.37e-02 -4.20e-02 8.57e-02 0.119518 1.055 2.87e-03  
## 55 -2.66e-03 1.39e-03 1.63e-03 1.28e-03 -1.81e-03 -0.007157 1.068 1.03e-05  
## 56 -1.20e-01 1.22e-01 8.68e-02 -7.20e-02 -3.19e-02 0.161333 1.063 5.23e-03  
## 57 -4.25e-02 -6.59e-03 4.32e-02 3.25e-02 -6.81e-02 -0.138639 1.024 3.85e-03  
## 58 9.52e-04 -9.86e-05 -6.88e-04 -1.07e-03 1.25e-03 0.003432 1.071 2.38e-06  
## 59 4.20e-01 -1.37e-01 -4.30e-01 7.49e-02 3.10e-01 -0.571145 1.279 6.52e-02  
## 60 5.26e-02 -9.47e-02 -2.09e-02 7.55e-02 -5.49e-02 -0.147763 1.072 4.39e-03  
## 61 -2.73e-03 1.93e-03 1.85e-03 -8.86e-04 -1.66e-05 -0.004949 1.069 4.95e-06  
## 62 -5.86e-02 8.07e-02 5.86e-02 -2.32e-01 2.18e-01 0.332617 0.961 2.18e-02  
## 63 3.95e-02 -6.81e-02 -1.71e-02 -5.20e-03 7.68e-02 -0.112014 1.067 2.53e-03  
## 64 6.38e-02 -1.59e-01 -8.06e-03 7.10e-02 -4.97e-03 -0.227958 0.971 1.03e-02  
## 65 -2.52e-02 1.91e-02 1.26e-02 1.30e-02 -1.46e-02 -0.058038 1.065 6.80e-04  
## 66 -2.44e-02 2.18e-02 2.31e-02 -2.65e-02 -6.43e-03 0.046811 1.074 4.42e-04  
## 67 9.51e-03 -4.88e-02 4.66e-03 3.12e-02 -7.54e-03 -0.102098 1.038 2.09e-03  
## 68 -5.93e-02 4.65e-02 5.10e-02 -4.11e-02 -1.09e-02 0.073552 1.094 1.09e-03  
## 69 -2.14e-03 5.32e-02 -2.06e-02 3.25e-02 -7.12e-02 0.117261 1.037 2.76e-03  
## 70 -3.75e-02 3.30e-02 2.00e-02 6.27e-03 -1.92e-02 -0.069213 1.061 9.66e-04  
## 71 1.56e-02 -4.12e-02 -6.69e-03 1.36e-02 4.39e-02 -0.088162 1.066 1.57e-03  
## 72 -9.20e-02 1.57e-01 3.81e-02 -1.54e-02 -1.23e-01 0.204144 1.063 8.35e-03  
## 73 2.42e-02 -7.50e-02 -1.26e-02 8.16e-02 -4.04e-03 -0.176748 1.002 6.22e-03  
## 74 1.41e-02 -9.79e-03 -8.89e-03 5.32e-03 -6.58e-03 0.028705 1.069 1.66e-04  
## 75 7.71e-02 -8.54e-02 -4.03e-02 1.56e-02 2.95e-02 0.107800 1.080 2.34e-03  
## 76 -4.69e-03 4.44e-03 -2.61e-05 2.08e-03 9.40e-03 -0.024891 1.081 1.25e-04  
## 77 1.93e-01 4.37e-02 -3.04e-01 6.49e-01 -6.16e-01 0.748762 1.185 1.11e-01  
## 78 -2.17e-03 -1.04e-03 -1.63e-03 2.82e-02 -3.26e-02 -0.047343 1.082 4.53e-04  
## 79 -2.71e-02 3.11e-02 -1.90e-03 5.31e-02 -3.09e-02 -0.117946 1.048 2.79e-03  
## 80 5.85e-03 -1.37e-02 -1.82e-03 3.21e-03 1.00e-02 -0.023214 1.075 1.09e-04  
## 81 -4.40e-02 1.18e-01 7.34e-03 -7.33e-02 4.16e-03 0.177461 1.033 6.30e-03  
## 82 6.94e-02 1.58e-01 -1.90e-01 4.36e-01 -5.28e-01 0.595652 1.038 6.97e-02  
## 83 1.86e-02 -2.20e-02 -1.90e-02 4.44e-02 -1.73e-02 -0.063026 1.074 8.02e-04  
## 84 4.55e-01 -7.91e-01 -1.76e-01 2.44e-01 2.92e-01 -0.883227 0.702 1.43e-01  
## 85 1.36e+00 1.50e+00 -2.62e+00 1.67e+00 -2.99e-01 -3.385618 0.974 2.02e+00  
## 86 -2.96e-02 6.27e-02 -1.09e-02 -3.05e-02 9.36e-02 -0.170281 1.054 5.81e-03  
## 87 7.46e-02 -2.82e-02 -6.57e-02 6.88e-02 -7.78e-02 0.144683 1.036 4.19e-03  
## 88 2.65e-03 -5.75e-03 -1.06e-03 5.92e-04 6.78e-03 -0.010608 1.091 2.27e-05  
## 89 -2.04e-02 -9.20e-04 3.99e-02 -4.12e-02 -3.46e-02 0.106128 1.073 2.27e-03  
## 90 5.17e-03 -1.26e-02 -4.15e-03 2.03e-02 -8.93e-03 -0.036159 1.073 2.64e-04  
## 91 -1.54e-01 4.73e-02 3.02e-01 -7.56e-01 3.90e-01 0.926675 0.539 1.50e-01  
## 92 5.80e-02 -8.86e-02 6.10e-03 -4.17e-02 -2.81e-02 0.203971 1.044 8.32e-03  
## 93 2.44e-02 1.58e-02 -3.35e-02 3.76e-03 2.31e-04 0.053050 1.108 5.68e-04  
## 94 -3.67e-02 5.96e-05 4.47e-02 -8.10e-02 9.38e-02 -0.112581 1.116 2.56e-03  
## 95 1.52e-02 -2.72e-02 2.49e-03 -1.60e-02 9.31e-03 0.046344 1.105 4.34e-04  
## 96 4.33e-03 -2.07e-02 2.41e-04 8.72e-03 1.85e-02 -0.045729 1.078 4.22e-04  
## 97 7.32e-02 -1.12e-01 6.45e-03 -4.52e-02 -3.15e-02 0.256010 0.974 1.30e-02  
## 98 6.11e-02 -9.50e-02 -1.59e-02 1.65e-02 -2.66e-03 0.109642 1.188 2.43e-03  
## 99 -2.07e-01 1.46e-01 1.58e-01 -2.04e-01 1.93e-01 -0.341586 1.004 2.31e-02  
## 100 1.10e-02 -1.68e-02 -2.81e-03 1.00e-03 1.60e-03 0.019336 1.214 7.56e-05  
## 101 -2.45e-02 2.62e-02 6.07e-04 2.59e-02 1.33e-02 -0.096694 1.082 1.88e-03  
## 102 -1.05e+00 -1.59e-02 1.27e+00 -1.20e+00 8.79e-01 -1.564027 0.557 4.23e-01  
## hat inf  
## 1 0.0636   
## 2 0.0489   
## 3 0.0239   
## 4 0.0318   
## 5 0.0211   
## 6 0.0398   
## 7 0.0474   
## 8 0.0302   
## 9 0.2541 \*  
## 10 0.0670   
## 11 0.0357   
## 12 0.1292 \*  
## 13 0.0337   
## 14 0.0271   
## 15 0.1604 \*  
## 16 0.0563   
## 17 0.0153   
## 18 0.0606   
## 19 0.0110   
## 20 0.0285   
## 21 0.1749 \*  
## 22 0.0107   
## 23 0.0112   
## 24 0.0182   
## 25 0.0247   
## 26 0.0363   
## 27 0.0290   
## 28 0.0230   
## 29 0.0330   
## 30 0.0282   
## 31 0.0209   
## 32 0.0167   
## 33 0.0202   
## 34 0.0170   
## 35 0.0194   
## 36 0.0204   
## 37 0.0152   
## 38 0.1223 \*  
## 39 0.0281   
## 40 0.0219   
## 41 0.0456   
## 42 0.0384   
## 43 0.0216   
## 44 0.0131   
## 45 0.0219   
## 46 0.0171   
## 47 0.0523   
## 48 0.0478   
## 49 0.0432   
## 50 0.0198   
## 51 0.0135   
## 52 0.0183   
## 53 0.0192   
## 54 0.0276   
## 55 0.0145   
## 56 0.0407   
## 57 0.0203   
## 58 0.0170   
## 59 0.2234 \*  
## 60 0.0424   
## 61 0.0145   
## 62 0.0408   
## 63 0.0323   
## 64 0.0246   
## 65 0.0196   
## 66 0.0241   
## 67 0.0170   
## 68 0.0435   
## 69 0.0197   
## 70 0.0195   
## 71 0.0263   
## 72 0.0497   
## 73 0.0219   
## 74 0.0173   
## 75 0.0391   
## 76 0.0265   
## 77 0.2054 \*  
## 78 0.0306   
## 79 0.0241   
## 80 0.0218   
## 81 0.0309   
## 82 0.1165   
## 83 0.0267   
## 84 0.0741 \*  
## 85 0.4512 \*  
## 86 0.0378   
## 87 0.0252   
## 88 0.0347   
## 89 0.0344   
## 90 0.0213   
## 91 0.0541 \*  
## 92 0.0411   
## 93 0.0523   
## 94 0.0653   
## 95 0.0490   
## 96 0.0269   
## 97 0.0302   
## 98 0.1180 \*  
## 99 0.0548   
## 100 0.1324 \*  
## 101 0.0384   
## 102 0.1315 \*

influence.measures(model2)

