Practice Solutions to Getting Started with R and RStudio

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Slides available at http://bit.ly/berd_r_intro

pdf version: http://bit.ly/berd_r_intro_pdf

Practice questions

1. Create a vector of all integers from 4 to 10, and save it as `a1`.
2. Create a vector of integers from 4 to 10, and save it as `a2`.
3. What is the sum of `a1` and `a2`?
4. What does the command `sum(a1)` do?
5. What does the command `length(a1)` do?
6. Use the commands to calculate the average of the values in `a1`.
7. The formula for the first integers is . Compute the sum of all integers from 1 to 100 to verify that this formula holds for .
8. Compute the sum of the squares of all integers from 1 to 100.
9. Take a break!

Answers to practice questions (1/4)

Create a vector of all integers from 4 to 10, and save it as `a1`.

Create a vector of integers from 4 to 10, and save it as `a2`.

```
> a1 <- 4:10
> a2 <- c(4, 6, 8, 10)
> # the following works as well:
> a2 <- 2*(2:5)
```

What is the sum of `a1` and `a2`?

```
> a1+a2
```

```
Warning in a1 + a2: longer object length is not a multiple of shorter
object length
```

```
[1]  8 11 14 17 12 15 18
```

Note that instead of giving an error, the terms of `a1` are repeated as needed since `a2` is longer than `a1`

Answers to practice questions (2/4)

What does the command `sum(a1)` do?

```
> sum(a1)
```

```
[1] 49
```

`sum` adds up the values in the vector

What does the command `length(a1)` do?

```
> length(a1)
```

```
[1] 7
```

`length` is the number of values in the vector

Answers to practice questions (3/4)

Use the commands to calculate the average of the values in `a1`.

```
> sum(a1) / length(a1)
```

```
[1] 7
```

The formula for the first integers is . Compute the sum of all integers from 1 to 100 to verify that this formula holds for .

```
> sum(1:100)
```

```
[1] 5050
```

```
> # verify formula for n=100:
> n=100
> n * (n+1) / 2
```

```
[1] 5050
```

Answers to practice questions (4/4)

Compute the sum of the squares of all integers from 1 to 100.

```
> # The following code creates a vector of the squares of all integers from 1 to 100
> (1:100)^2
```

```
  [1]     1     4     9    16    25    36    49    64    81   100   121
 [12]   144   169   196   225   256   289   324   361   400   441   484
 [23]   529   576   625   676   729   784   841   900   961  1024  1089
 [34]  1156  1225  1296  1369  1444  1521  1600  1681  1764  1849  1936
 [45]  2025  2116  2209  2304  2401  2500  2601  2704  2809  2916  3025
 [56]  3136  3249  3364  3481  3600  3721  3844  3969  4096  4225  4356
 [67]  4489  4624  4761  4900  5041  5184  5329  5476  5625  5776  5929
 [78]  6084  6241  6400  6561  6724  6889  7056  7225  7396  7569  7744
 [89]  7921  8100  8281  8464  8649  8836  9025  9216  9409  9604  9801
[100] 10000
```

```
> # Now add the squares:
> sum((1:100)^2)
```

```
[1] 338350
```

Practice

1. Create data frames for males and females separately.
2. Do males and females have similar BMI's? Weights? Compares means, standard deviations, range, and boxplots.
3. Plot BMI vs. weight for each gender separately. Do they have similar relationships?
4. Are males or females more likely to be bullied in the past 12 months? Calculate the percentage bullied for each gender.
5. Are students that were bullied in the past year more likely to have smoked in the past? Does this vary by gender?

Practice Answers (1/7)

Create data frames for males and females separately.

```
> boys <- mydata[mydata$sex == "Male", ]
> girls <- mydata[mydata$sex == "Female", ]
```

Practice Answers (2/7)

Do males and females have similar BMI's? Weights? Compares means, standard deviations, range, and boxplots.

```
> summary(boys$bmi); sd(boys$bmi)
```

```
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  18.18   19.57   20.90   20.63   21.58   22.46
```

```
[1] 1.466896
```

```
> summary(girls$bmi); sd(girls$bmi)
```

