ass.R

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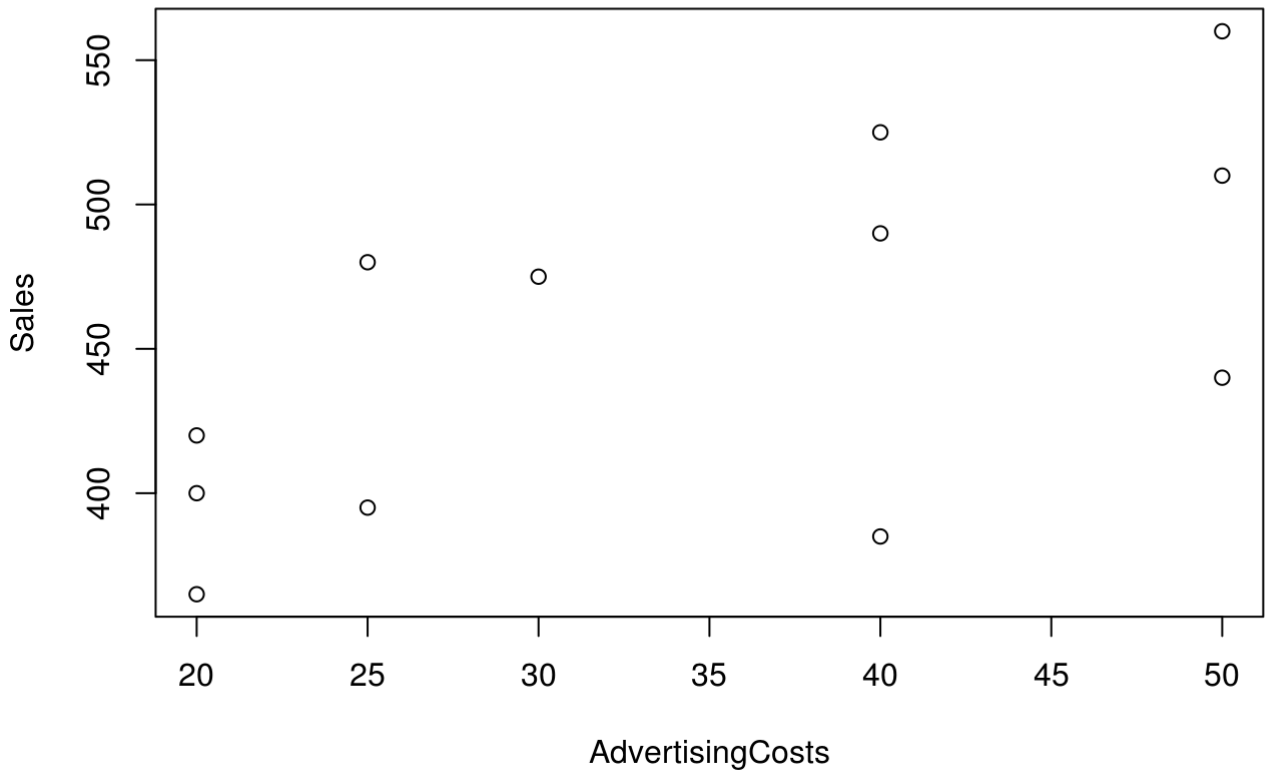
```
## Question1
# Loading the data
adv = read.csv("ques1.csv", header=TRUE)
colnames(adv)=c("AdvertisingCosts","Sales")
adv
```

```
##    AdvertisingCosts Sales
## 1                40   385
## 2                20   400
## 3                25   395
## 4                20   365
## 5                30   475
## 6                50   440
## 7                40   490
## 8                20   420
## 9                50   560
## 10               40   525
## 11               25   480
## 12               50   510
```

```
# (a)Scatter plot
attach(adv)
plot(Sales~AdvertisingCosts)
```




```
# (b)Equation of regression line
# Fit the regression model using the fnction lm():
adv.lm<-lm(Sales~AdvertisingCosts,data= adv)
# Use the function summary() to get results
summary(adv.lm)
```

```
##
## Call:
## lm(formula = Sales ~ AdvertisingCosts, data = adv)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -87.538 -32.700   8.566  39.118  55.774
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)       343.706     44.766   7.678 1.68e-05 ***
## AdvertisingCosts    3.221      1.240   2.598   0.0266 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 50.23 on 10 degrees of freedom
## Multiple R-squared:  0.403,  Adjusted R-squared:  0.3433
## F-statistic: 6.751 on 1 and 10 DF,  p-value: 0.02657
```

