Homework #2

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1. (1.2) The members of a health spa pay annual membership dues of \$\$\$300 plus a charge of \$\$\$2 for each visit to the spa. Let Y denote the dollar cost for the year for a member and X the number of visits by the member during the year. Express the relation between X and Y mathematically. Is it a functional relation or a statistical relation (that is, is the relation deterministic or stochastic)?

   - deterministic: the output of the model is entirely determined by the values of the parameters and the initial conditions; stochastic: random, unpredictable.
   - The association between X and Y is: $Y = 300 + 2X$ (dollars) This is a functional relationship because a effect in the value of the X will cause the corresponding change in the value of the Y. X and Y will not have a uncertain effect.

2. (1.6) Suppose the regression parameters are $\beta0 = 200$ and $\beta1 = 5.0$.

   (a) Plot the regression equation.

   (b) Predict the response for X = 10, 20, and 40.

   (c) Explain the meaning of parameters $\beta0$ and $\beta1$.

```
library(tidyverse)
```

```
## -- Attaching packages ---- tidyverse 1.3.0 --
```

```
## v ggplot2 3.3.2     v purrr   0.3.4
## v tibble  3.0.3     v dplyr   1.0.2
## v tidyr   1.1.2     v stringr 1.4.0
## v readr   1.3.1     v forcats 0.5.0
```

```
## -- Conflicts ------- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
aaa <- read_tsv("./data/CH01PR19.txt")
```

```
## Parsed with column specification:
## cols(
##   `3.897    21` = col_character()
## )
```

```
aaa
```

```
## # A tibble: 119 x 1
##    `3.897    21`
##    <chr>
##  1 3.885    14
##  2 3.778    28
```

```
##  3 2.540    22
##  4 3.028    21
##  5 3.865    31
##  6 2.962    32
##  7 3.961    27
##  8 0.500    29
##  9 3.178    26
## 10 3.310    24
## # ... with 109 more rows
```