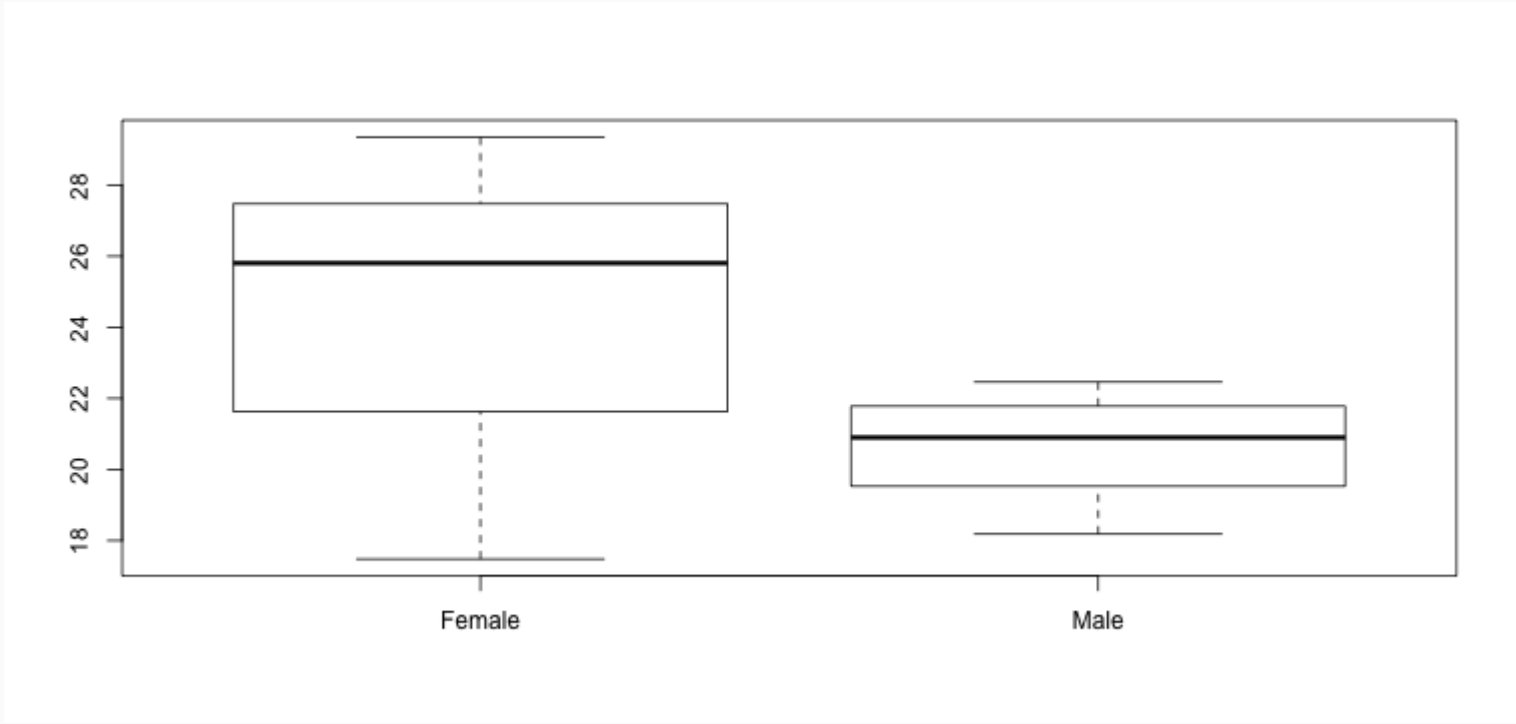
```
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  17.48   21.95   25.80   24.59   27.47   29.35
```

```
[1] 3.70739
```

Practice Answers (3/7)