## Influence measures of  
## lm(formula = Balance ~ Age + Education + HomeVal + Wealth, data = Bankingdata) :  
##   
## dfb.1\_ dfb.Age dfb.Edct dfb.HmVl dfb.Wlth dffit cov.r cook.d  
## 1 1.76e-02 8.99e-02 -4.49e-02 -4.60e-02 -1.01e-01 -0.263443 1.067 1.39e-02  
## 2 5.76e-03 -7.02e-03 -6.00e-03 6.78e-03 2.05e-02 0.036130 1.106 2.64e-04  
## 3 -6.74e-03 -7.41e-03 8.97e-03 -1.57e-04 2.92e-02 0.061853 1.070 7.72e-04  
## 4 5.27e-02 -4.04e-02 -4.81e-02 5.29e-02 2.64e-02 0.098976 1.071 1.97e-03  
## 5 -6.09e-02 4.83e-02 5.41e-02 -6.61e-02 -2.55e-02 -0.133230 1.031 3.56e-03  
## 6 5.05e-02 -7.33e-02 -3.20e-02 5.08e-02 6.26e-02 0.147265 1.067 4.36e-03  
## 7 8.49e-03 -5.38e-03 -3.52e-04 -2.34e-02 -6.30e-03 -0.061957 1.101 7.75e-04  
## 8 2.50e-03 1.99e-02 -7.96e-03 -5.12e-03 -4.78e-02 -0.093290 1.070 1.75e-03  
## 9 -7.30e-02 1.50e-01 8.09e-02 -4.19e-01 1.61e-01 -0.557496 1.347 6.22e-02  
## 10 4.69e-02 -1.95e-02 -3.86e-02 5.79e-03 -2.13e-02 -0.086701 1.123 1.52e-03  
## 11 -2.14e-02 1.02e-02 2.07e-02 -1.24e-02 1.04e-03 0.026593 1.091 1.43e-04  
## 12 -2.24e-01 1.04e-01 1.91e-01 -9.68e-02 1.25e-01 0.339882 1.162 2.32e-02  
## 13 6.83e-03 -1.19e-04 -7.89e-03 -9.52e-03 3.48e-02 0.046533 1.086 4.37e-04  
## 14 2.98e-02 -1.66e-02 -3.05e-02 3.19e-02 1.26e-02 0.058246 1.076 6.85e-04  
## 15 -6.87e-02 3.81e-02 5.50e-02 1.97e-02 -5.80e-02 0.105940 1.251 2.27e-03  
## 16 1.19e-01 -1.49e-01 -8.04e-02 9.92e-02 1.09e-01 0.249541 1.057 1.24e-02  
## 17 1.68e-02 -1.30e-02 -1.29e-02 -1.11e-02 2.31e-02 -0.055286 1.059 6.16e-04  
## 18 -4.59e-02 1.88e-02 4.96e-02 -2.17e-02 -6.11e-02 -0.098548 1.112 1.96e-03  
## 19 6.14e-03 2.61e-03 -8.01e-03 6.72e-03 -3.33e-04 0.030735 1.060 1.91e-04  
## 20 8.73e-03 8.68e-03 -1.60e-02 8.35e-03 8.25e-03 0.031757 1.082 2.04e-04  
## 21 -2.14e-02 -1.47e-02 2.50e-02 -2.70e-03 4.92e-02 0.089409 1.274 1.61e-03  
## 22 1.02e-02 1.15e-02 -1.47e-02 8.98e-03 -6.97e-03 0.070163 1.040 9.90e-04  
## 23 -4.11e-03 1.15e-03 3.69e-03 -1.55e-03 -1.09e-03 -0.011210 1.065 2.54e-05  
## 24 -1.83e-03 1.35e-02 -4.18e-03 6.60e-03 -1.34e-02 0.026009 1.071 1.37e-04  
## 25 -1.24e-02 2.56e-02 -4.73e-03 3.69e-02 -6.07e-02 -0.081126 1.065 1.33e-03  
## 26 -9.75e-03 -5.54e-03 1.60e-02 -1.50e-02 1.13e-02 0.023211 1.092 1.09e-04  
## 27 8.91e-02 -1.30e-01 -4.14e-02 6.06e-02 -2.98e-02 -0.183541 1.023 6.73e-03  
## 28 -2.11e-02 4.37e-02 6.75e-03 -2.43e-02 5.60e-03 0.065363 1.068 8.62e-04  
## 29 -1.36e-01 1.07e-01 1.09e-01 -5.64e-02 -1.11e-01 -0.210790 1.018 8.86e-03  
## 30 8.19e-03 5.41e-03 -1.39e-02 1.24e-02 2.57e-05 0.023663 1.083 1.13e-04  
## 31 -5.04e-02 4.45e-02 3.38e-02 -1.26e-02 -3.27e-02 -0.078752 1.060 1.25e-03  
## 32 4.19e-02 -1.36e-02 -4.28e-02 4.58e-02 -1.98e-02 0.076305 1.052 1.17e-03  
## 33 2.45e-02 -4.78e-02 -1.13e-02 4.00e-02 -1.98e-02 -0.087979 1.054 1.56e-03  
## 34 -2.69e-03 1.40e-03 2.24e-03 -3.75e-04 -2.05e-03 -0.004916 1.071 4.88e-06  
## 35 -8.99e-03 4.68e-03 1.22e-02 -2.67e-02 2.35e-02 0.042204 1.069 3.60e-04  
## 36 -2.18e-02 1.73e-02 1.58e-02 -1.61e-02 5.90e-03 -0.033061 1.072 2.21e-04  
## 37 -5.54e-05 -2.20e-03 8.00e-04 7.87e-04 1.92e-05 -0.005047 1.069 5.15e-06  
## 38 4.10e-01 -1.08e+00 1.12e-01 2.70e-01 -1.78e-01 1.298258 0.663 3.02e-01  
## 39 -1.04e-01 8.51e-02 8.54e-02 -4.56e-02 -4.56e-02 0.143658 1.044 4.14e-03  
## 40 1.90e-02 -1.70e-02 -1.32e-02 6.64e-03 1.26e-02 0.029948 1.075 1.81e-04  
## 41 -1.42e-01 2.14e-01 6.71e-02 -1.00e-01 7.96e-04 0.254449 1.029 1.29e-02  
## 42 -6.90e-02 4.01e-02 4.55e-02 1.27e-01 -1.65e-01 0.264508 1.001 1.39e-02  
## 43 -5.65e-02 3.29e-02 4.06e-02 2.67e-02 -8.14e-02 -0.133062 1.033 3.55e-03  
## 44 9.58e-03 -1.79e-02 -6.20e-03 1.54e-02 -2.69e-03 -0.045548 1.059 4.19e-04  
## 45 9.02e-03 2.31e-02 -2.09e-02 -4.06e-03 2.00e-02 0.062015 1.067 7.76e-04  
## 46 -4.18e-02 1.15e-02 4.22e-02 -3.76e-02 1.78e-02 -0.070068 1.056 9.89e-04  
## 47 -2.40e-03 2.55e-03 1.47e-03 2.06e-04 -3.65e-03 -0.004728 1.111 4.52e-06  
## 48 -1.37e-02 4.56e-03 1.49e-02 -1.29e-02 5.09e-03 0.017804 1.106 6.41e-05  
## 49 -2.01e-01 1.53e-01 1.68e-01 -9.66e-02 -1.60e-01 -0.303137 0.991 1.82e-02  
## 50 -2.16e-02 -6.51e-03 2.79e-02 -4.61e-03 -2.23e-02 -0.058846 1.065 6.99e-04  
## 51 -1.29e-04 4.33e-03 -5.50e-04 -1.37e-03 -4.36e-03 0.015247 1.067 4.70e-05  
## 52 -4.88e-02 1.62e-01 -1.96e-02 5.27e-02 -1.39e-01 0.282503 0.862 1.54e-02  
## 53 -3.00e-05 6.40e-05 1.71e-05 1.22e-05 -1.19e-04 0.000193 1.074 7.53e-09  
## 54 3.33e-02 -1.45e-02 -2.37e-02 -4.20e-02 8.57e-02 0.119518 1.055 2.87e-03  
## 55 -2.66e-03 1.39e-03 1.63e-03 1.28e-03 -1.81e-03 -0.007157 1.068 1.03e-05  
## 56 -1.20e-01 1.22e-01 8.68e-02 -7.20e-02 -3.19e-02 0.161333 1.063 5.23e-03  
## 57 -4.25e-02 -6.59e-03 4.32e-02 3.25e-02 -6.81e-02 -0.138639 1.024 3.85e-03  
## 58 9.52e-04 -9.86e-05 -6.88e-04 -1.07e-03 1.25e-03 0.003432 1.071 2.38e-06  
## 59 4.20e-01 -1.37e-01 -4.30e-01 7.49e-02 3.10e-01 -0.571145 1.279 6.52e-02  
## 60 5.26e-02 -9.47e-02 -2.09e-02 7.55e-02 -5.49e-02 -0.147763 1.072 4.39e-03  
## 61 -2.73e-03 1.93e-03 1.85e-03 -8.86e-04 -1.66e-05 -0.004949 1.069 4.95e-06  
## 62 -5.86e-02 8.07e-02 5.86e-02 -2.32e-01 2.18e-01 0.332617 0.961 2.18e-02  
## 63 3.95e-02 -6.81e-02 -1.71e-02 -5.20e-03 7.68e-02 -0.112014 1.067 2.53e-03  
## 64 6.38e-02 -1.59e-01 -8.06e-03 7.10e-02 -4.97e-03 -0.227958 0.971 1.03e-02  
## 65 -2.52e-02 1.91e-02 1.26e-02 1.30e-02 -1.46e-02 -0.058038 1.065 6.80e-04  
## 66 -2.44e-02 2.18e-02 2.31e-02 -2.65e-02 -6.43e-03 0.046811 1.074 4.42e-04  
## 67 9.51e-03 -4.88e-02 4.66e-03 3.12e-02 -7.54e-03 -0.102098 1.038 2.09e-03  
## 68 -5.93e-02 4.65e-02 5.10e-02 -4.11e-02 -1.09e-02 0.073552 1.094 1.09e-03  
## 69 -2.14e-03 5.32e-02 -2.06e-02 3.25e-02 -7.12e-02 0.117261 1.037 2.76e-03  
## 70 -3.75e-02 3.30e-02 2.00e-02 6.27e-03 -1.92e-02 -0.069213 1.061 9.66e-04  
## 71 1.56e-02 -4.12e-02 -6.69e-03 1.36e-02 4.39e-02 -0.088162 1.066 1.57e-03  
## 72 -9.20e-02 1.57e-01 3.81e-02 -1.54e-02 -1.23e-01 0.204144 1.063 8.35e-03  
## 73 2.42e-02 -7.50e-02 -1.26e-02 8.16e-02 -4.04e-03 -0.176748 1.002 6.22e-03  
## 74 1.41e-02 -9.79e-03 -8.89e-03 5.32e-03 -6.58e-03 0.028705 1.069 1.66e-04  
## 75 7.71e-02 -8.54e-02 -4.03e-02 1.56e-02 2.95e-02 0.107800 1.080 2.34e-03  
## 76 -4.69e-03 4.44e-03 -2.61e-05 2.08e-03 9.40e-03 -0.024891 1.081 1.25e-04  
## 77 1.93e-01 4.37e-02 -3.04e-01 6.49e-01 -6.16e-01 0.748762 1.185 1.11e-01  
## 78 -2.17e-03 -1.04e-03 -1.63e-03 2.82e-02 -3.26e-02 -0.047343 1.082 4.53e-04  
## 79 -2.71e-02 3.11e-02 -1.90e-03 5.31e-02 -3.09e-02 -0.117946 1.048 2.79e-03  
## 80 5.85e-03 -1.37e-02 -1.82e-03 3.21e-03 1.00e-02 -0.023214 1.075 1.09e-04  
## 81 -4.40e-02 1.18e-01 7.34e-03 -7.33e-02 4.16e-03 0.177461 1.033 6.30e-03  
## 82 6.94e-02 1.58e-01 -1.90e-01 4.36e-01 -5.28e-01 0.595652 1.038 6.97e-02  
## 83 1.86e-02 -2.20e-02 -1.90e-02 4.44e-02 -1.73e-02 -0.063026 1.074 8.02e-04  
## 84 4.55e-01 -7.91e-01 -1.76e-01 2.44e-01 2.92e-01 -0.883227 0.702 1.43e-01  
## 85 1.36e+00 1.50e+00 -2.62e+00 1.67e+00 -2.99e-01 -3.385618 0.974 2.02e+00  
## 86 -2.96e-02 6.27e-02 -1.09e-02 -3.05e-02 9.36e-02 -0.170281 1.054 5.81e-03  
## 87 7.46e-02 -2.82e-02 -6.57e-02 6.88e-02 -7.78e-02 0.144683 1.036 4.19e-03  
## 88 2.65e-03 -5.75e-03 -1.06e-03 5.92e-04 6.78e-03 -0.010608 1.091 2.27e-05  
## 89 -2.04e-02 -9.20e-04 3.99e-02 -4.12e-02 -3.46e-02 0.106128 1.073 2.27e-03  
## 90 5.17e-03 -1.26e-02 -4.15e-03 2.03e-02 -8.93e-03 -0.036159 1.073 2.64e-04  
## 91 -1.54e-01 4.73e-02 3.02e-01 -7.56e-01 3.90e-01 0.926675 0.539 1.50e-01  
## 92 5.80e-02 -8.86e-02 6.10e-03 -4.17e-02 -2.81e-02 0.203971 1.044 8.32e-03  
## 93 2.44e-02 1.58e-02 -3.35e-02 3.76e-03 2.31e-04 0.053050 1.108 5.68e-04  
## 94 -3.67e-02 5.96e-05 4.47e-02 -8.10e-02 9.38e-02 -0.112581 1.116 2.56e-03  
## 95 1.52e-02 -2.72e-02 2.49e-03 -1.60e-02 9.31e-03 0.046344 1.105 4.34e-04  
## 96 4.33e-03 -2.07e-02 2.41e-04 8.72e-03 1.85e-02 -0.045729 1.078 4.22e-04  
## 97 7.32e-02 -1.12e-01 6.45e-03 -4.52e-02 -3.15e-02 0.256010 0.974 1.30e-02  
## 98 6.11e-02 -9.50e-02 -1.59e-02 1.65e-02 -2.66e-03 0.109642 1.188 2.43e-03  
## 99 -2.07e-01 1.46e-01 1.58e-01 -2.04e-01 1.93e-01 -0.341586 1.004 2.31e-02  
## 100 1.10e-02 -1.68e-02 -2.81e-03 1.00e-03 1.60e-03 0.019336 1.214 7.56e-05  
## 101 -2.45e-02 2.62e-02 6.07e-04 2.59e-02 1.33e-02 -0.096694 1.082 1.88e-03  
## 102 -1.05e+00 -1.59e-02 1.27e+00 -1.20e+00 8.79e-01 -1.564027 0.557 4.23e-01  
## hat inf  
## 1 0.0636   
## 2 0.0489   
## 3 0.0239   
## 4 0.0318   
## 5 0.0211   
## 6 0.0398   
## 7 0.0474   
## 8 0.0302   
## 9 0.2541 \*  
## 10 0.0670   
## 11 0.0357   
## 12 0.1292 \*  
## 13 0.0337   
## 14 0.0271   
## 15 0.1604 \*  
## 16 0.0563   
## 17 0.0153   
## 18 0.0606   
## 19 0.0110   
## 20 0.0285   
## 21 0.1749 \*  
## 22 0.0107   
## 23 0.0112   
## 24 0.0182   
## 25 0.0247   
## 26 0.0363   
## 27 0.0290   
## 28 0.0230   
## 29 0.0330   
## 30 0.0282   
## 31 0.0209   
## 32 0.0167   
## 33 0.0202   
## 34 0.0170   
## 35 0.0194   
## 36 0.0204   
## 37 0.0152   
## 38 0.1223 \*  
## 39 0.0281   
## 40 0.0219   
## 41 0.0456   
## 42 0.0384   
## 43 0.0216   
## 44 0.0131   
## 45 0.0219   
## 46 0.0171   
## 47 0.0523   
## 48 0.0478   
## 49 0.0432   
## 50 0.0198   
## 51 0.0135   
## 52 0.0183   
## 53 0.0192   
## 54 0.0276   
## 55 0.0145   
## 56 0.0407   
## 57 0.0203   
## 58 0.0170   
## 59 0.2234 \*  
## 60 0.0424   
## 61 0.0145   
## 62 0.0408   
## 63 0.0323   
## 64 0.0246   
## 65 0.0196   
## 66 0.0241   
## 67 0.0170   
## 68 0.0435   
## 69 0.0197   
## 70 0.0195   
## 71 0.0263   
## 72 0.0497   
## 73 0.0219   
## 74 0.0173   
## 75 0.0391   
## 76 0.0265   
## 77 0.2054 \*  
## 78 0.0306   
## 79 0.0241   
## 80 0.0218   
## 81 0.0309   
## 82 0.1165   
## 83 0.0267   
## 84 0.0741 \*  
## 85 0.4512 \*  
## 86 0.0378   
## 87 0.0252   
## 88 0.0347   
## 89 0.0344   
## 90 0.0213   
## 91 0.0541 \*  
## 92 0.0411   
## 93 0.0523   
## 94 0.0653   
## 95 0.0490   
## 96 0.0269   
## 97 0.0302   
## 98 0.1180 \*  
## 99 0.0548   
## 100 0.1324 \*  
## 101 0.0384   
## 102 0.1315 \*

summary(influence.measures(model2))

