Modelos Lineares I
Exercicio 1

Rodrigo Barbosa

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insert chunk => ctrl + alt + i

principais argumentos dos chunks

*include = FALSE prevents code and results from appearing in the finished file. R Markdown still runs the code in the chunk, and the results can be used by other chunks.

*echo = FALSE prevents code, but not the results from appearing in the finished file. This is a useful way to embed figures.

*message = FALSE prevents messages that are generated by code from appearing in the finished file.

*warning = FALSE prevents warnings that are generated by code from appearing in the finished.

*fig.cap = "..." adds a caption to graphical results.

```
##        t              x              y              r
##  Min.   : 1.00   Min.   :10.0   Min.   :190.0   Min.   :2500
##  1st Qu.: 3.25   1st Qu.:14.5   1st Qu.:201.2   1st Qu.:3615
##  Median : 5.50   Median :19.0   Median :215.0   Median :4034
##  Mean   : 5.50   Mean   :19.0   Mean   :220.8   Mean   :4081
##  3rd Qu.: 7.75   3rd Qu.:23.5   3rd Qu.:244.8   3rd Qu.:4880
##  Max.   :10.00   Max.   :28.0   Max.   :250.0   Max.   :5320
```

Table 1: teste

t	x	y	r
Min. : 1.00	Min. :10.0	Min. :190.0	Min. :2500
1st Qu.: 3.25	1st Qu.:14.5	1st Qu.:201.2	1st Qu.:3615
Median : 5.50	Median :19.0	Median :215.0	Median :4034
Mean : 5.50	Mean :19.0	Mean :220.8	Mean :4081
3rd Qu.: 7.75	3rd Qu.:23.5	3rd Qu.:244.8	3rd Qu.:4880
Max. :10.00	Max. :28.0	Max. :250.0	Max. :5320

Table 2: Estatística descritiva para a Renda

n	Min	Max	Q_1	Q_2	Q_3	$\bar{X}$	σ
10	2500	5320	3615	4034	4880	4080.8	958.22

Questão A

#a)

```r
summary(df)
```
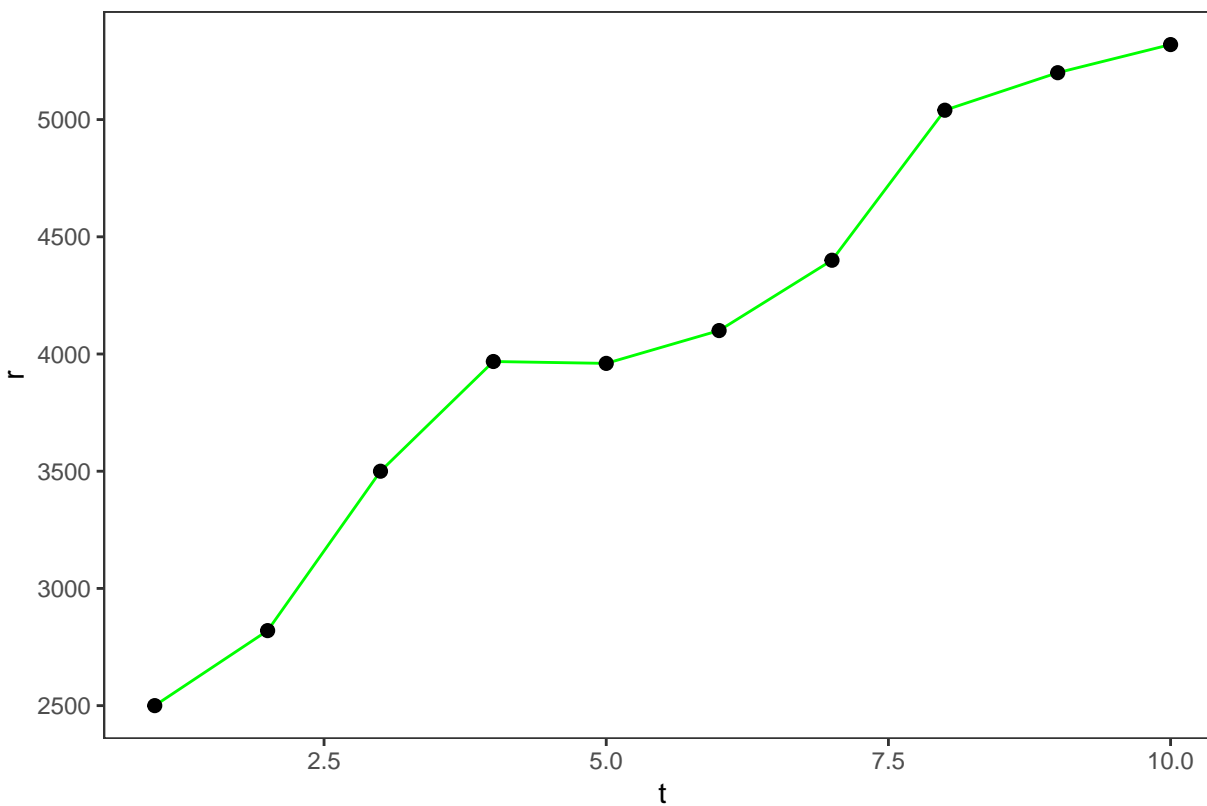
```
##        t                x               y               r
##  Min.   : 1.00   Min.   :10.0   Min.   :190.0   Min.   :2500
##  1st Qu.: 3.25   1st Qu.:14.5   1st Qu.:201.2   1st Qu.:3615
##  Median : 5.50   Median :19.0   Median :215.0   Median :4034
##  Mean   : 5.50   Mean   :19.0   Mean   :220.8   Mean   :4081
##  3rd Qu.: 7.75   3rd Qu.:23.5   3rd Qu.:244.8   3rd Qu.:4880
##  Max.   :10.00   Max.   :28.0   Max.   :250.0   Max.   :5320
```

