LING82100: homework 1 solution

1 Arithmetic

1. ```
   > 1 / 3 + 1 / 4
   [1] 0.5833333
   ```

2. ```
   > 2 ^ 10 + 1
   [1] 1025
   ```

3. ```
   > f <- 440
   > 1127 * log(1 + f / 700)
   [1] 549.6415
   ```

4. ```
   > a <- 2
   > b <- 4
   > c <- -4
   > (-b + sqrt(b ^ 2 - 4 * a * c)) / (2 * a)
   [1] 0.7320508
   ```

2 Categorical data

```
d <- read.csv("http://wellformedness.com/courses/LING82100/Data/NYC.csv")
```

- ```
  > d.p1 <- droplevels(subset(d, word == "fouRth" & emphasis == "emphatic"))
  > table(d.p1)
  , , emphasis = emphatic, word = fouRth

     store
  r   Klein's Macy's Saks
    1       6     13   16
  ```

  In other words, just 6 times at S. Klein's, 13 times at Macy's, and 16 times at Saks 5th Ave.

- ```
  > d.p2 <- subset(d, word == "flooR" & store == "Klein's")
  > mean(d.p2$r)
  [1] 0.1153846
  ```

  In other words, 11.54% of the time. (This hack works just because *r* is coded as 1 and no-*r* is coded as 0.)

3 Ratio data

```
> d <- read.table("http://wellformedness.com/courses/LING82100/Data/VOT.tsv",
                  header = TRUE)
```

- ```
  > quantile(d$vot)
        0%     25%     50%     75%    100%
  -85.290 -17.975  13.825  27.365  82.860
  ```

  The first sample quartile is -17.98, the sample median is 13.83, and the third sample quartile is 82.86.

- ```
  > d.spanish <- subset(d, language == "spanish")
  > mean(d.spanish$vot)
  [1] -24.31306
  ```

  The sample mean VOT for Spanish speakers is $\mu = -24.31$. (Spanish voiced obstruents are pre-voiced, presumably).

- ```
  > d.english <- subset(d, language == "english")
  > sd(d$vot)
  [1] 19.86479
  ```

  The sample standard deviation VOT for English speakers is $s = 19.86$.
  ```