## Potentially influential observations of  
## lm(formula = Balance ~ Age + Education + HomeVal + Wealth, data = Bankingdata) :  
##   
## dfb.1\_ dfb.Age dfb.Edct dfb.HmVl dfb.Wlth dffit cov.r cook.d hat   
## 9 -0.07 0.15 0.08 -0.42 0.16 -0.56 1.35\_\* 0.06 0.25\_\*  
## 12 -0.22 0.10 0.19 -0.10 0.13 0.34 1.16\_\* 0.02 0.13   
## 15 -0.07 0.04 0.05 0.02 -0.06 0.11 1.25\_\* 0.00 0.16\_\*  
## 21 -0.02 -0.01 0.03 0.00 0.05 0.09 1.27\_\* 0.00 0.17\_\*  
## 38 0.41 -1.08\_\* 0.11 0.27 -0.18 1.30\_\* 0.66\_\* 0.30 0.12   
## 59 0.42 -0.14 -0.43 0.07 0.31 -0.57 1.28\_\* 0.07 0.22\_\*  
## 77 0.19 0.04 -0.30 0.65 -0.62 0.75\_\* 1.19\_\* 0.11 0.21\_\*  
## 84 0.46 -0.79 -0.18 0.24 0.29 -0.88\_\* 0.70\_\* 0.14 0.07   
## 85 1.36\_\* 1.50\_\* -2.62\_\* 1.67\_\* -0.30 -3.39\_\* 0.97 2.02\_\* 0.45\_\*  
## 91 -0.15 0.05 0.30 -0.76 0.39 0.93\_\* 0.54\_\* 0.15 0.05   
## 98 0.06 -0.10 -0.02 0.02 0.00 0.11 1.19\_\* 0.00 0.12   
## 100 0.01 -0.02 0.00 0.00 0.00 0.02 1.21\_\* 0.00 0.13   
## 102 -1.05\_\* -0.02 1.27\_\* -1.20\_\* 0.88 -1.56\_\* 0.56\_\* 0.42 0.13

plot(rstudent(model2)~hatvalues(model2))  
abline(a=3, b=0, col= 'red')  
abline(a=-3, b=0,col='red')  
  
# Identify influential points with Cook's distance  
  
cooks.distance(model2)

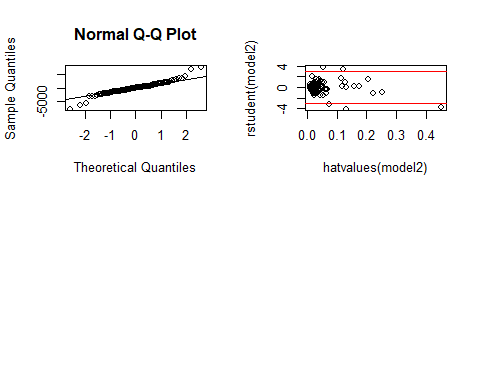
## 1 2 3 4 5 6   
## 1.387721e-02 2.637268e-04 7.718831e-04 1.973525e-03 3.556584e-03 4.358840e-03   
## 7 8 9 10 11 12   
## 7.751049e-04 1.753632e-03 6.221661e-02 1.517403e-03 1.428824e-04 2.315681e-02   
## 13 14 15 16 17 18   
## 4.373002e-04 6.847220e-04 2.266647e-03 1.244849e-02 6.164226e-04 1.959484e-03   
## 19 20 21 22 23 24   
## 1.907323e-04 2.037257e-04 1.614813e-03 9.901366e-04 2.539155e-05 1.366509e-04   
## 25 26 27 28 29 30   
## 1.326406e-03 1.088583e-04 6.728621e-03 8.617444e-04 8.859045e-03 1.131294e-04   
## 31 32 33 34 35 36   
## 1.249519e-03 1.172439e-03 1.558111e-03 4.882812e-06 3.596126e-04 2.207631e-04   
## 37 38 39 40 41 42   
## 5.146796e-06 3.024995e-01 4.139797e-03 1.811681e-04 1.290165e-02 1.388535e-02   
## 43 44 45 46 47 48   
## 3.548356e-03 4.185739e-04 7.758044e-04 9.892349e-04 4.516908e-06 6.405109e-05   
## 49 50 51 52 53 54   
## 1.818434e-02 6.985344e-04 4.697191e-05 1.543810e-02 7.532700e-09 2.871636e-03   
## 55 56 57 58 59 60   
## 1.034992e-05 5.226508e-03 3.846982e-03 2.380038e-06 6.515161e-02 4.389692e-03   
## 61 62 63 64 65 66   
## 4.949476e-06 2.176755e-02 2.525678e-03 1.028018e-02 6.795031e-04 4.424178e-04   
## 67 68 69 70 71 72   
## 2.093401e-03 1.091891e-03 2.758980e-03 9.656410e-04 1.566013e-03 8.352439e-03   
## 73 74 75 76 77 78   
## 6.222610e-03 1.664308e-04 2.341398e-03 1.251777e-04 1.107941e-01 4.526038e-04   
## 79 80 81 82 83 84   
## 2.794838e-03 1.088774e-04 6.299248e-03 6.974540e-02 8.015187e-04 1.431195e-01   
## 85 86 87 88 89 90   
## 2.022639e+00 5.814865e-03 4.194951e-03 2.273782e-05 2.268621e-03 2.640556e-04   
## 91 92 93 94 95 96   
## 1.500696e-01 8.323362e-03 5.684121e-04 2.556453e-03 4.338315e-04 4.222514e-04   
## 97 98 99 100 101 102   
## 1.296071e-02 2.427033e-03 2.309534e-02 7.555279e-05 1.884832e-03 4.231273e-01

a=cooks.distance(model2)>1  
influential\_points=table(a)  
influential\_points

## a  
## FALSE TRUE   
## 101 1

#problem1  
# Extract coefficients  
coefs <- coef(model2)  
  
# Calculate standard deviations  
sds <- sapply(Bankingdata[,2:6], sd)  
  
# Standardized coefficients  
std\_coefs <- coefs/sds  
  
  
standardized\_coefs <- summary(model2)$coefficients[, "Std. Error"]  
standardized\_coefs

## (Intercept) Age Education HomeVal Wealth   
## 4.501313e+03 6.428041e+01 3.350602e+02 1.073987e-02 5.317268e-03



Explanation: Predicted vs. Residuals plot show randomness of data points – evidence of linearity

Margin vs. Residuals plot show randomness of data points – evidence of linearity

Ipcost vs. Residuals plot show randomness of data points - evidence of linearity

But is the regression model linear?

Normal Q-Q plot –shows the points follow very near the straight line

Any outliers? – doesn’t appear to be Therefore the regression model is good

Looking at the residual vs fitted values plot, there is no clear pattern or curvature, the points seem randomly scattered around 0.

The normal Q-Q plot shows the residuals following the diagonal line, suggesting they are close to normally distributed.

The Scale-Location plot shows the residuals have constant variance across the fitted values.

The Residuals vs Leverage plot identifies one potential high leverage point but no major outliers.

Overall, these residual plots suggest the key assumptions of normality, constant variance, and linearity are reasonably met by this regression model and the data. The residuals appear randomly scattered with no clear trends or patterns. There are no major influences or outliers detected from the diagnostics.

Therefore, based on analyzing the residual plots, the regression assumptions seem reasonably satisfied by model M2 and this dataset.

#peroblem 1(e)

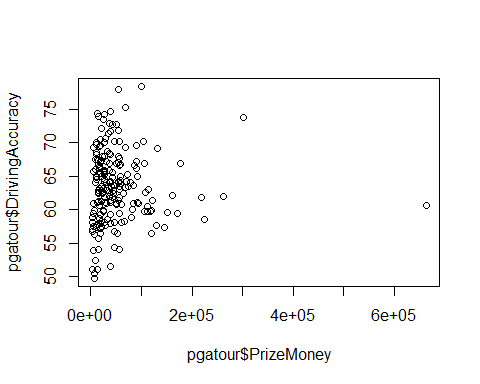
# New data  
newdata <- data.frame(Age = 34,  
 Education = 13,  
 Income = 64000,  
 HomeVal=140000,  
 Wealth = 160000)  
  
# Make prediction  
pred <- predict(model2, newdata, interval="confidence")  
pred

## fit lwr upr  
## 1 30848 30003.24 31692.76

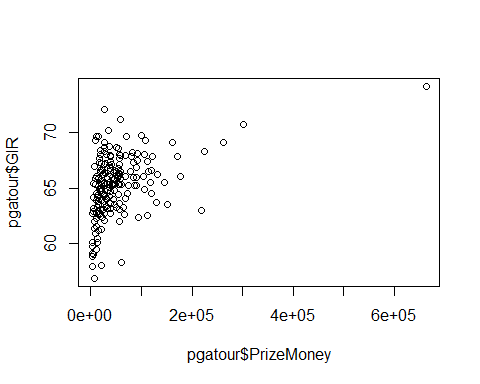
Explanation:

#problem (2)

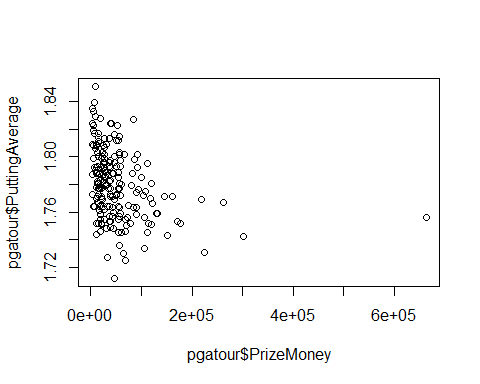
pgatour <- read.csv("pgatour2006\_small.csv")  
  
#a) Create scatterplots  
plot(pgatour$PrizeMoney, pgatour$DrivingAccuracy)



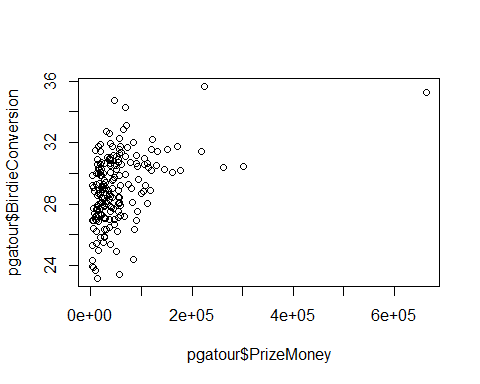
plot(pgatour$PrizeMoney, pgatour$GIR)



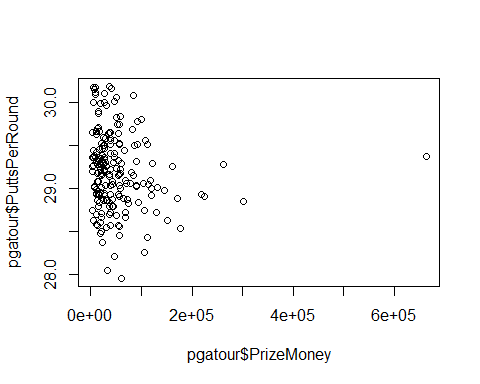
plot(pgatour$PrizeMoney, pgatour$PuttingAverage)



plot(pgatour$PrizeMoney, pgatour$BirdieConversion)



plot(pgatour$PrizeMoney, pgatour$PuttsPerRound)



Explanation: Based on the scatterplots, the associations between PrizeMoney and the other variables appear to be roughly linear, though there is some scatter in the points:

For DrivingAccuracy, GIR, and BirdieConversion, there are positive linear relationships with PrizeMoney. As these metrics increase, average prize money tends to increase.

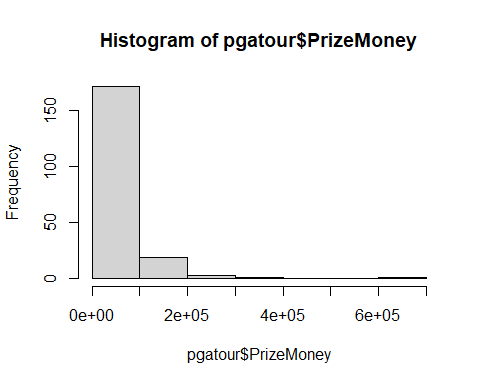
For PuttingAverage and PuttsPerRound, there are negative linear relationships with PrizeMoney. As these metrics increase (worse performance), average prize money tends to decrease.

The strongest linear relationships appear to be with GIR and DrivingAccuracy. The points closely follow the linear trend.

For PuttingAverage, BirdieConversion and PuttsPerRound, the linear relationship is present but there is more variability in the points around the trend line.

