

# Ch14 hw week 14

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```
library(ggplot2, warn.conflicts = F)
library(dplyr, warn.conflicts = F)
```

2 -a)

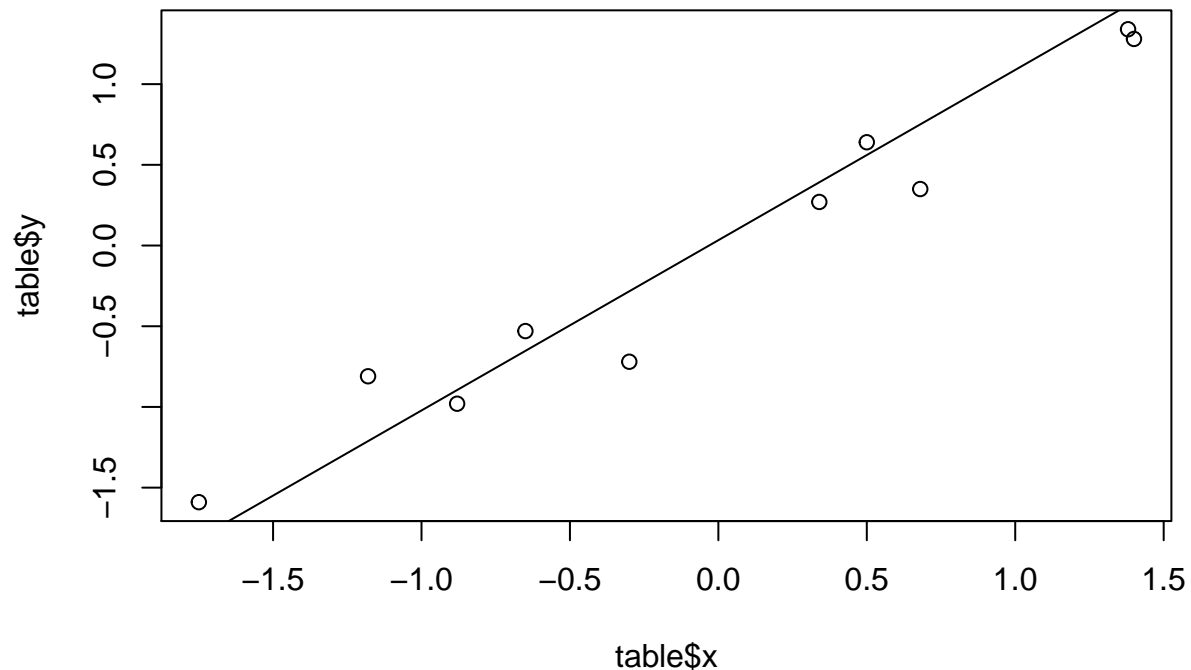
```
table <- data.frame(c(0.34, 1.38, -0.65, 0.68, 1.40, -0.88, -0.3, -1.18, 0.5, -1.75),
                    c(0.27, 1.34, -0.53, 0.35, 1.28, -0.98, -0.72, -0.81, 0.64, -1.59))

colnames(table) <- c("x", "y")

answer <- lm(formula= table$y ~ table$x)

plot(table$x, table$y)
abline(lm(table$x ~ table$y, col = "red"))
```

```
## Warning: In lm.fit(x, y, offset = offset, singular.ok = singular.ok, ...) :
## extra argument 'col' will be disregarded
```



```
summary(answer)
```

```
##
## Call:
## lm(formula = table$y ~ table$x)
##
```

```
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.41528 -0.11406  0.03667  0.11680  0.29061
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.03340    0.07159  -0.467   0.653
## table$x      0.90441    0.07008  12.905 1.23e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2261 on 8 degrees of freedom
## Multiple R-squared:  0.9542, Adjusted R-squared:  0.9484
## F-statistic: 166.5 on 1 and 8 DF,  p-value: 1.23e-06
#Extra calculation just to make sure my answer is correct.
xbar <- mean(table$x)
ybar <- mean(table$y)
numerator <- (length(table$x) - 1) * cov(table$x, table$y) # multiply by 9 since it is sample, not popl
denominator <- (sum((table$x - xbar)**2))