cont'd

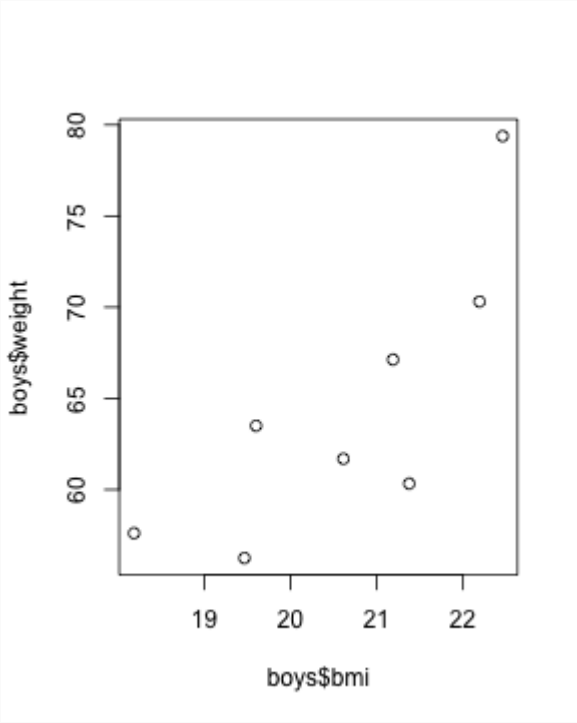
```
> boxplot(mydata$bmi ~ mydata$sex)
```



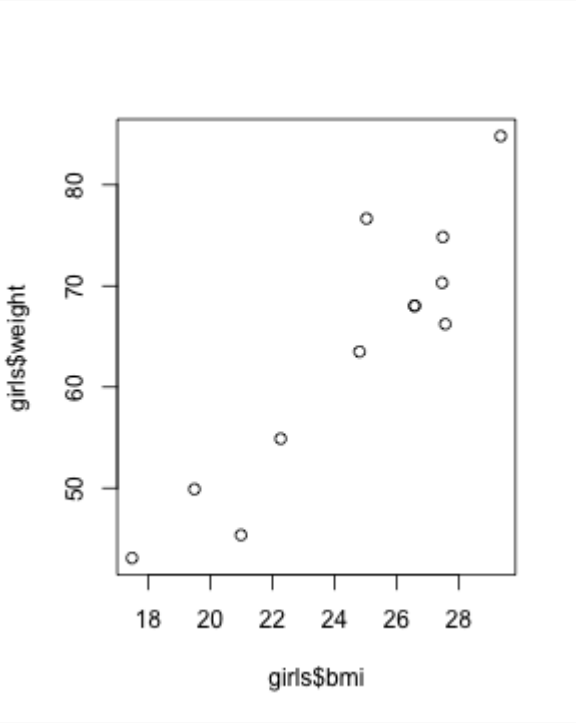
Practice Answers (4/7)

Plot BMI vs. weight for each gender separately. Do they have similar relationships?

```
> plot(boys$bmi, boys$weight)
```




```
> plot(girls$bmi, girls$weight)
```



Practice Answers (5/7)

Are males or females more likely to be bullied in the past 12 months? Calculate the percentage bullied for each gender.

```
> bullied_boys <- boys[boys$bullied_past_12mo == TRUE,]
> nrow(bullied_boys)
```

```
[1] 3
```

```
> bullied_boys_prct <- nrow(bullied_boys) / nrow(boys) * 100; bullied_boys_prct
```

```
[1] 37.5
```

```
> bullied_girls <- girls[girls$bullied_past_12mo == TRUE,]
> nrow(bullied_girls)
```

```
[1] 6
```

```
> bullied_girls_prct <- nrow(bullied_girls) / nrow(girls) * 100; bullied_girls_prct
```

Practice Answers (6/7)

Are students that were bullied in the past year more likely to have smoked in the past? Does this vary by gender?

```
> bullied_yes <- mydata[mydata$bullied_past_12mo == TRUE,]
> bullied_no <- mydata[mydata$bullied_past_12mo == FALSE,]
>
> # Not bullied students have higher proportion of smokers
> summary(bullied_yes$smoked_ever)
```

```
  No  Yes NA's
   5    1    3
```

```
> summary(bullied_no$smoked_ever)
```

```
  No  Yes NA's
   5    4    4
```

Practice Answers (7/7)

cont'd

```
> # Vary by gender? Not really.
> summary(bullied_yes[bullied_yes$sex == "Male", "smoked_ever"])
```

```
  No  Yes NA's
   2    0    3
```

```
> summary(bullied_yes[bullied_yes$sex == "Female", "smoked_ever"])
```

```
  No  Yes NA's
   3    1    2
```

```
> summary(bullied_no[bullied_no$sex == "Male", "smoked_ever"])
```

```
  No  Yes NA's
   2    2    3
```

```
> summary(bullied_no[bullied_no$sex == "Female", "smoked_ever"])
```