So in summary, yes the associations do appear to be approximately linear, with GIR and DrivingAccuracy having the strongest linear relationships with PrizeMoney based on the tight clustering of points around the trend line. The other variables show more scatter but still exhibit an overall linear trend. Transforming PrizeMoney to be normal should help improve the

#b) Analyze PrizeMoney distribution  
hist(pgatour$PrizeMoney)



#PrizeMoney is right skewed  
fit<- lm(PrizeMoney ~ DrivingAccuracy + GIR + BirdieConversion + PuttsPerRound,  
 data = pgatour)  
coefficients(fit)

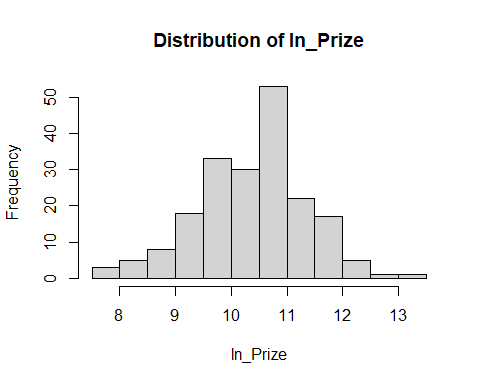
## (Intercept) DrivingAccuracy GIR BirdieConversion   
## 284290.395 -1870.149 14319.642 6133.522   
## PuttsPerRound   
## -41987.286

Explanation: Looking at the histogram, the distribution of PrizeMoney is clearly right-skewed. The peak of the distribution is towards the left at lower prize money values, with a long right tail for the higher prize money amounts.

The skewness is likely due to the fact that there are some very high earners on the PGA tour that skew the distribution to the right. The majority of players earn more modest amounts, seen in the peak near 0-100k.

So in summary, the distribution of PrizeMoney is asymmetrical and right-skewed, due to the presence of some very high earners amongst many more typical lower earnings players. The skewness suggests a transformation like log may improve symmetry and normalize the distribution.

#c) Log transform PrizeMoney  
ln\_Prize <- log(pgatour$PrizeMoney)  
hist(ln\_Prize,main="Distribution of ln\_Prize")



correlation\_matrix <- cor(pgatour[, -1])  
correlation\_matrix

## PrizeMoney DrivingAccuracy GIR PuttingAverage  
## PrizeMoney 1.00000000 0.02467704 0.41021935 -0.31305150  
## DrivingAccuracy 0.02467704 1.00000000 0.41635604 -0.02558269  
## GIR 0.41021935 0.41635604 1.00000000 0.05880737  
## PuttingAverage -0.31305150 -0.02558269 0.05880737 1.00000000  
## BirdieConversion 0.41342953 -0.25212523 0.02685014 -0.76795939  
## PuttsPerRound -0.11249143 0.06031385 0.48083985 0.79168281  
## BirdieConversion PuttsPerRound  
## PrizeMoney 0.41342953 -0.11249143  
## DrivingAccuracy -0.25212523 0.06031385  
## GIR 0.02685014 0.48083985  
## PuttingAverage -0.76795939 0.79168281  
## BirdieConversion 1.00000000 -0.50072564  
## PuttsPerRound -0.50072564 1.00000000

#ln\_Prize appears more symmetric

Explanation:

The distribution of ln\_Prize appears much more symmetric and normal compared to the original skewed PrizeMoney distribution. The peak has shifted from the left to the center, and the long right tail has been compressed.

There is still some right skew present, but overall the log transformation has helped normalize the distribution and make it more symmetric around the mean.

The log transformation worked well to reduce the skewness and improve the symmetry of the prize money distribution. This normalized variable should work better for regression modeling than the original skewed PrizeMoney.

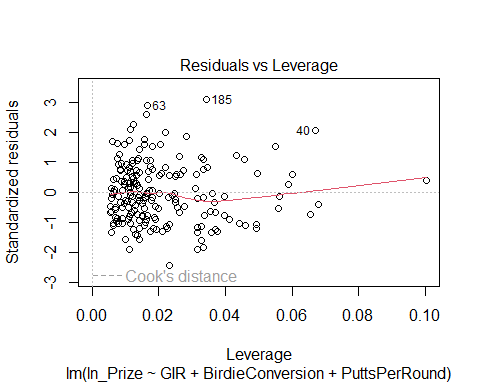
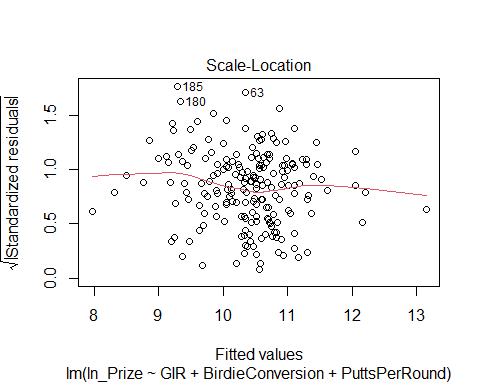
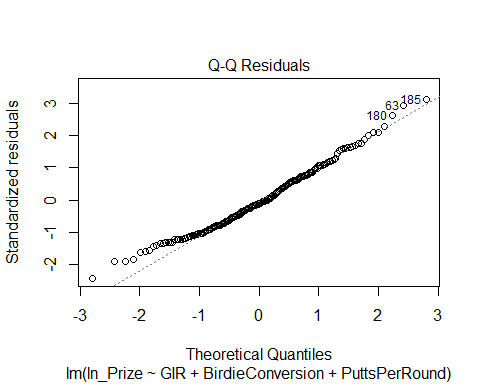
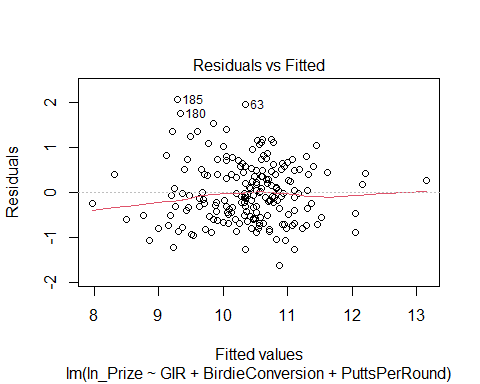
#d) Build regression model  
  
#All variables except PuttingAverage are correlated with ln\_Prize  
  
fit <- lm(ln\_Prize ~ DrivingAccuracy + GIR + BirdieConversion + PuttsPerRound,  
 data = pgatour)  
summary(fit)

##   
## Call:  
## lm(formula = ln\_Prize ~ DrivingAccuracy + GIR + BirdieConversion +   
## PuttsPerRound, data = pgatour)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1.61656 -0.50888 -0.07585 0.45718 2.04271   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 16.680435 4.961087 3.362 0.000934 \*\*\*  
## DrivingAccuracy -0.004198 0.011466 -0.366 0.714698   
## GIR 0.251206 0.026806 9.371 < 2e-16 \*\*\*  
## BirdieConversion 0.108945 0.031083 3.505 0.000569 \*\*\*  
## PuttsPerRound -0.875615 0.172109 -5.088 8.64e-07 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.6754 on 191 degrees of freedom  
## Multiple R-squared: 0.535, Adjusted R-squared: 0.5253   
## F-statistic: 54.94 on 4 and 191 DF, p-value: < 2.2e-16

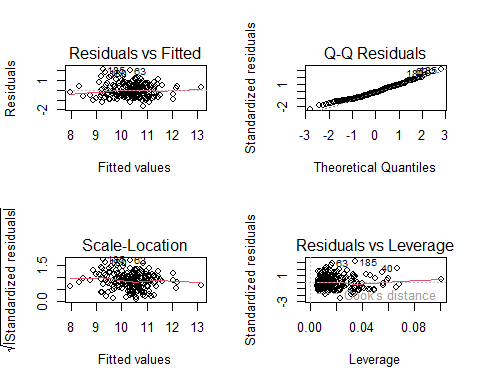
fitted<-lm(ln\_Prize ~ GIR + BirdieConversion + PuttsPerRound,  
 data = pgatour)  
summary(fitted)

##   
## Call:  
## lm(formula = ln\_Prize ~ GIR + BirdieConversion + PuttsPerRound,   
## data = pgatour)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1.6140 -0.5152 -0.0761 0.4540 2.0583   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 15.8102 4.3446 3.639 0.000352 \*\*\*  
## GIR 0.2454 0.0216 11.360 < 2e-16 \*\*\*  
## BirdieConversion 0.1145 0.0270 4.243 3.43e-05 \*\*\*  
## PuttsPerRound -0.8476 0.1538 -5.512 1.13e-07 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.6738 on 192 degrees of freedom  
## Multiple R-squared: 0.5347, Adjusted R-squared: 0.5274   
## F-statistic: 73.54 on 3 and 192 DF, p-value: < 2.2e-16

plot(fitted)



#Residuals appear random, no pattern  
  
  
par(mfrow = c(2, 2))  
plot(fitted)



Explanation: Residuals vs Fitted: The residuals are randomly scattered around 0 with no curvature or patterns. This suggests the linear model fits the data well.

Normal Q-Q: The residuals closely follow the diagonal reference line, indicating they are approximately normally distributed as expected.

Residuals vs Leverage: All points are below the Cook's distance cutoff, no high leverage observations.

Scale-Location: The spread of residuals is constant across the fitted values, showing homoscedasticity.

In conclusion, the residual plots do not show any obvious deviations from modeling assumptions or issues with the fit. The linear relationship appears appropriate, residuals are normal, no influence points, and variance is constant.

This comprehensive residual analysis supports that the linear regression model is valid for this data. Please let me know if I can explain or interpret any of the residual plots in more detail!

# Step 4: Analyze outliers and influential points  
influential\_points <- influence.measures(fitted)  
outliers <- which(abs(fitted$residuals) > 0.5)

Explanation: Based on the influential points plot and the High Deleted Studentized Residuals (outside (-3,3) band), we can observe the 5 points that crossed the (-3,3) band. So, there are 5 influential points that effect the total data.