approx_b <- numerator/denominator
approx_a <- (ybar - (approx_b * xbar))
```

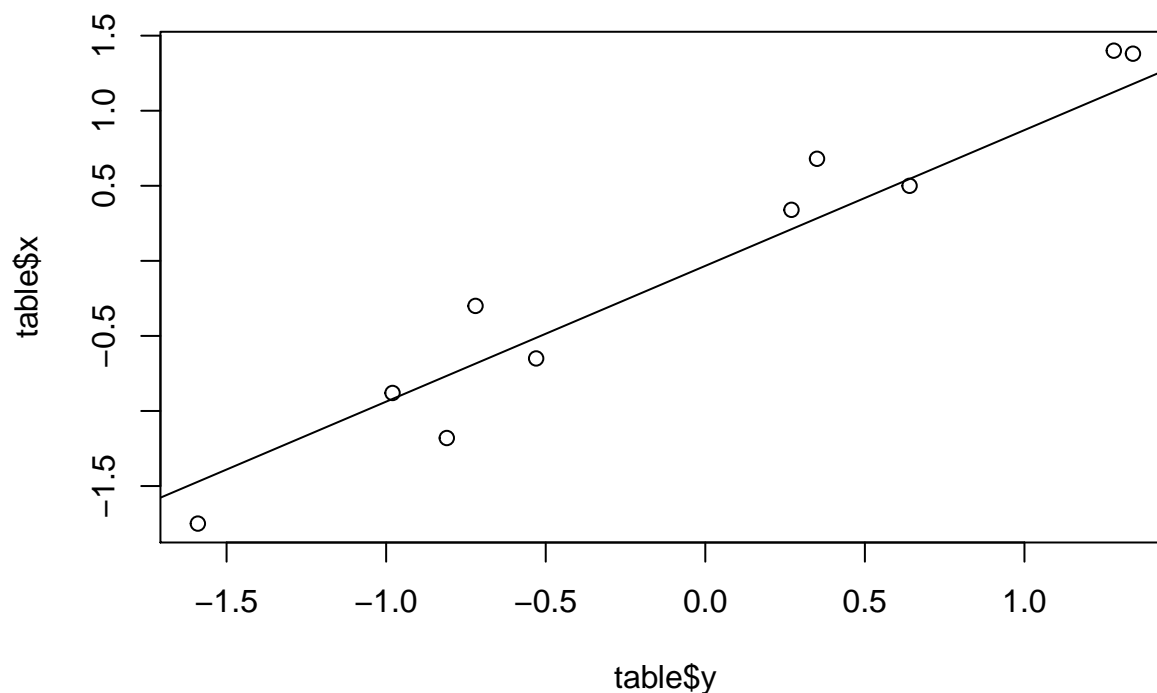
So, it is proved that the formulas in the book is approximately the same as the functions in R.

b)

```
answer2 <- lm(formula = table$x ~ table$y)

plot(table$y, table$x)
abline(lm(table$y ~ table$x, col = "blue"))

## Warning: In lm.fit(x, y, offset = offset, singular.ok = singular.ok, ...) :
## extra argument 'col' will be disregarded
```



```
summary(answer2)
```

```
##
## Call:
## lm(formula = table$x ~ table$y)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.35857 -0.11939 -0.02519  0.09609  0.42648
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.03313    0.07748   0.428    0.68
## table$y      1.05501    0.08175  12.905 1.23e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2443 on 8 degrees of freedom
## Multiple R-squared:  0.9542, Adjusted R-squared:  0.9484
## F-statistic: 166.5 on 1 and 8 DF, p-value: 1.23e-06
```

*#Extra calculation just to make sure my answer is correct.*

```
numerator <- (length(table$y) - 1) * cov(table$y, table$x) # multiply by 9 since it is sample, not popl
denominator <- (sum((table$y - ybar)**2))
```

```
approx_d <- numerator/denominator
approx_c <- (xbar - (approx_d * ybar))
```