Question 2

f) The prediction interval from R code is (-965181.2, 2390641). Because 1.2 million is contained in the 95% prediction interval, his compensation of 1.2 million dollars is consistent with that of the CEOs of other companies.

```
# f)
newdata <- data.frame(AGE=65,EDUCATN=1,bg="2",TENURE=22,EXPER=8,SALES=3250,
                      VAL=8.2,PCNTOWN=2,PROF=112)
predict(ceocomplm,newdata,interval='prediction',level=.95)
```

```
> newdata <- data.frame(AGE=65,EDUCATN=1,bg="2",TENURE=22,EXPER=8,SALES=3250,
+                       VAL=8.2,PCNTOWN=2,PROF=112)
> predict(ceocomplm,newdata,interval='prediction',level=.95)
       fit       lwr      upr
1 712.7298 -965.1812 2390.641
```

g)

Based on the R code output in part b, we get $\hat{\sigma} = 767.4$. As presented in lesson, we know that $\hat{\sigma} = \sqrt{\frac{SS(Res)}{n-(p+1)}}$ and so we get $SS(Res) = \hat{\sigma}^2(n-(p+1)) = 767.4^2 \times 46 = 27089526.96$

Then we know that $R^2 = 1 - \frac{SS(Res)}{SS(Tot)} = 0.4883$ based on the R code output in part b, we have $SS(Tot) = \frac{SS(Res)}{1-R^2} = \frac{27089527}{1-0.4883} = 52940252.02$

$SS(Reg) = SS(Tot) - SS(Res) = 52940252.02 - 27089526.96 = 25850725.06$.

$$F = \frac{SS(Reg)/p}{SS(Res)/(n-(p+1))} = \frac{25850725.06/12}{27089526.96/(59-13)} = 3.658075307 \approx 3.658$$

p-value $= P(F_{12,46} > 3.658) = 0.0006975241$ by the following R code.

By comparing the R code output in part b with the above numbers, we find that the value of F is close since the F calculated as presented in lessons is approximately 3.658 and the output shows F-statistic is 3.658. Also, the p-value calculated as presented in lessons is 0.0006975241, which is close to 0.0006972 shown in R code output in part b.

The R code output in b shows

```
F-statistic: 3.658 on 12 and 46 DF,  p-value: 0.0006972
```

```
# g)
calculatepvalue <- 1-pf(3.658,12,46)
calculatepvalue
```