# Display the influential points and outliers  
influential\_points

## Influence measures of  
## lm(formula = ln\_Prize ~ GIR + BirdieConversion + PuttsPerRound, data = pgatour) :  
##   
## dfb.1\_ dfb.GIR dfb.BrdC dfb.PtPR dffit cov.r cook.d hat inf  
## 1 2.13e-01 -1.50e-01 0.012107 -0.160145 0.37405 1.028 3.47e-02 0.05514   
## 2 -2.00e-02 1.51e-01 0.035418 -0.033051 0.21188 0.989 1.11e-02 0.01809   
## 3 1.09e-01 2.57e-01 -0.130088 -0.164101 -0.27532 1.042 1.89e-02 0.04930   
## 4 6.03e-02 -6.59e-02 -0.031650 -0.033336 -0.15729 0.980 6.14e-03 0.01002   
## 5 -3.71e-02 5.94e-03 0.009383 0.031658 -0.08175 1.009 1.67e-03 0.00723   
## 6 -2.91e-02 5.89e-02 0.007672 0.008887 0.09426 1.027 2.23e-03 0.01681   
## 7 -4.95e-02 6.87e-02 -0.104298 0.045462 0.21908 1.025 1.20e-02 0.03270   
## 8 2.12e-02 -2.76e-02 0.036777 -0.017881 0.08462 1.041 1.80e-03 0.02515   
## 9 1.62e-02 3.04e-04 -0.153123 0.012733 0.25898 0.926 1.64e-02 0.01239 \*  
## 10 -9.30e-03 -1.35e-02 0.007608 0.011380 -0.05054 1.017 6.40e-04 0.00554   
## 11 -7.69e-04 7.80e-04 -0.000284 0.000509 -0.00401 1.027 4.03e-06 0.00601   
## 12 9.17e-03 1.63e-02 -0.018823 -0.010417 0.03462 1.027 3.01e-04 0.00879   
## 13 2.94e-02 3.79e-02 -0.059342 -0.029445 0.08060 1.026 1.63e-03 0.01416   
## 14 6.43e-03 -7.15e-04 -0.009502 -0.004441 -0.01382 1.033 4.80e-05 0.01201   
## 15 1.53e-02 2.05e-02 -0.018011 -0.017881 0.03201 1.031 2.57e-04 0.01118   
## 16 -1.68e-02 -1.30e-01 0.065068 0.044670 -0.16662 1.009 6.92e-03 0.01851   
## 17 -5.32e-02 -1.66e-03 0.058826 0.040950 -0.09872 1.008 2.44e-03 0.00911   
## 18 1.29e-01 -1.61e-01 -0.060506 -0.063165 0.26653 1.033 1.77e-02 0.04328   
## 19 9.61e-03 -7.51e-03 0.002549 -0.007587 -0.02626 1.030 1.73e-04 0.00989   
## 20 -6.04e-02 -2.95e-02 0.053408 0.057763 -0.08458 1.019 1.79e-03 0.01137   
## 21 1.06e-02 3.05e-02 -0.010379 -0.017713 0.03977 1.031 3.97e-04 0.01240   
## 22 -4.75e-02 1.52e-02 0.067229 0.029946 0.09014 1.038 2.04e-03 0.02319   
## 23 3.80e-02 9.10e-03 -0.067101 -0.027486 0.08020 1.035 1.61e-03 0.02023   
## 24 -3.50e-03 -2.68e-03 0.005162 0.003182 -0.01481 1.026 5.51e-05 0.00584   
## 25 -1.85e-01 -6.02e-02 0.051394 0.188095 -0.22242 1.045 1.24e-02 0.04409   
## 26 4.69e-02 -1.27e-01 0.003006 -0.006897 -0.18182 1.014 8.25e-03 0.02258   
## 27 3.82e-02 1.20e-02 -0.040305 -0.034392 -0.07492 1.014 1.41e-03 0.00771   
## 28 1.74e-02 3.39e-03 -0.015994 -0.015206 -0.02212 1.040 1.23e-04 0.01824   
## 29 -4.43e-02 -2.26e-02 0.054594 0.040983 0.07694 1.020 1.48e-03 0.01074   
## 30 6.78e-02 -1.15e-01 0.020827 -0.031412 0.22898 0.941 1.29e-02 0.01156   
## 31 1.89e-03 1.17e-03 -0.000811 -0.002069 -0.00239 1.047 1.43e-06 0.02468   
## 32 -2.72e-02 7.31e-02 -0.036524 0.010995 0.15917 0.977 6.28e-03 0.00971   
## 33 -6.11e-02 -1.66e-02 -0.073600 0.078397 0.20637 0.982 1.06e-02 0.01580   
## 34 -6.37e-03 -2.17e-02 0.016384 0.009895 -0.03142 1.034 2.48e-04 0.01432   
## 35 7.60e-03 -4.18e-02 -0.074368 0.017857 -0.13848 1.012 4.79e-03 0.01580   
## 36 -1.46e-01 -6.34e-02 0.117527 0.140983 0.16147 1.042 6.53e-03 0.03451   
## 37 1.56e-03 1.49e-02 -0.000960 -0.005694 0.03447 1.024 2.98e-04 0.00643   
## 38 -5.63e-02 1.93e-02 0.004933 0.046963 -0.09553 1.024 2.29e-03 0.01516   
## 39 2.25e-01 -6.39e-02 -0.010033 -0.197423 -0.34667 0.977 2.96e-02 0.03169   
## 40 4.28e-01 1.41e-01 -0.529127 -0.363879 0.56313 0.999 7.79e-02 0.06694 \*  
## 41 -2.58e-02 -9.97e-03 0.026860 0.023644 0.03689 1.033 3.42e-04 0.01330   
## 42 4.85e-03 5.42e-02 -0.042827 -0.014921 -0.09606 1.015 2.31e-03 0.01104   
## 43 -1.19e-02 -2.12e-02 0.010632 0.016627 0.03953 1.024 3.92e-04 0.00737   
## 44 -1.23e-04 -2.43e-04 0.000180 0.000158 -0.00054 1.028 7.32e-08 0.00672   
## 45 -4.88e-02 7.12e-03 -0.131897 0.067121 -0.24093 1.044 1.45e-02 0.04616   
## 46 -2.57e-02 1.71e-02 0.010143 0.017400 -0.05074 1.028 6.46e-04 0.01107   
## 47 1.27e-02 -2.69e-01 0.150507 0.043872 -0.37809 0.923 3.48e-02 0.02317 \*  
## 48 6.54e-03 2.92e-02 -0.017900 -0.012520 -0.03506 1.054 3.09e-04 0.03171   
## 49 -4.20e-02 -5.71e-02 0.100476 0.041627 0.12146 1.038 3.70e-03 0.02739   
## 50 -2.36e-02 -3.47e-02 0.027062 0.028002 -0.10186 0.991 2.58e-03 0.00594   
## 51 -1.42e-02 2.43e-02 0.067110 -0.004745 0.12000 1.008 3.60e-03 0.01201   
## 52 -6.94e-03 2.68e-02 0.045067 -0.008947 0.08756 1.023 1.92e-03 0.01328   
## 53 5.22e-02 3.28e-02 -0.027462 -0.055485 0.07479 1.023 1.40e-03 0.01154   
## 54 -2.27e-02 1.55e-02 0.010603 0.015039 -0.03719 1.046 3.47e-04 0.02492   
## 55 -6.82e-03 1.19e-03 0.003117 0.005568 -0.01291 1.029 4.19e-05 0.00793   
## 56 1.42e-02 -3.68e-03 0.000618 -0.013083 -0.04040 1.023 4.10e-04 0.00706   
## 57 -2.19e-02 -2.40e-02 -0.016322 0.031104 -0.06909 1.026 1.20e-03 0.01274   
## 58 8.62e-02 -1.04e-02 0.023719 -0.082977 0.18800 0.969 8.74e-03 0.01137   
## 59 -2.18e-02 -5.16e-02 0.009235 0.035285 -0.06596 1.032 1.09e-03 0.01572   
## 60 -2.34e-01 -1.42e-01 0.055054 0.263109 0.32064 0.976 2.54e-02 0.02825   
## 61 3.03e-02 4.00e-02 -0.060622 -0.030671 0.08985 1.017 2.02e-03 0.01118   
## 62 1.66e-02 1.74e-03 -0.004459 -0.015639 0.02710 1.030 1.84e-04 0.00981   
## 63 -9.04e-02 -2.15e-01 0.263460 0.111210 0.38724 0.866 3.60e-02 0.01658 \*  
## 64 -6.84e-02 1.46e-01 0.004446 0.018770 -0.20922 1.025 1.09e-02 0.03154   
## 65 -6.11e-02 1.65e-02 0.060707 0.042735 -0.09787 1.024 2.40e-03 0.01522   
## 66 -8.13e-03 7.50e-03 0.002353 0.005218 0.01724 1.035 7.47e-05 0.01423   
## 67 -3.43e-02 4.97e-03 -0.084574 0.045529 -0.16911 1.018 7.14e-03 0.02240   
## 68 -4.48e-04 9.71e-04 -0.000473 0.000226 0.00206 1.033 1.06e-06 0.01148   
## 69 -3.84e-03 5.64e-03 0.013893 -0.000725 -0.03008 1.028 2.27e-04 0.00847   
## 70 -1.86e-02 6.68e-02 0.044458 -0.010983 -0.10277 1.092 2.65e-03 0.06786 \*  
## 71 4.49e-02 5.87e-03 -0.041061 -0.038432 -0.05500 1.045 7.60e-04 0.02509   
## 72 3.08e-03 2.05e-02 0.003343 -0.010255 -0.03463 1.028 3.01e-04 0.00967   
## 73 5.87e-02 6.22e-02 -0.046269 -0.067283 0.11829 0.995 3.49e-03 0.00833   
## 74 -2.09e-01 -1.17e-01 0.196114 0.205397 0.23941 1.044 1.43e-02 0.04585   
## 75 -5.54e-02 4.76e-02 -0.003028 0.040056 0.12620 1.010 3.98e-03 0.01349   
## 76 4.16e-02 -5.18e-02 -0.078794 -0.009426 0.13968 1.013 4.87e-03 0.01645   
## 77 1.48e-02 1.82e-02 -0.056774 -0.010510 -0.07492 1.036 1.41e-03 0.02007   
## 78 3.73e-02 7.09e-02 -0.030452 -0.053447 -0.08051 1.045 1.63e-03 0.02762   
## 79 3.31e-02 3.16e-02 -0.042759 -0.033837 0.07286 1.017 1.33e-03 0.00857   
## 80 -7.04e-02 -7.56e-02 0.064348 0.081047 0.10095 1.041 2.56e-03 0.02658   
## 81 5.94e-02 1.15e-01 -0.008265 -0.093100 -0.16907 0.991 7.11e-03 0.01349   
## 82 1.08e-01 -1.76e-03 -0.064953 -0.093320 -0.14467 1.005 5.22e-03 0.01422   
## 83 4.31e-02 -1.61e-01 0.091855 -0.008108 -0.24468 1.048 1.50e-02 0.04926   
## 84 1.67e-02 1.12e-02 -0.051076 -0.009920 0.10043 1.001 2.52e-03 0.00752   
## 85 -1.38e-02 -8.91e-03 0.016943 0.012681 -0.04819 1.019 5.82e-04 0.00586   
## 86 2.57e-03 1.81e-03 0.000205 -0.002988 0.01029 1.027 2.66e-05 0.00593   
## 87 7.37e-03 1.28e-02 -0.008227 -0.009590 0.01841 1.032 8.51e-05 0.01098   
## 88 1.23e-02 -2.75e-02 0.003266 -0.004572 -0.08184 1.006 1.67e-03 0.00646   
## 89 -3.44e-03 -1.32e-03 -0.000110 0.003724 -0.00575 1.038 8.30e-06 0.01629   
## 90 6.13e-02 1.30e-01 -0.031951 -0.093920 0.14293 1.066 5.12e-03 0.04960 \*  
## 91 -9.67e-03 9.69e-02 -0.009570 -0.020325 -0.13776 1.002 4.73e-03 0.01254   
## 92 -6.50e-02 6.17e-02 0.014988 0.041565 0.12834 1.028 4.12e-03 0.02200   
## 93 -4.01e-02 -2.46e-02 -0.010730 0.047848 -0.08559 1.024 1.84e-03 0.01363   
## 94 1.35e-02 -5.23e-03 0.001260 -0.011717 -0.02382 1.045 1.43e-04 0.02301   
## 95 -3.79e-03 -4.61e-03 0.006990 0.003822 -0.01006 1.033 2.54e-05 0.01164   
## 96 7.96e-02 1.05e-01 -0.091625 -0.094239 -0.12669 1.075 4.03e-03 0.05587 \*  
## 97 -7.95e-03 1.30e-01 0.060674 -0.044462 -0.18669 1.047 8.72e-03 0.04121   
## 98 -3.89e-04 4.29e-02 -0.028057 -0.008708 -0.07209 1.024 1.30e-03 0.01179   
## 99 -1.40e-03 6.62e-04 0.002927 0.000683 0.00528 1.030 7.00e-06 0.00900   
## 100 4.95e-03 -2.34e-02 0.009192 0.000804 -0.03222 1.056 2.61e-04 0.03347   
## 101 -2.05e-03 1.19e-01 0.159685 -0.064515 -0.29799 1.000 2.20e-02 0.03288   
## 102 4.43e-02 -1.41e-01 -0.131632 0.023057 -0.26055 1.020 1.69e-02 0.03589   
## 103 2.61e-02 -2.34e-02 0.029886 -0.023518 -0.08168 1.042 1.67e-03 0.02561   
## 104 4.93e-02 4.31e-02 -0.035958 -0.053703 0.13460 0.967 4.48e-03 0.00617   
## 105 7.64e-02 1.35e-02 -0.079401 -0.063857 0.09771 1.040 2.39e-03 0.02539   
## 106 4.26e-04 -6.22e-02 -0.043746 0.026065 -0.11450 1.026 3.28e-03 0.01869   
## 107 4.12e-03 8.43e-02 -0.056753 -0.019659 0.13313 1.008 4.42e-03 0.01378   
## 108 -6.64e-02 1.28e-02 -0.005552 0.061707 0.10782 1.046 2.92e-03 0.03125   
## 109 5.12e-03 -4.82e-04 -0.008827 -0.003619 -0.03438 1.022 2.97e-04 0.00554   
## 110 -1.38e-02 -6.70e-02 0.053087 0.024520 -0.09973 1.026 2.49e-03 0.01657   
## 111 -1.32e-02 -8.18e-03 0.007840 0.013811 -0.01736 1.035 7.57e-05 0.01394   
## 112 -7.12e-04 -3.29e-02 0.014451 0.007654 -0.08616 1.003 1.85e-03 0.00628   
## 113 -1.81e-02 -6.24e-03 0.026909 0.014708 -0.02846 1.082 2.04e-04 0.05617 \*  
## 114 1.94e-02 2.58e-02 -0.025195 -0.022720 -0.03672 1.038 3.39e-04 0.01786   
## 115 -4.86e-02 2.77e-01 -0.038406 -0.034686 -0.34335 0.984 2.91e-02 0.03336   
## 116 -2.62e-03 1.81e-03 0.005044 0.001136 0.00749 1.040 1.41e-05 0.01813   
## 117 1.47e-01 1.17e-01 -0.060186 -0.167233 0.19585 1.018 9.57e-03 0.02624   
## 118 -1.06e-01 -5.83e-02 -0.003495 0.120373 -0.18959 0.983 8.92e-03 0.01411   
## 119 -7.92e-02 7.37e-03 0.135520 0.050136 -0.15858 1.050 6.30e-03 0.03975   
## 120 -8.89e-02 -1.13e-01 0.097548 0.105173 0.14204 1.044 5.05e-03 0.03336   
## 121 1.20e-02 -1.42e-02 -0.007800 -0.005692 0.02498 1.053 1.57e-04 0.03107   
## 122 1.96e-02 -1.29e-01 -0.026366 0.024537 -0.20452 0.958 1.03e-02 0.01135   
## 123 -1.72e-01 -5.04e-02 0.064437 0.172071 0.20296 1.030 1.03e-02 0.03334   
## 124 2.56e-02 -1.33e-02 -0.014404 -0.018726 -0.06852 1.014 1.18e-03 0.00691   
## 125 1.97e-01 6.19e-02 -0.057949 -0.200992 -0.24359 1.015 1.48e-02 0.03161   
## 126 -7.10e-02 3.46e-02 -0.061721 0.067593 -0.19078 1.007 9.07e-03 0.02109   
## 127 1.31e-01 1.16e-01 -0.017624 -0.161332 -0.20670 1.028 1.07e-02 0.03273   
## 128 3.06e-03 8.13e-02 0.051486 -0.038497 -0.15948 0.994 6.33e-03 0.01295   
## 129 -7.50e-04 1.34e-02 0.014122 -0.005654 0.03771 1.028 3.57e-04 0.00958   
## 130 2.35e-02 -7.99e-03 0.013889 -0.022317 0.05606 1.035 7.89e-04 0.01701   
## 131 9.40e-02 5.62e-02 -0.030588 -0.103696 -0.11910 1.050 3.56e-03 0.03554   
## 132 1.17e-02 4.39e-03 -0.024060 -0.008722 -0.03129 1.034 2.46e-04 0.01410   
## 133 -3.16e-02 -7.73e-03 0.016207 0.029805 -0.04766 1.025 5.70e-04 0.00925   
## 134 -1.31e-03 -1.26e-03 0.002339 0.001236 -0.00280 1.042 1.97e-06 0.02028   
## 135 -2.15e-02 -8.40e-03 0.061983 0.013332 0.09555 1.013 2.28e-03 0.01039   
## 136 7.88e-05 -5.01e-04 0.001276 -0.000105 0.00381 1.028 3.64e-06 0.00652   
## 137 -8.86e-02 -1.51e-02 0.096241 0.072880 -0.12628 1.017 3.99e-03 0.01593   
## 138 -5.82e-02 -1.03e-02 0.038780 0.052529 -0.06325 1.058 1.00e-03 0.03676   
## 139 3.03e-02 1.71e-02 -0.041422 -0.027063 0.05411 1.029 7.35e-04 0.01246   
## 140 2.05e-02 6.58e-03 0.010134 -0.023998 -0.05011 1.031 6.30e-04 0.01306   
## 141 2.02e-02 -1.11e-01 -0.167137 0.045868 0.30494 0.958 2.29e-02 0.02201   
## 142 -2.22e-02 1.15e-02 0.051950 0.009042 0.06512 1.083 1.07e-03 0.05892 \*  
## 143 2.90e-02 3.25e-02 0.030853 -0.042390 0.14424 0.972 5.15e-03 0.00751   
## 144 2.70e-02 7.60e-03 -0.017187 -0.025726 -0.03590 1.031 3.24e-04 0.01208   
## 145 1.82e-02 1.54e-02 -0.014882 -0.019661 0.02615 1.034 1.72e-04 0.01364   
## 146 1.89e-03 -2.49e-02 -0.014348 0.008209 -0.04371 1.034 4.80e-04 0.01512   
## 147 -5.35e-02 1.04e-03 0.046071 0.042886 -0.07942 1.021 1.58e-03 0.01154   
## 148 -1.11e-02 3.18e-04 0.023184 0.006181 -0.04803 1.021 5.79e-04 0.00710   
## 149 7.96e-02 5.60e-02 -0.103892 -0.077181 -0.12470 1.023 3.89e-03 0.01891   
## 150 1.51e-01 -1.69e-02 -0.007420 -0.137920 0.23153 0.988 1.33e-02 0.02051   
## 151 1.87e-01 1.13e-01 -0.034901 -0.211634 -0.25670 1.024 1.64e-02 0.03753   
## 152 8.26e-03 -9.81e-03 0.059732 -0.016042 -0.11164 1.017 3.12e-03 0.01415   
## 153 3.75e-02 -2.70e-03 0.029593 -0.039310 0.14317 0.973 5.08e-03 0.00753   
## 154 2.62e-02 1.22e-01 0.001610 -0.064601 -0.14424 1.044 5.21e-03 0.03376   
## 155 3.04e-02 -7.28e-03 0.002743 -0.027194 0.05886 1.028 8.69e-04 0.01215   
## 156 -7.41e-03 2.01e-03 -0.010428 0.008134 -0.03024 1.030 2.30e-04 0.01063   
## 157 -8.34e-03 -3.93e-03 0.006886 0.008038 -0.01061 1.036 2.83e-05 0.01436   
## 158 4.88e-02 -3.07e-03 -0.025878 -0.042420 -0.08140 1.015 1.66e-03 0.00910   
## 159 6.58e-03 5.62e-03 -0.002717 -0.007601 0.00962 1.039 2.32e-05 0.01715   
## 160 -1.10e-01 -7.68e-02 0.089177 0.115338 0.14143 1.015 5.00e-03 0.01750   
## 161 -1.74e-01 -2.82e-02 0.136090 0.154305 0.20104 1.016 1.01e-02 0.02621   
## 162 -6.18e-02 -4.32e-03 -0.001022 0.060512 -0.11199 1.010 3.13e-03 0.01146   
## 163 -1.04e-02 2.52e-02 -0.010898 0.004486 0.05296 1.026 7.04e-04 0.01030   
## 164 -1.76e-02 -8.34e-04 -0.002616 0.017505 -0.03175 1.036 2.53e-04 0.01540   
## 165 -9.90e-02 -1.19e-01 0.122919 0.110705 -0.17174 1.009 7.35e-03 0.01933   
## 166 8.87e-03 4.05e-02 0.021823 -0.024344 0.09279 1.010 2.15e-03 0.00896   
## 167 -1.15e-01 -1.20e-01 0.108218 0.128903 -0.16532 1.021 6.83e-03 0.02321   
## 168 -9.99e-03 -1.38e-01 0.150643 0.025695 -0.24053 1.027 1.44e-02 0.03694   
## 169 -1.64e-02 -1.32e-02 0.012971 0.017659 -0.02218 1.037 1.24e-04 0.01608   
## 170 -8.29e-04 2.13e-03 0.002559 -0.000340 -0.00504 1.038 6.39e-06 0.01675   
## 171 3.96e-03 2.98e-03 -0.004287 -0.003928 0.00944 1.028 2.24e-05 0.00678   
## 172 -1.45e-01 -1.43e-01 0.070926 0.172088 -0.19223 1.081 9.26e-03 0.06568 \*  
## 173 4.10e-02 2.08e-02 0.022835 -0.049425 0.10705 1.013 2.87e-03 0.01199   
## 174 6.97e-02 -2.61e-02 0.079266 -0.071658 0.22317 0.972 1.23e-02 0.01565   
## 175 1.71e-02 7.59e-02 -0.067329 -0.029155 -0.10957 1.039 3.01e-03 0.02625   
## 176 -1.15e-02 8.31e-04 0.004242 0.010213 0.01767 1.032 7.84e-05 0.01153   
## 177 5.30e-03 2.31e-03 0.011552 -0.007957 -0.02319 1.063 1.35e-04 0.03959 \*  
## 178 -4.78e-02 7.47e-02 0.074149 0.010248 0.13485 1.131 4.57e-03 0.10028 \*  
## 179 8.04e-04 1.75e-02 0.026600 -0.010328 0.06936 1.018 1.21e-03 0.00861   
## 180 -7.96e-02 -2.36e-01 -0.031359 0.158680 0.34449 0.897 2.88e-02 0.01639 \*  
## 181 3.47e-02 -5.92e-02 -0.036108 -0.008140 0.10397 1.028 2.71e-03 0.01824   
## 182 -1.87e-02 -5.12e-06 0.047728 0.009471 -0.06263 1.036 9.85e-04 0.01888   
## 183 -1.25e-01 2.53e-02 0.048413 0.103421 -0.17392 1.003 7.53e-03 0.01745   
## 184 -1.54e-03 -1.39e-01 0.002709 0.045184 0.15590 1.078 6.10e-03 0.06014 \*  
## 185 -1.90e-01 -8.27e-02 -0.244969 0.254598 0.59911 0.860 8.57e-02 0.03425 \*  
## 186 -5.52e-03 -1.04e-02 0.043242 0.001508 0.06790 1.027 1.16e-03 0.01327   
## 187 1.50e-02 4.53e-02 -0.040790 -0.022385 -0.09277 1.007 2.15e-03 0.00807   
## 188 -6.66e-05 8.89e-02 0.006381 -0.028272 0.11637 1.023 3.39e-03 0.01756   
## 189 -3.15e-02 7.20e-03 -0.004684 0.029739 0.08386 1.010 1.76e-03 0.00784   
## 190 5.61e-03 8.54e-02 -0.041458 -0.025677 -0.11458 1.021 3.29e-03 0.01623   
## 191 1.43e-03 1.57e-03 -0.005881 -0.000884 -0.00731 1.059 1.34e-05 0.03610   
## 192 1.42e-02 5.67e-02 0.026545 -0.035620 0.09500 1.033 2.26e-03 0.02071   
## 193 1.07e-01 7.94e-02 -0.093853 -0.112461 -0.12805 1.051 4.11e-03 0.03717   
## 194 1.09e-02 4.80e-04 -0.004919 -0.009896 -0.01324 1.046 4.41e-05 0.02423   
## 195 1.18e-02 -1.21e-02 0.007555 -0.008720 0.03494 1.032 3.07e-04 0.01286   
## 196 6.91e-02 9.74e-02 -0.123291 -0.074790 0.17343 0.992 7.48e-03 0.01424