Questão B

```
## (Intercept)           t
##   2374.9333    310.1576
```
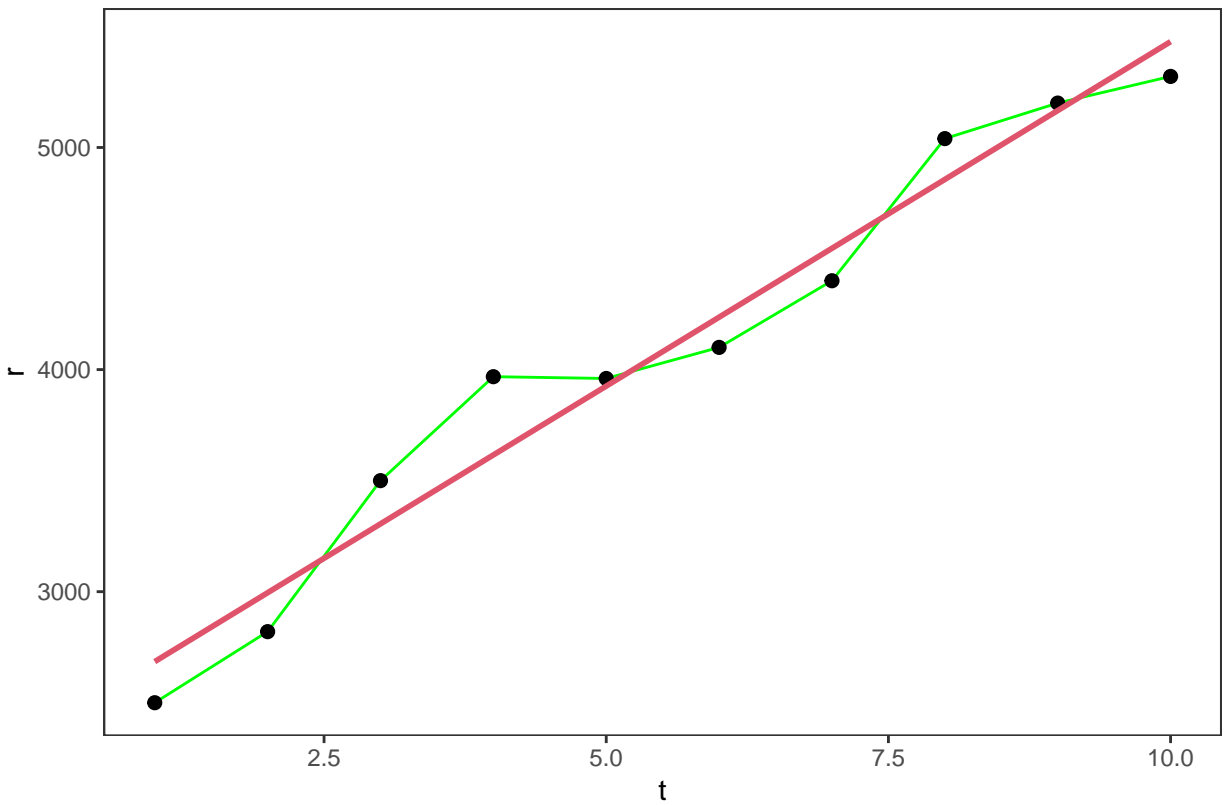
```
## `geom_smooth()` using formula = 'y ~ x'
```

