4.1 No and no

90% confident that it falls in that interval

4.2 90%

4.11 If the model is for finding regression, then going through the origin shouldn't be a goal

4.23 $\Sigma X_i (Y_i - b_1 X_i) = \Sigma X_i e_i = 0$

4.25 $\sigma^2\{\hat{Y}_h\} = \sigma^2\{b_1 X_h\} = X_h^2 \sigma^2\{b_1\} = X_h^2 (\sigma^2 / \Sigma X_i^2)$

$s^2\{\hat{Y}_h\} = X_h^2 (MSE / \Sigma X_i^2)$

4.14

```
f=file.choose()
Scores=read.table(f,header = FALSE)
colnames(Scores)=c("GPA","ACT")
```

a)

```
> Scores.lm=lm(GPA~ACT-1,data = Scores)
> Scores.lm

Call:
lm(formula = GPA ~ ACT - 1, data = Scores)

Coefficients:
   ACT
0.1216
```

b)

```
> conf.Scores=confint(Scores.lm,level = .95)
> conf.Scores
        2.5 %    97.5 %
ACT 0.1164216 0.1268643
```

c)

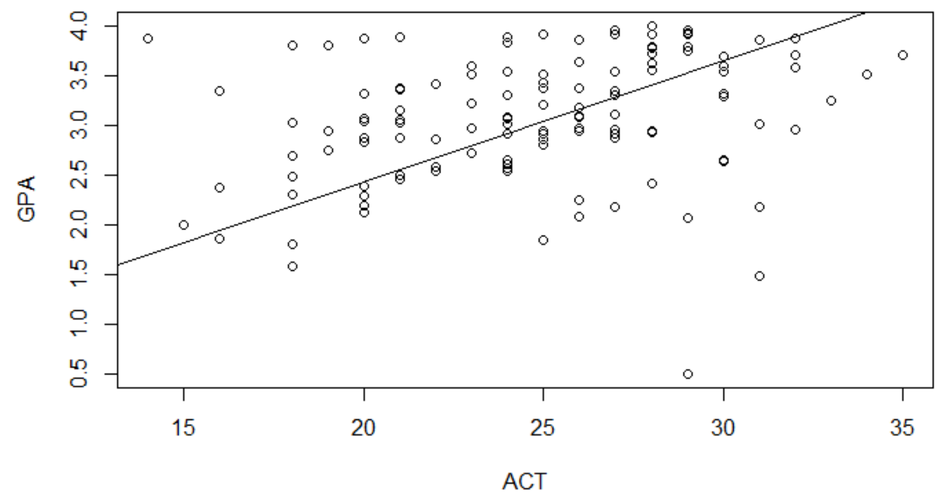
```
> predict(Scores.lm,data.frame(ACT=30),level = .95,interval = "prediction")
       fit      lwr      upr
1 3.649287 2.203822 5.094753
```

3.64928 ± 1.9801(0.0791074)

4.15

a)

```
plot(Scores[,2],Scores[,1],xlab = "ACT",ylab = "GPA")
abline(Scores.lm)
```



b)