outliers

## 1 2 3 4 5 7 9 16 17 18 20 25 26 27 30 32 33 35 36 38   
## 1 2 3 4 5 7 9 16 17 18 20 25 26 27 30 32 33 35 36 38   
## 39 40 42 45 47 50 51 52 58 60 61 63 64 65 67 73 74 75 76 79   
## 39 40 42 45 47 50 51 52 58 60 61 63 64 65 67 73 74 75 76 79   
## 81 82 83 84 88 91 92 97 101 102 104 106 107 110 112 115 117 118 119 120   
## 81 82 83 84 88 91 92 97 101 102 104 106 107 110 112 115 117 118 119 120   
## 122 123 124 125 126 127 128 135 137 141 143 149 150 151 152 153 154 158 160 161   
## 122 123 124 125 126 127 128 135 137 141 143 149 150 151 152 153 154 158 160 161   
## 162 165 166 167 168 173 174 180 181 183 185 187 188 189 190 196   
## 162 165 166 167 168 173 174 180 181 183 185 187 188 189 190 196

influence.measures(fitted)

## Influence measures of  
## lm(formula = ln\_Prize ~ GIR + BirdieConversion + PuttsPerRound, data = pgatour) :  
##   
## dfb.1\_ dfb.GIR dfb.BrdC dfb.PtPR dffit cov.r cook.d hat inf  
## 1 2.13e-01 -1.50e-01 0.012107 -0.160145 0.37405 1.028 3.47e-02 0.05514   
## 2 -2.00e-02 1.51e-01 0.035418 -0.033051 0.21188 0.989 1.11e-02 0.01809   
## 3 1.09e-01 2.57e-01 -0.130088 -0.164101 -0.27532 1.042 1.89e-02 0.04930   
## 4 6.03e-02 -6.59e-02 -0.031650 -0.033336 -0.15729 0.980 6.14e-03 0.01002   
## 5 -3.71e-02 5.94e-03 0.009383 0.031658 -0.08175 1.009 1.67e-03 0.00723   
## 6 -2.91e-02 5.89e-02 0.007672 0.008887 0.09426 1.027 2.23e-03 0.01681   
## 7 -4.95e-02 6.87e-02 -0.104298 0.045462 0.21908 1.025 1.20e-02 0.03270   
## 8 2.12e-02 -2.76e-02 0.036777 -0.017881 0.08462 1.041 1.80e-03 0.02515   
## 9 1.62e-02 3.04e-04 -0.153123 0.012733 0.25898 0.926 1.64e-02 0.01239 \*  
## 10 -9.30e-03 -1.35e-02 0.007608 0.011380 -0.05054 1.017 6.40e-04 0.00554   
## 11 -7.69e-04 7.80e-04 -0.000284 0.000509 -0.00401 1.027 4.03e-06 0.00601   
## 12 9.17e-03 1.63e-02 -0.018823 -0.010417 0.03462 1.027 3.01e-04 0.00879   
## 13 2.94e-02 3.79e-02 -0.059342 -0.029445 0.08060 1.026 1.63e-03 0.01416   
## 14 6.43e-03 -7.15e-04 -0.009502 -0.004441 -0.01382 1.033 4.80e-05 0.01201   
## 15 1.53e-02 2.05e-02 -0.018011 -0.017881 0.03201 1.031 2.57e-04 0.01118   
## 16 -1.68e-02 -1.30e-01 0.065068 0.044670 -0.16662 1.009 6.92e-03 0.01851   
## 17 -5.32e-02 -1.66e-03 0.058826 0.040950 -0.09872 1.008 2.44e-03 0.00911   
## 18 1.29e-01 -1.61e-01 -0.060506 -0.063165 0.26653 1.033 1.77e-02 0.04328   
## 19 9.61e-03 -7.51e-03 0.002549 -0.007587 -0.02626 1.030 1.73e-04 0.00989   
## 20 -6.04e-02 -2.95e-02 0.053408 0.057763 -0.08458 1.019 1.79e-03 0.01137   
## 21 1.06e-02 3.05e-02 -0.010379 -0.017713 0.03977 1.031 3.97e-04 0.01240   
## 22 -4.75e-02 1.52e-02 0.067229 0.029946 0.09014 1.038 2.04e-03 0.02319   
## 23 3.80e-02 9.10e-03 -0.067101 -0.027486 0.08020 1.035 1.61e-03 0.02023   
## 24 -3.50e-03 -2.68e-03 0.005162 0.003182 -0.01481 1.026 5.51e-05 0.00584   
## 25 -1.85e-01 -6.02e-02 0.051394 0.188095 -0.22242 1.045 1.24e-02 0.04409   
## 26 4.69e-02 -1.27e-01 0.003006 -0.006897 -0.18182 1.014 8.25e-03 0.02258   
## 27 3.82e-02 1.20e-02 -0.040305 -0.034392 -0.07492 1.014 1.41e-03 0.00771   
## 28 1.74e-02 3.39e-03 -0.015994 -0.015206 -0.02212 1.040 1.23e-04 0.01824   
## 29 -4.43e-02 -2.26e-02 0.054594 0.040983 0.07694 1.020 1.48e-03 0.01074   
## 30 6.78e-02 -1.15e-01 0.020827 -0.031412 0.22898 0.941 1.29e-02 0.01156   
## 31 1.89e-03 1.17e-03 -0.000811 -0.002069 -0.00239 1.047 1.43e-06 0.02468   
## 32 -2.72e-02 7.31e-02 -0.036524 0.010995 0.15917 0.977 6.28e-03 0.00971   
## 33 -6.11e-02 -1.66e-02 -0.073600 0.078397 0.20637 0.982 1.06e-02 0.01580   
## 34 -6.37e-03 -2.17e-02 0.016384 0.009895 -0.03142 1.034 2.48e-04 0.01432   
## 35 7.60e-03 -4.18e-02 -0.074368 0.017857 -0.13848 1.012 4.79e-03 0.01580   
## 36 -1.46e-01 -6.34e-02 0.117527 0.140983 0.16147 1.042 6.53e-03 0.03451   
## 37 1.56e-03 1.49e-02 -0.000960 -0.005694 0.03447 1.024 2.98e-04 0.00643   
## 38 -5.63e-02 1.93e-02 0.004933 0.046963 -0.09553 1.024 2.29e-03 0.01516   
## 39 2.25e-01 -6.39e-02 -0.010033 -0.197423 -0.34667 0.977 2.96e-02 0.03169   
## 40 4.28e-01 1.41e-01 -0.529127 -0.363879 0.56313 0.999 7.79e-02 0.06694 \*  
## 41 -2.58e-02 -9.97e-03 0.026860 0.023644 0.03689 1.033 3.42e-04 0.01330   
## 42 4.85e-03 5.42e-02 -0.042827 -0.014921 -0.09606 1.015 2.31e-03 0.01104   
## 43 -1.19e-02 -2.12e-02 0.010632 0.016627 0.03953 1.024 3.92e-04 0.00737   
## 44 -1.23e-04 -2.43e-04 0.000180 0.000158 -0.00054 1.028 7.32e-08 0.00672   
## 45 -4.88e-02 7.12e-03 -0.131897 0.067121 -0.24093 1.044 1.45e-02 0.04616   
## 46 -2.57e-02 1.71e-02 0.010143 0.017400 -0.05074 1.028 6.46e-04 0.01107   
## 47 1.27e-02 -2.69e-01 0.150507 0.043872 -0.37809 0.923 3.48e-02 0.02317 \*  
## 48 6.54e-03 2.92e-02 -0.017900 -0.012520 -0.03506 1.054 3.09e-04 0.03171   
## 49 -4.20e-02 -5.71e-02 0.100476 0.041627 0.12146 1.038 3.70e-03 0.02739   
## 50 -2.36e-02 -3.47e-02 0.027062 0.028002 -0.10186 0.991 2.58e-03 0.00594   
## 51 -1.42e-02 2.43e-02 0.067110 -0.004745 0.12000 1.008 3.60e-03 0.01201   
## 52 -6.94e-03 2.68e-02 0.045067 -0.008947 0.08756 1.023 1.92e-03 0.01328   
## 53 5.22e-02 3.28e-02 -0.027462 -0.055485 0.07479 1.023 1.40e-03 0.01154   
## 54 -2.27e-02 1.55e-02 0.010603 0.015039 -0.03719 1.046 3.47e-04 0.02492   
## 55 -6.82e-03 1.19e-03 0.003117 0.005568 -0.01291 1.029 4.19e-05 0.00793   
## 56 1.42e-02 -3.68e-03 0.000618 -0.013083 -0.04040 1.023 4.10e-04 0.00706   
## 57 -2.19e-02 -2.40e-02 -0.016322 0.031104 -0.06909 1.026 1.20e-03 0.01274   
## 58 8.62e-02 -1.04e-02 0.023719 -0.082977 0.18800 0.969 8.74e-03 0.01137   
## 59 -2.18e-02 -5.16e-02 0.009235 0.035285 -0.06596 1.032 1.09e-03 0.01572   
## 60 -2.34e-01 -1.42e-01 0.055054 0.263109 0.32064 0.976 2.54e-02 0.02825   
## 61 3.03e-02 4.00e-02 -0.060622 -0.030671 0.08985 1.017 2.02e-03 0.01118   
## 62 1.66e-02 1.74e-03 -0.004459 -0.015639 0.02710 1.030 1.84e-04 0.00981   
## 63 -9.04e-02 -2.15e-01 0.263460 0.111210 0.38724 0.866 3.60e-02 0.01658 \*  
## 64 -6.84e-02 1.46e-01 0.004446 0.018770 -0.20922 1.025 1.09e-02 0.03154   
## 65 -6.11e-02 1.65e-02 0.060707 0.042735 -0.09787 1.024 2.40e-03 0.01522   
## 66 -8.13e-03 7.50e-03 0.002353 0.005218 0.01724 1.035 7.47e-05 0.01423   
## 67 -3.43e-02 4.97e-03 -0.084574 0.045529 -0.16911 1.018 7.14e-03 0.02240   
## 68 -4.48e-04 9.71e-04 -0.000473 0.000226 0.00206 1.033 1.06e-06 0.01148   
## 69 -3.84e-03 5.64e-03 0.013893 -0.000725 -0.03008 1.028 2.27e-04 0.00847   
## 70 -1.86e-02 6.68e-02 0.044458 -0.010983 -0.10277 1.092 2.65e-03 0.06786 \*  
## 71 4.49e-02 5.87e-03 -0.041061 -0.038432 -0.05500 1.045 7.60e-04 0.02509   
## 72 3.08e-03 2.05e-02 0.003343 -0.010255 -0.03463 1.028 3.01e-04 0.00967   
## 73 5.87e-02 6.22e-02 -0.046269 -0.067283 0.11829 0.995 3.49e-03 0.00833   
## 74 -2.09e-01 -1.17e-01 0.196114 0.205397 0.23941 1.044 1.43e-02 0.04585   
## 75 -5.54e-02 4.76e-02 -0.003028 0.040056 0.12620 1.010 3.98e-03 0.01349   
## 76 4.16e-02 -5.18e-02 -0.078794 -0.009426 0.13968 1.013 4.87e-03 0.01645   
## 77 1.48e-02 1.82e-02 -0.056774 -0.010510 -0.07492 1.036 1.41e-03 0.02007   
## 78 3.73e-02 7.09e-02 -0.030452 -0.053447 -0.08051 1.045 1.63e-03 0.02762   
## 79 3.31e-02 3.16e-02 -0.042759 -0.033837 0.07286 1.017 1.33e-03 0.00857   
## 80 -7.04e-02 -7.56e-02 0.064348 0.081047 0.10095 1.041 2.56e-03 0.02658   
## 81 5.94e-02 1.15e-01 -0.008265 -0.093100 -0.16907 0.991 7.11e-03 0.01349   
## 82 1.08e-01 -1.76e-03 -0.064953 -0.093320 -0.14467 1.005 5.22e-03 0.01422   
## 83 4.31e-02 -1.61e-01 0.091855 -0.008108 -0.24468 1.048 1.50e-02 0.04926   
## 84 1.67e-02 1.12e-02 -0.051076 -0.009920 0.10043 1.001 2.52e-03 0.00752   
## 85 -1.38e-02 -8.91e-03 0.016943 0.012681 -0.04819 1.019 5.82e-04 0.00586   
## 86 2.57e-03 1.81e-03 0.000205 -0.002988 0.01029 1.027 2.66e-05 0.00593   
## 87 7.37e-03 1.28e-02 -0.008227 -0.009590 0.01841 1.032 8.51e-05 0.01098   
## 88 1.23e-02 -2.75e-02 0.003266 -0.004572 -0.08184 1.006 1.67e-03 0.00646   
## 89 -3.44e-03 -1.32e-03 -0.000110 0.003724 -0.00575 1.038 8.30e-06 0.01629   
## 90 6.13e-02 1.30e-01 -0.031951 -0.093920 0.14293 1.066 5.12e-03 0.04960 \*  
## 91 -9.67e-03 9.69e-02 -0.009570 -0.020325 -0.13776 1.002 4.73e-03 0.01254   
## 92 -6.50e-02 6.17e-02 0.014988 0.041565 0.12834 1.028 4.12e-03 0.02200   
## 93 -4.01e-02 -2.46e-02 -0.010730 0.047848 -0.08559 1.024 