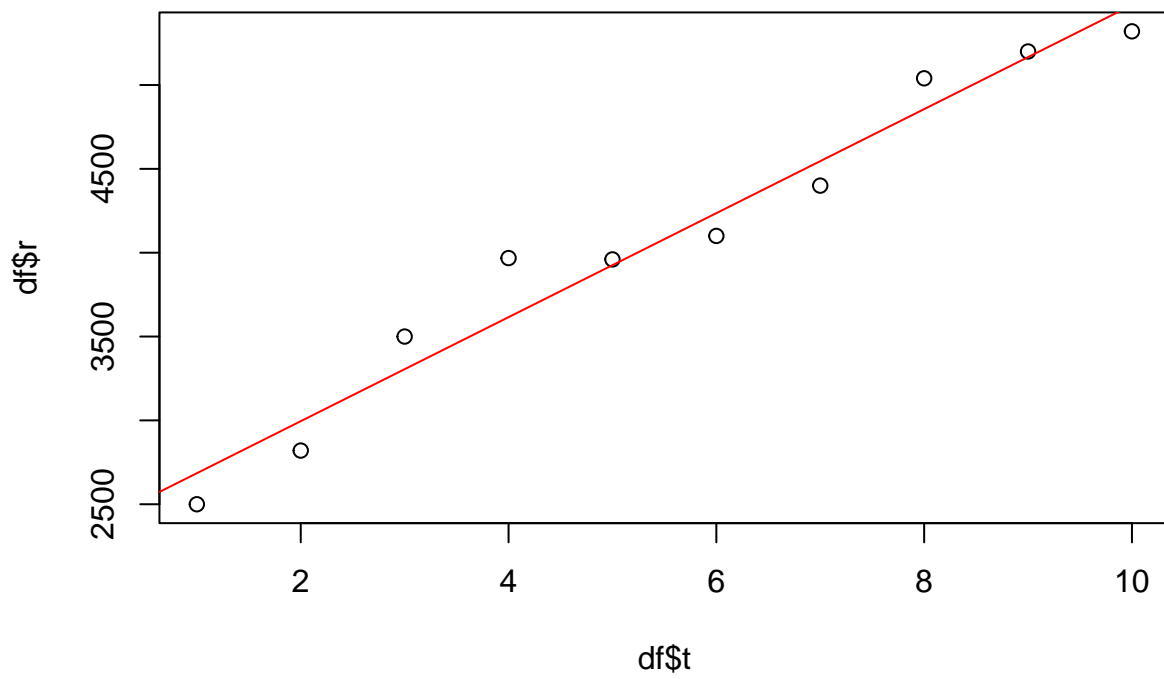**Modelo de regressão linear básico com apenas uma variável regressora:**

