Worksheet 01: Writing Functions

Dr. D's Solutions

1/27/23

Note: There are many ways to write functions. My approach and solutions may look different than yours, and thats OK as long as you got a similar numerical answer.

1a. My function to compute the midhinge

```r
midhinge <- function(x){
  mh <- quantile(x, c(.25, .75)) |> mean()
  return(mh)
}
```

1b. Using my function on provided numbers.

```r
midhinge(x = c(3,100,40,7,29,2,230,44,100,1200,8,15,900))
```

```
[1] 54
```

2. Using my midhinge function to estimate the mean of a Poisson distribution.

```r
rand.pois.data <- rpois(100, .4)
table(rand.pois.data) # just wanted to see what it looked like
```

```
rand.pois.data
 0  1  2  3
72 21  4  3
```

```r
midhinge(rand.pois.data)
```

```
[1] 0.5
```

3a. My functions to calculate the intercept and slope of a linear regression.

```r
least.squares.estimate <- function(x,y){
  n <- length(x)
  mean.x <- sum(x)/n
  diff.x <- x- mean.x

  num <- sum(diff.x*y)
  den <- sum(diff.x^2)

  b1 <- num/den
  b0 <- sum(y)/n - b1*mean.x

  return(list(intercept = b0, slope = b1))
}
```

3b. Testing my function on wolf population data.

```r
x <- c(31, 34, 27, 25, 17, 23, 20)
y <- c(75, 85, 75, 60, 48, 60, 60)
```

my function

```r
least.squares.estimate(x,y)
```

```
$intercept
[1] 15.35141

$slope
[1] 2.008701
```

using the `lm` function

```r
lm(y~x)
```

```
Call:
lm(formula = y ~ x)

Coefficients:
(Intercept)            x
     15.351        2.009
```