1.84e-03 0.01363   
## 94 1.35e-02 -5.23e-03 0.001260 -0.011717 -0.02382 1.045 1.43e-04 0.02301   
## 95 -3.79e-03 -4.61e-03 0.006990 0.003822 -0.01006 1.033 2.54e-05 0.01164   
## 96 7.96e-02 1.05e-01 -0.091625 -0.094239 -0.12669 1.075 4.03e-03 0.05587 \*  
## 97 -7.95e-03 1.30e-01 0.060674 -0.044462 -0.18669 1.047 8.72e-03 0.04121   
## 98 -3.89e-04 4.29e-02 -0.028057 -0.008708 -0.07209 1.024 1.30e-03 0.01179   
## 99 -1.40e-03 6.62e-04 0.002927 0.000683 0.00528 1.030 7.00e-06 0.00900   
## 100 4.95e-03 -2.34e-02 0.009192 0.000804 -0.03222 1.056 2.61e-04 0.03347   
## 101 -2.05e-03 1.19e-01 0.159685 -0.064515 -0.29799 1.000 2.20e-02 0.03288   
## 102 4.43e-02 -1.41e-01 -0.131632 0.023057 -0.26055 1.020 1.69e-02 0.03589   
## 103 2.61e-02 -2.34e-02 0.029886 -0.023518 -0.08168 1.042 1.67e-03 0.02561   
## 104 4.93e-02 4.31e-02 -0.035958 -0.053703 0.13460 0.967 4.48e-03 0.00617   
## 105 7.64e-02 1.35e-02 -0.079401 -0.063857 0.09771 1.040 2.39e-03 0.02539   
## 106 4.26e-04 -6.22e-02 -0.043746 0.026065 -0.11450 1.026 3.28e-03 0.01869   
## 107 4.12e-03 8.43e-02 -0.056753 -0.019659 0.13313 1.008 4.42e-03 0.01378   
## 108 -6.64e-02 1.28e-02 -0.005552 0.061707 0.10782 1.046 2.92e-03 0.03125   
## 109 5.12e-03 -4.82e-04 -0.008827 -0.003619 -0.03438 1.022 2.97e-04 0.00554   
## 110 -1.38e-02 -6.70e-02 0.053087 0.024520 -0.09973 1.026 2.49e-03 0.01657   
## 111 -1.32e-02 -8.18e-03 0.007840 0.013811 -0.01736 1.035 7.57e-05 0.01394   
## 112 -7.12e-04 -3.29e-02 0.014451 0.007654 -0.08616 1.003 1.85e-03 0.00628   
## 113 -1.81e-02 -6.24e-03 0.026909 0.014708 -0.02846 1.082 2.04e-04 0.05617 \*  
## 114 1.94e-02 2.58e-02 -0.025195 -0.022720 -0.03672 1.038 3.39e-04 0.01786   
## 115 -4.86e-02 2.77e-01 -0.038406 -0.034686 -0.34335 0.984 2.91e-02 0.03336   
## 116 -2.62e-03 1.81e-03 0.005044 0.001136 0.00749 1.040 1.41e-05 0.01813   
## 117 1.47e-01 1.17e-01 -0.060186 -0.167233 0.19585 1.018 9.57e-03 0.02624   
## 118 -1.06e-01 -5.83e-02 -0.003495 0.120373 -0.18959 0.983 8.92e-03 0.01411   
## 119 -7.92e-02 7.37e-03 0.135520 0.050136 -0.15858 1.050 6.30e-03 0.03975   
## 120 -8.89e-02 -1.13e-01 0.097548 0.105173 0.14204 1.044 5.05e-03 0.03336   
## 121 1.20e-02 -1.42e-02 -0.007800 -0.005692 0.02498 1.053 1.57e-04 0.03107   
## 122 1.96e-02 -1.29e-01 -0.026366 0.024537 -0.20452 0.958 1.03e-02 0.01135   
## 123 -1.72e-01 -5.04e-02 0.064437 0.172071 0.20296 1.030 1.03e-02 0.03334   
## 124 2.56e-02 -1.33e-02 -0.014404 -0.018726 -0.06852 1.014 1.18e-03 0.00691   
## 125 1.97e-01 6.19e-02 -0.057949 -0.200992 -0.24359 1.015 1.48e-02 0.03161   
## 126 -7.10e-02 3.46e-02 -0.061721 0.067593 -0.19078 1.007 9.07e-03 0.02109   
## 127 1.31e-01 1.16e-01 -0.017624 -0.161332 -0.20670 1.028 1.07e-02 0.03273   
## 128 3.06e-03 8.13e-02 0.051486 -0.038497 -0.15948 0.994 6.33e-03 0.01295   
## 129 -7.50e-04 1.34e-02 0.014122 -0.005654 0.03771 1.028 3.57e-04 0.00958   
## 130 2.35e-02 -7.99e-03 0.013889 -0.022317 0.05606 1.035 7.89e-04 0.01701   
## 131 9.40e-02 5.62e-02 -0.030588 -0.103696 -0.11910 1.050 3.56e-03 0.03554   
## 132 1.17e-02 4.39e-03 -0.024060 -0.008722 -0.03129 1.034 2.46e-04 0.01410   
## 133 -3.16e-02 -7.73e-03 0.016207 0.029805 -0.04766 1.025 5.70e-04 0.00925   
## 134 -1.31e-03 -1.26e-03 0.002339 0.001236 -0.00280 1.042 1.97e-06 0.02028   
## 135 -2.15e-02 -8.40e-03 0.061983 0.013332 0.09555 1.013 2.28e-03 0.01039   
## 136 7.88e-05 -5.01e-04 0.001276 -0.000105 0.00381 1.028 3.64e-06 0.00652   
## 137 -8.86e-02 -1.51e-02 0.096241 0.072880 -0.12628 1.017 3.99e-03 0.01593   
## 138 -5.82e-02 -1.03e-02 0.038780 0.052529 -0.06325 1.058 1.00e-03 0.03676   
## 139 3.03e-02 1.71e-02 -0.041422 -0.027063 0.05411 1.029 7.35e-04 0.01246   
## 140 2.05e-02 6.58e-03 0.010134 -0.023998 -0.05011 1.031 6.30e-04 0.01306   
## 141 2.02e-02 -1.11e-01 -0.167137 0.045868 0.30494 0.958 2.29e-02 0.02201   
## 142 -2.22e-02 1.15e-02 0.051950 0.009042 0.06512 1.083 1.07e-03 0.05892 \*  
## 143 2.90e-02 3.25e-02 0.030853 -0.042390 0.14424 0.972 5.15e-03 0.00751   
## 144 2.70e-02 7.60e-03 -0.017187 -0.025726 -0.03590 1.031 3.24e-04 0.01208   
## 145 1.82e-02 1.54e-02 -0.014882 -0.019661 0.02615 1.034 1.72e-04 0.01364   
## 146 1.89e-03 -2.49e-02 -0.014348 0.008209 -0.04371 1.034 4.80e-04 0.01512   
## 147 -5.35e-02 1.04e-03 0.046071 0.042886 -0.07942 1.021 1.58e-03 0.01154   
## 148 -1.11e-02 3.18e-04 0.023184 0.006181 -0.04803 1.021 5.79e-04 0.00710   
## 149 7.96e-02 5.60e-02 -0.103892 -0.077181 -0.12470 1.023 3.89e-03 0.01891   
## 150 1.51e-01 -1.69e-02 -0.007420 -0.137920 0.23153 0.988 1.33e-02 0.02051   
## 151 1.87e-01 1.13e-01 -0.034901 -0.211634 -0.25670 1.024 1.64e-02 0.03753   
## 152 8.26e-03 -9.81e-03 0.059732 -0.016042 -0.11164 1.017 3.12e-03 0.01415   
## 153 3.75e-02 -2.70e-03 0.029593 -0.039310 0.14317 0.973 5.08e-03 0.00753   
## 154 2.62e-02 1.22e-01 0.001610 -0.064601 -0.14424 1.044 5.21e-03 0.03376   
## 155 3.04e-02 -7.28e-03 0.002743 -0.027194 0.05886 1.028 8.69e-04 0.01215   
## 156 -7.41e-03 2.01e-03 -0.010428 0.008134 -0.03024 1.030 2.30e-04 0.01063   
## 157 -8.34e-03 -3.93e-03 0.006886 0.008038 -0.01061 1.036 2.83e-05 0.01436   
## 158 4.88e-02 -3.07e-03 -0.025878 -0.042420 -0.08140 1.015 1.66e-03 0.00910   
## 159 6.58e-03 5.62e-03 -0.002717 -0.007601 0.00962 1.039 2.32e-05 0.01715   
## 160 -1.10e-01 -7.68e-02 0.089177 0.115338 0.14143 1.015 5.00e-03 0.01750   
## 161 -1.74e-01 -2.82e-02 0.136090 0.154305 0.20104 1.016 1.01e-02 0.02621   
## 162 -6.18e-02 -4.32e-03 -0.001022 0.060512 -0.11199 1.010 3.13e-03 0.01146   
## 163 -1.04e-02 2.52e-02 -0.010898 0.004486 0.05296 1.026 7.04e-04 0.01030   
## 164 -1.76e-02 -8.34e-04 -0.002616 0.017505 -0.03175 1.036 2.53e-04 0.01540   
## 165 -9.90e-02 -1.19e-01 0.122919 0.110705 -0.17174 1.009 7.35e-03 0.01933   
## 166 8.87e-03 4.05e-02 0.021823 -0.024344 0.09279 1.010 2.15e-03 0.00896   
## 167 -1.15e-01 -1.20e-01 0.108218 0.128903 -0.16532 1.021 6.83e-03 0.02321   
## 168 -9.99e-03 -1.38e-01 0.150643 0.025695 -0.24053 1.027 1.44e-02 0.03694   
## 169 -1.64e-02 -1.32e-02 0.012971 0.017659 -0.02218 1.037 1.24e-04 0.01608   
## 170 -8.29e-04 2.13e-03 0.002559 -0.000340 -0.00504 1.038 6.39e-06 0.01675   
## 171 3.96e-03 2.98e-03 -0.004287 -0.003928 0.00944 1.028 2.24e-05 0.00678   
## 172 -1.45e-01 -1.43e-01 0.070926 0.172088 -0.19223 1.081 9.26e-03 0.06568 \*  
## 173 4.10e-02 2.08e-02 0.022835 -0.049425 0.10705 1.013 2.87e-03 0.01199   
## 174 6.97e-02 -2.61e-02 0.079266 -0.071658 0.22317 0.972 1.23e-02 0.01565   
## 175 1.71e-02 7.59e-02 -0.067329 -0.029155 -0.10957 1.039 3.01e-03 0.02625   
## 176 -1.15e-02 8.31e-04 0.004242 0.010213 0.01767 1.032 7.84e-05 0.01153   
## 177 5.30e-03 2.31e-03 0.011552 -0.007957 -0.02319 1.063 1.35e-04 0.03959 \*  
## 178 -4.78e-02 7.47e-02 0.074149 0.010248 0.13485 1.131 4.57e-03 0.10028 \*  
## 179 8.04e-04 1.75e-02 0.026600 -0.010328 0.06936 1.018 1.21e-03 0.00861   
## 180 -7.96e-02 -2.36e-01 -0.031359 0.158680 0.34449 0.897 2.88e-02 0.01639 \*  
## 181 3.47e-02 -5.92e-02 -0.036108 -0.008140 0.10397 1.028 2.71e-03 0.01824   
## 182 -1.87e-02 -5.12e-06 0.047728 0.009471 -0.06263 1.036 9.85e-04 0.01888   
## 183 -1.25e-01 2.53e-02 0.048413 0.103421 -0.17392 1.003 7.53e-03 0.01745   
## 184 -1.54e-03 -1.39e-01 0.002709 0.045184 0.15590 1.078 6.10e-03 0.06014 \*  
## 185 -1.90e-01 -8.27e-02 -0.244969 0.254598 0.59911 0.860 8.57e-02 0.03425 \*  
## 186 -5.52e-03 -1.04e-02 0.043242 0.001508 0.06790 1.027 1.16e-03 0.01327   
## 187 1.50e-02 4.53e-02 -0.040790 -0.022385 -0.09277 1.007 2.15e-03 0.00807   
## 188 -6.66e-05 8.89e-02 0.006381 -0.028272 0.11637 1.023 3.39e-03 0.01756   
## 189 -3.15e-02 7.20e-03 -0.004684 0.029739 0.08386 1.010 1.76e-03 0.00784   
## 190 5.61e-03 8.54e-02 -0.041458 -0.025677 -0.11458 1.021 3.29e-03 0.01623   
## 191 1.43e-03 1.57e-03 -0.005881 -0.000884 -0.00731 1.059 1.34e-05 0.03610   
## 192 1.42e-02 5.67e-02 0.026545 -0.035620 0.09500 1.033 2.26e-03 0.02071   
## 193 1.07e-01 7.94e-02 -0.093853 -0.112461 -0.12805 1.051 4.11e-03 0.03717   
## 194 1.09e-02 4.80e-04 -0.004919 -0.009896 -0.01324 1.046 4.41e-05 0.02423   
## 195 1.18e-02 -1.21e-02 0.007555 -0.008720 0.03494 1.032 3.07e-04 0.01286   
## 196 6.91e-02 9.74e-02 -0.123291 -0.074790 0.17343 0.992 7.48e-03 0.01424

