1   Keeping R tidy - Answer Key

Metro Bike Share is a bike sharing system that operates in Los Angeles. Metro has been administering this bike share system since July 7, 2016. The way it works is riders can pick up a bike from one of the bike stations, ride it, and return it to a bike station. Make sure to read their homepage for more information about how the pricing works.

Metro provides data on bike rides `https://bikeshare.metro.net/about/data/`. We will be using the data from the third quarter of 2019. Complete the following tasks based on this data.

```r
library(tidyverse)
```

1. Download the dataset and read it into R.

```r
bike2 <- read.csv("data/metro-bike-share-trips-2019-q3.csv")
bike <- read_csv("data/metro-bike-share-trips-2019-q3.csv")
```

```
## Parsed with column specification:
## cols(
##   trip_id = col_double(),
##   duration = col_double(),
##   start_time = col_character(),
##   end_time = col_character(),
##   start_station = col_double(),
##   start_lat = col_double(),
##   start_lon = col_double(),
##   end_station = col_double(),
##   end_lat = col_double(),
##   end_lon = col_double(),
##   bike_id = col_double(),
##   plan_duration = col_double(),
##   trip_route_category = col_character(),
##   passholder_type = col_character(),
##   bike_type = col_character()
## )
```

```
## Warning: 2 parsing failures.
##   row     col expected actual                                    file
## 32310 bike_id a double Rblock 'data/metro-bike-share-trips-2019-q3.csv'
## 32314 bike_id a double Rblock 'data/metro-bike-share-trips-2019-q3.csv'
```

```r
bike %>%
  filter(bike_id == "Rblock")
```

```
## # A tibble: 0 x 15
## # ... with 15 variables: trip_id <dbl>, duration <dbl>, start_time <chr>,
## #   end_time <chr>, start_station <dbl>, start_lat <dbl>, start_lon <dbl>,
## #   end_station <dbl>, end_lat <dbl>, end_lon <dbl>, bike_id <dbl>,
## #   plan_duration <dbl>, trip_route_category <chr>, passholder_type <chr>,
## #   bike_type <chr>
```

```r
bike %>%
  slice(c(32310,32314))
```

```
## # A tibble: 2 x 15
##   trip_id duration start_time end_time start_station start_lat start_lon
##     <dbl>    <dbl> <chr>      <chr>            <dbl>     <dbl>     <dbl>
## 1  1.27e8       10 8/5/2019 ~ 8/5/201~          3000        NA        NA
## 2  1.27e8        7 8/5/2019 ~ 8/5/201~          3000        NA        NA
## # ... with 8 more variables: end_station <dbl>, end_lat <dbl>,
## #   end_lon <dbl>, bike_id <dbl>, plan_duration <dbl>,
```

```
## #   trip_route_category <chr>, passholder_type <chr>, bike_type <chr>
```

2. Check how many variables, and how many observations the dataset has. What does each row represent in the data?

```
glimpse(bike)
```

```
## Observations: 92,124
## Variables: 15
## $ trip_id             <dbl> 124657107, 124657587, 124658068, 124659747...
## $ duration            <dbl> 5, 9, 5, 20, 27, 7, 37, 8, 4, 4, 4, 72, 17...
## $ start_time          <chr> "7/1/2019 0:04", "7/1/2019 0:07", "7/1/201...
## $ end_time            <chr> "7/1/2019 0:09", "7/1/2019 0:16", "7/1/201...
## $ start_station       <dbl> 4312, 3066, 4410, 3045, 3035, 3056, 3047, ...
## $ start_lat           <dbl> 34.06699, 34.06339, 34.06335, 34.02851, 34...
## $ start_lon           <dbl> -118.2909, -118.2362, -118.2968, -118.2567...
## $ end_station         <dbl> 4410, 3066, 4312, 4275, 3049, 3031, 3047, ...
## $ end_lat             <dbl> 34.06335, 34.06339, 34.06699, 34.01252, 34...
## $ end_lon             <dbl> -118.2968, -118.2362, -118.2909, -118.2859...
## $ bike_id             <dbl> 6168, 17584, 18920, 6016, 5867, 18530, 188...
## $ plan_duration       <dbl> 30, 30, 30, 1, 30, 30, 30, 30, 30, 30, 1, ...
## $ trip_route_category <chr> "One Way", "Round Trip", "One Way", "One W...
## $ passholder_type     <chr> "Monthly Pass", "Monthly Pass", "Monthly P...
## $ bike_type           <chr> "standard", "electric", "electric", "stand...
```

3. Can you calculate how much money riders have paid to Metro in third quarter of 2019? If yes, calculate the value, if not explain why it cannot be calculated.

No

4. If you look into `passholder_type` closely, you will realize that some of the rides were test rides. Eliminate any ride that was a test ride from the dataset.

```
count(bike, passholder_type)
```

```
## # A tibble: 6 x 2
##   passholder_type     n
##   <chr>           <int>
## 1 Annual Pass      6220
## 2 Flex Pass           6
## 3 Monthly Pass    57175
## 4 One Day Pass     5175
## 5 Testing            46
## 6 Walk-up         23502
```

```
bike <-
  bike %>%
  filter(passholder_type != "Testing")
```

5. There are three types of bike used in the Metro bike system as standard, electric, and smart. We want to make a comparison of standard bikes and the other two types. Make a new variable called standard. This variable should have "yes" values for bikes that are standard and "no" values for bikes that are electric or smart.

```
bike <-
  bike %>%
  mutate(bike_type = as.factor(bike_type))

count(bike, bike_type)
```

```
## # A tibble: 3 x 2
##   bike_type     n
##   <fct>     <int>
```

```
## 1 electric   46446
## 2 smart      16155
## 3 standard  29477
```

```r
bike <- bike %>%
  mutate(standard = case_when(bike_type == "standard" ~ "yes",
                              bike_type != "standard" ~ "no"))
```

6. Calculate the mean, median, n, sd, for standard and nonstandard bike rides.

```r
bike %>%
  group_by(standard) %>%
  summarize(mean_dur = mean(duration), sd_dur = sd(duration),
            med_dur = median(duration), n = n())
```

```
## # A tibble: 2 x 5
##   standard mean_dur sd_dur med_dur      n
##   <chr>       <dbl>  <dbl>   <dbl>  <int>
## 1 no           34.4   129.      13  62601
## 2 yes          30.5   130.       9  29477
```

```r
bike_summary <- bike %>%
  group_by(standard) %>%
  summarize(mean_dur = mean(duration), sd_dur = sd(duration),
            med_dur = median(duration), n = n())
```

7. Calculate the proportion of standard and nonstandard bike rides.

```r
bike_summary %>%
  mutate(prop = n/sum(n))
```

```
## # A tibble: 2 x 6
##   standard mean_dur sd_dur med_dur      n  prop
##   <chr>       <dbl>  <dbl>   <dbl>  <int> <dbl>
## 1 no           34.4   129.      13  62601 0.680
## 2 yes          30.5   130.       9  29477 0.320
```