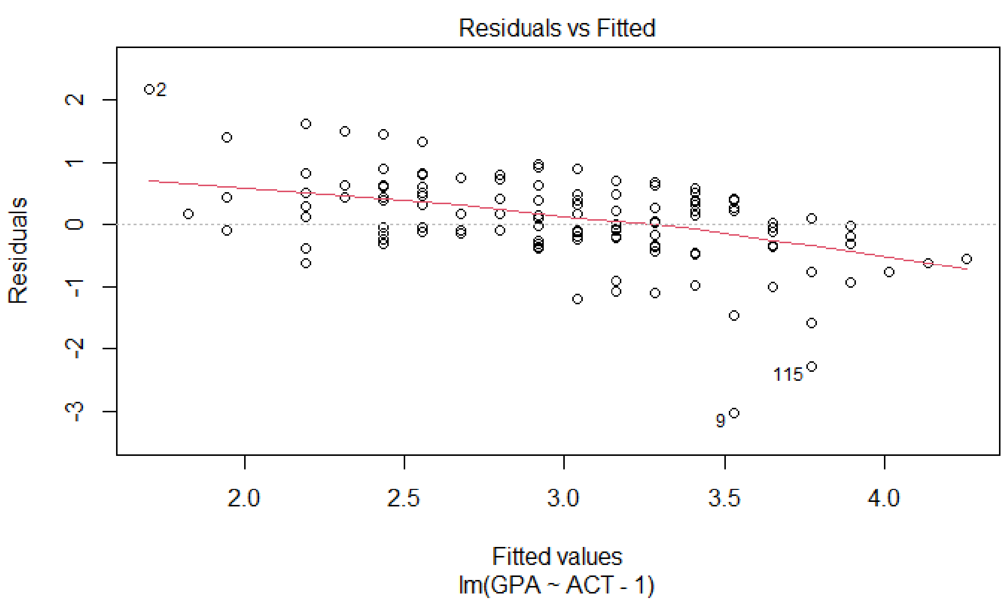
```
Scores.lm$residuals
          1           2           3           4           5 
 1.342498990  2.181999327  0.371998653 -0.136143915  0.473498990 
          6           7           8           9          10 
 0.094069938 -0.930572968  0.676641559 -3.027644252  0.015284464 
         11          12          13          14          15 
 0.390570274 -0.111287157  0.163570274  0.093570274 -0.769215873 
         16          17          18          19          20 
-0.321358441  0.480927369 -0.757930062 -0.094072631 -0.314858105 
         21          22          23          24          25 
-0.356429726  0.802498990  0.324998653  0.640641559  0.149998653 
         26          27          28          29          30 
-0.061715536 -0.986001347 -0.097143915  0.708284464  0.505498990 
         31          32          33          34          35 
 0.885927369  0.428713516 -0.477001347  0.212284464  0.180856085 
         36          37          38          39          40 
 0.152570274  0.826498990 -0.359287157  0.264641559  0.483284464 
         41          42          43          44          45 
-0.184715536 -0.995287157 -0.379429726 -0.912715536 -1.458644252 
         46          47          48          49          50 
-0.302429726 -1.587930062  0.175356421  0.640784800  1.616427706 
         51          52          53          54          55 
-0.413358441  1.405713516  0.020641559 -0.210715536  0.627570274 
         56          57          58          59          60 
 0.041712843  0.605498990 -0.238858105 -0.326287157  0.408355748 
         61          62          63          64          65 
-0.119072631 -0.081786821  0.328927369  0.808213179 -1.007287157 
```

```
          66           67           68           69           70 
-0.102501010 -0.264429726 -0.178572968 -0.383572294  0.718213179 
          71           72           73           74           75 
 0.606141895  0.168213179  0.292427706  0.510427706  0.392355748 
          76           77           78           79           80 
 0.401141895  0.424213179 -0.078715536  0.593998653 -0.624858778 
          81           82           83           84           85 
 0.890141895  0.639141895 -1.083715536 -0.017572968  0.166927369 
          86           87           88           89           90 
-0.364358441  0.060641559  0.428355748  1.496784800 -0.048501010 
          91           92           93           94           95 
 0.966570274 -1.101358441  0.387927369  0.834427706  0.222355748 
          96           97           98           99          100 
 0.913570274 -0.171358441  0.320498990  0.435784800  0.121427706 
         101          102          103          104          105 
-1.200072631 -0.606572294  0.446141895 -0.301572968 -0.005429726 
         106          107          108          109          110 
-0.541501683 -0.241072631  0.214998653  0.385998653 -0.174072631 
         111          112          113          114          115 
 0.742856085 -0.049287157 -0.038858105 -0.146858105 -2.284930062 
         116          117          118          119          120 
 1.452141895  0.272355748  0.507998653 -0.086286484 -0.458001347 

> sum(Scores.lm$residuals)
[1] 7.9715
```

No

plot(Scores.lm)



c)

H0: E{Y } = β1X, Ha: E{Y } = β1X. SSLF = 23.3378, SSP E = 39.3319, F* = 2.93711, F(.995; 20, 99) = 2.22939. If F* ≤ 2.22939, Reject the null

P-value = 0.0002