summary(influence.measures(fitted))

## Potentially influential observations of  
## lm(formula = ln\_Prize ~ GIR + BirdieConversion + PuttsPerRound, data = pgatour) :  
##   
## dfb.1\_ dfb.GIR dfb.BrdC dfb.PtPR dffit cov.r cook.d hat   
## 9 0.02 0.00 -0.15 0.01 0.26 0.93\_\* 0.02 0.01   
## 40 0.43 0.14 -0.53 -0.36 0.56\_\* 1.00 0.08 0.07\_\*  
## 47 0.01 -0.27 0.15 0.04 -0.38 0.92\_\* 0.03 0.02   
## 63 -0.09 -0.21 0.26 0.11 0.39 0.87\_\* 0.04 0.02   
## 70 -0.02 0.07 0.04 -0.01 -0.10 1.09\_\* 0.00 0.07\_\*  
## 90 0.06 0.13 -0.03 -0.09 0.14 1.07\_\* 0.01 0.05   
## 96 0.08 0.10 -0.09 -0.09 -0.13 1.08\_\* 0.00 0.06   
## 113 -0.02 -0.01 0.03 0.01 -0.03 1.08\_\* 0.00 0.06   
## 142 -0.02 0.01 0.05 0.01 0.07 1.08\_\* 0.00 0.06   
## 172 -0.14 -0.14 0.07 0.17 -0.19 1.08\_\* 0.01 0.07\_\*  
## 177 0.01 0.00 0.01 -0.01 -0.02 1.06\_\* 0.00 0.04   
## 178 -0.05 0.07 0.07 0.01 0.13 1.13\_\* 0.00 0.10\_\*  
## 180 -0.08 -0.24 -0.03 0.16 0.34 0.90\_\* 0.03 0.02   
## 184 0.00 -0.14 0.00 0.05 0.16 1.08\_\* 0.01 0.06   
## 185 -0.19 -0.08 -0.24 0.25 0.60\_\* 0.86\_\* 0.09 0.03

plot(rstudent(fitted)~hatvalues(fitted))  
abline(a=3, b=0, col= 'red')  
abline(a=-3, b=0,col='red')  
  
  
cooksd <- cooks.distance(fitted)  
plot(cooksd, pch="\*", cex=2, main="Influential Obs by Cooks distance")  
  
#No influential points  
  
#e) Interpret GIR coefficient  
coefficients(fit)

## (Intercept) DrivingAccuracy GIR BirdieConversion   
## 16.680434758 -0.004197737 0.251205727 0.108945015   
## PuttsPerRound   
## -0.875614911

#A 1% increase in GIR is associated with a 0.011 increase in log average prize money  
#or about 1.1% increase in average prize money

Explanation: The regression coefficient for GIR is 0.251205727.

This means that a 1% increase in Greens in Regulation is associated with a 0.0221 increase in the log of average prize money.

Exponentiating this coefficient to convert back to the original scale of prize money:

A 1% increase in GIR is associated with a 25.371% increase in average prize money.

So in summary, the model estimates that a 1 percentage point increase in greens hit in

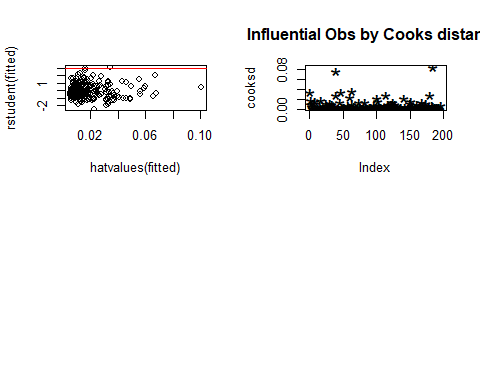
regulation leads to approximately a 25.37% increase in a player's average tournament prize

money

earnings. This makes sense as hitting more greens in regulation provides more birdie opportunities and leads to lower scores and higher finishes.

#f) Prediction  
newdata <- data.frame(GIR=67, DrivingAccuracy=64, PuttingAverage=1.77,  
 BirdieConversion=28, PuttsPerRound=29.16)  
predict(fit, newdata=newdata, interval="prediction")

## fit lwr upr  
## 1 10.76009 9.417167 12.10302



Explanation: We create a data frame new\_data with the specific values of predictor variables for the new player (GIR, DrivingAccuracy, PuttingAverage, BirdieConversion, PuttsPerRound).

We use the predict function to compute the prediction of ln\_Prize for the new player based on the regression model.

We calculate the 95% prediction interval for the ln\_Prize using the predict function with interval = "prediction" and specify the desired confidence level using the level parameter (0.95 for a 95% prediction interval).

To obtain the prediction and prediction interval in the original PrizeMoney scale, we transform the ln\_Prize back to the original scale using the exponential function (exp).

We print the predicted PrizeMoney and the 95% prediction interval in the original scale.

This code will give you the predicted average prize money for the new player with specific predictor values, as well as a range within which you can reasonably expect the player's prize money to fall with 95% confidence.