$$Y_i = \beta_0 + \beta_1 X_i + \epsilon_i$$

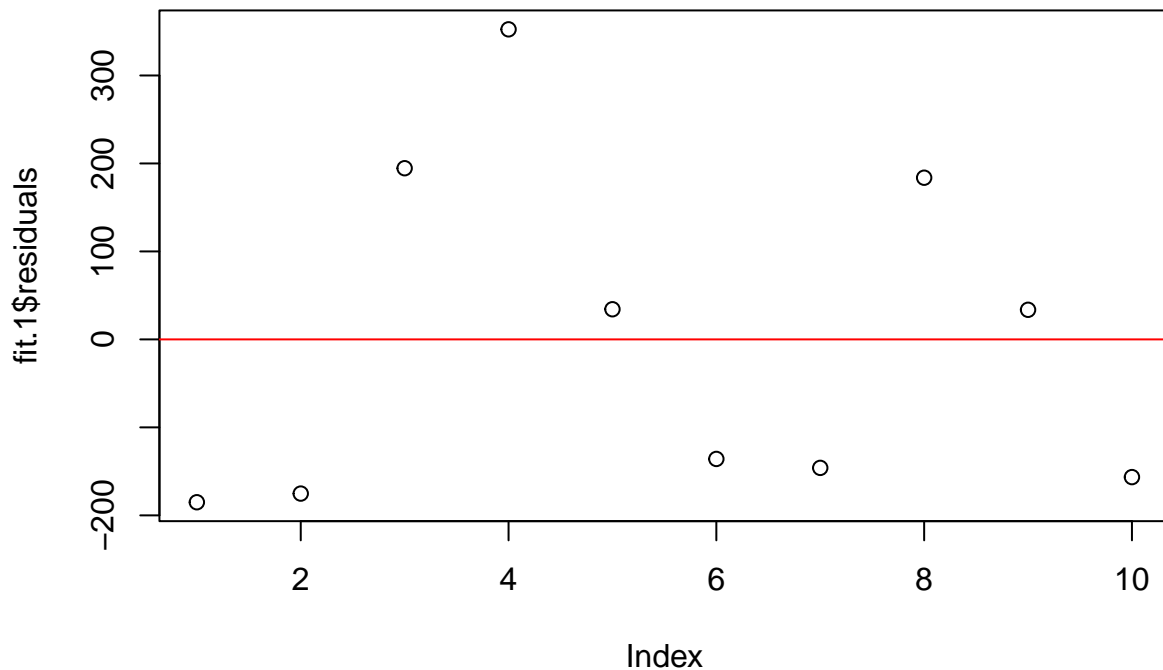**Modelo com os parâmetros β_0 e β_1 estimados:**

$$Y_i = 2374.9333 + 310.1576 X_i + \epsilon_i$$

Questão C

```r
plot(df$t, df$r)
abline(fit.1$coefficients, col='red')
```

```r
plot(fit.1$residuals)
abline(0,0,col='red')
```

Questão D

```r
summary(fit.1)
```

```
## 
## Call:
## lm(formula = r ~ t, data = df)
## 
## Residuals:
##     Min      1Q  Median      3Q     Max
## -185.09 -153.89  -51.12  146.42  352.44
## 
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  2374.93     138.20   17.18 1.34e-07 ***
## t             310.16      22.27   13.93 6.85e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 
## Residual standard error: 202.3 on 8 degrees of freedom
## Multiple R-squared:  0.9604, Adjusted R-squared:  0.9554
## F-statistic: 193.9 on 1 and 8 DF,  p-value: 6.849e-07
```

```r
confint(fit.1, level = 0.95)
```

```
##                   2.5 %     97.5 %
## (Intercept) 2056.2387 2693.6280
## t            258.7953  361.5199
```

Para cada mês adicional, a receita aumenta, em média, em R$ 310, podendo variar entre R$ 259 a R$ 362

Questão E

```r
novos_meses <- tibble(t=c(11, 12))
predict(fit.1, newdata = novos_meses)
```

```
##        1        2
## 5786.667 6096.824
```