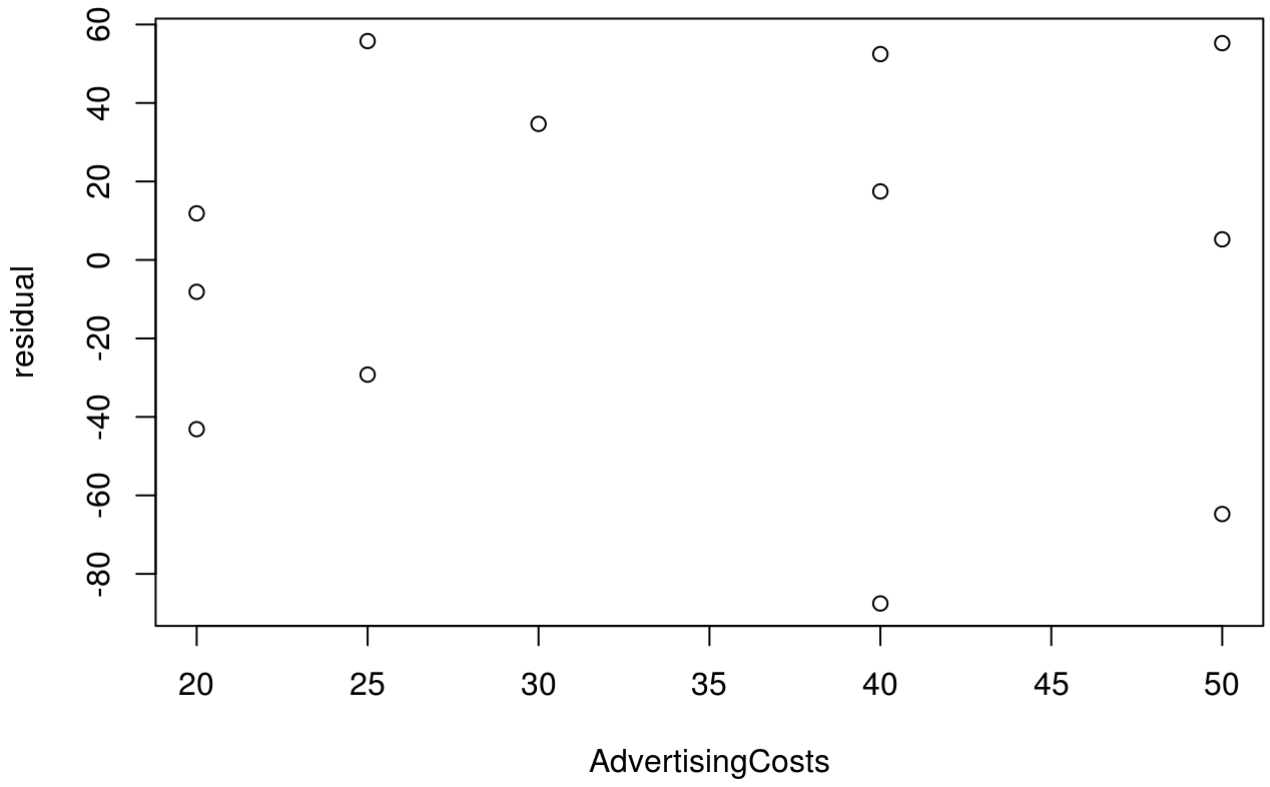
```
# Hence, b0=343.706, b1=3.221
# (c)Estimation for $35
343.706 + 35*3.221
```

```
## [1] 456.441
```

```
# (d)residuals Vs advertising costs
#create the table of fitted values and residuals
advNew=data.frame(adv,fitted.value=fitted(adv.lm),residual=resid(adv.lm))
advNew
```

```
##    AdvertisingCosts Sales fitted.value   residual
## 1                40   385     472.5381 -87.538071
## 2                20   400     408.1218  -8.121827
## 3                25   395     424.2259 -29.225888
## 4                20   365     408.1218 -43.121827
## 5                30   475     440.3299  34.670051
## 6                50   440     504.7462 -64.746193
## 7                40   490     472.5381  17.461929
## 8                20   420     408.1218  11.878173
## 9                50   560     504.7462  55.253807
## 10               40   525     472.5381  52.461929
## 11               25   480     424.2259  55.774112
## 12               50   510     504.7462   5.253807
```

```
plot(residual~AdvertisingCosts, data=advNew)
```

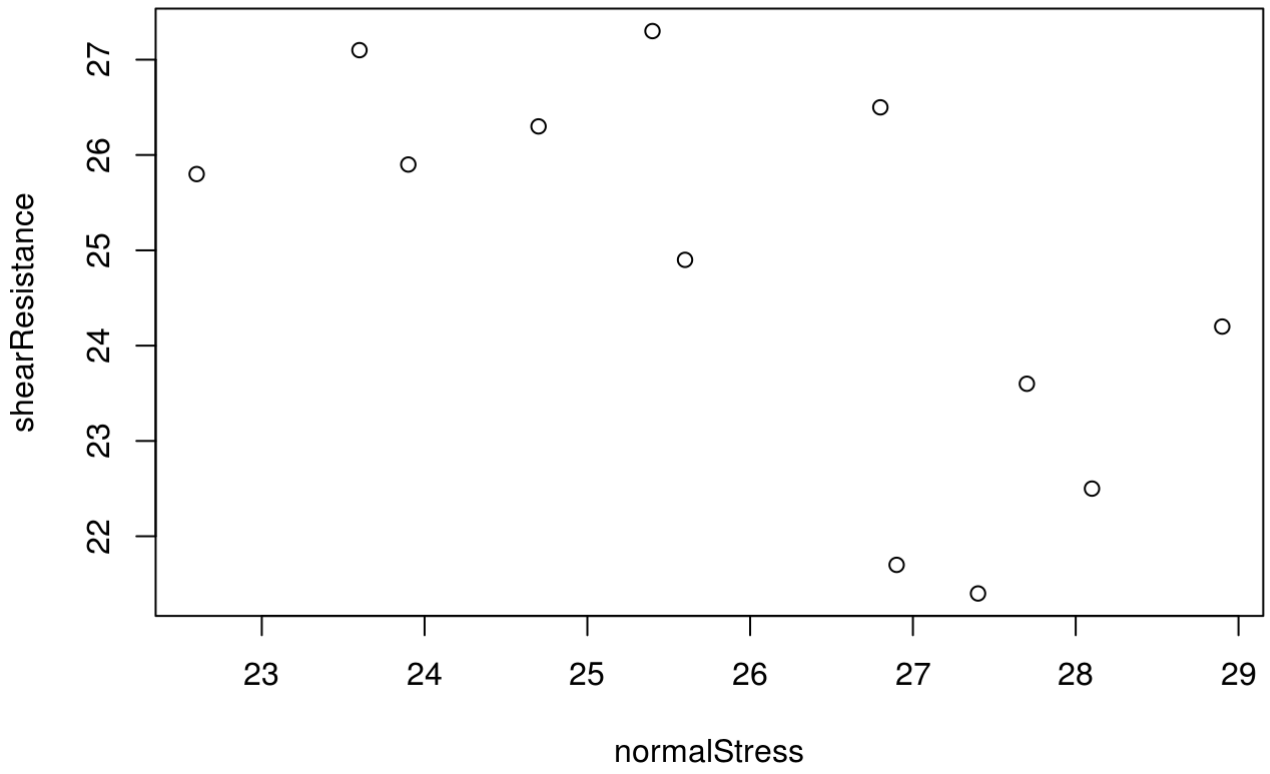


```
# From the plot, we can say that advertising costs do not explain all the variability
 in Sales.
# There is no pattern which means higher-degree polynomial fit is not required.

## Question-2
# (a)Equation of regression line
# Loading the data
data = read.csv("ques2.csv")
data
```

```
##    normalStress shearResistance
## 1          26.8            26.5
## 2          25.4            27.3
## 3          28.9            24.2
## 4          23.6            27.1
## 5          27.7            23.6
## 6          23.9            25.9
## 7          24.7            26.3
## 8          28.1            22.5
## 9          26.9            21.7
## 10         27.4            21.4
## 11         22.6            25.8
## 12         25.6            24.9
```

```
attach(data)
plot(shearResistance~normalStress)
```



```
# Fit the regression model using the fnction lm():
data.lm<-lm(shearResistance~normalStress,data= data)
# Use the function summary() to get results
summary(data.lm)
```

```
##
## Call:
## lm(formula = shearResistance ~ normalStress, data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.42633 -0.92139 -0.04785  0.89367  2.30506
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   42.5818     6.5065   6.544 6.52e-05 ***
## normalStress  -0.6861     0.2499  -2.745   0.0206 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.64 on 10 degrees of freedom
## Multiple R-squared:  0.4298, Adjusted R-squared:  0.3727
## F-statistic: 7.537 on 1 and 10 DF,  p-value: 0.02064
```

```
# Hence, b0=42.5818, b1=-0.6861
# (b) Estimation for normal stress 24.5
42.5818-0.6861*24.5
```

```
## [1] 25.77235
```