Homework 3

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2024-10-12

Problem 1

a)

```
x <-
  birthwt %>%
  pull(lwt)

t.test(x, conf.level = 0.95)
```

```
##
##  One Sample t-test
##
## data:  x
## t = 58.362, df = 188, p-value < 2.2e-16
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  125.4270 134.2027
## sample estimates:
## mean of x
##  129.8148
```

b)

We are 95% confident that the true average weight of American Women is between 125.4270 and 134.2027 pounds. c)

Since 171 is not in our confidence interval, we can reject the hypothesis that the average weight of American women is 171 pounds.

Problem 2

a)

```
not_smoke <-
  birthwt %>% select(lwt, smoke) %>% filter(smoke == 0) %>% select(-smoke) %>% pull(lwt)

smoke <-
  birthwt %>% select(lwt, smoke) %>% filter(smoke == 1) %>% select(-smoke) %>% pull(lwt)

var.test(not_smoke, smoke, alternative = "two.sided", conf.level = 0.95)
```

```
##
##  F test to compare two variances
##
## data:  not_smoke and smoke
## F = 0.7079, num df = 114, denom df = 73, p-value = 0.09744
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
##  0.4614313 1.0651436
## sample estimates:
## ratio of variances
##           0.7078964
```

b)

We should preform a two sample t test with variance, since we get that the p-value is 0.09 we fail to reject the null hypothesis that the variances are equal.

c)

```
t.test(not_smoke, smoke, var.equal = TRUE, conf.level = 0.90)
```

```
##
##  Two Sample t-test
##
## data:  not_smoke and smoke
## t = 0.60473, df = 187, p-value = 0.5461
## alternative hypothesis: true difference in means is not equal to 0
## 90 percent confidence interval:
##  -4.785414 10.306448
## sample estimates:
## mean of x mean of y
##  130.8957  128.1351
```

We get a p-value to be 0.5161. This means we fail to reject the null hypothesis that

Problem 3

a)

```
hypertension <-
  birthwt %>% pull(ht)
t.test(hypertension, conf.level = 0.99, alternative = c("two.sided"))
```

```
##
##  One Sample t-test
##
## data:  hypertension
## t = 3.5701, df = 188, p-value = 0.000453
## alternative hypothesis: true mean is not equal to 0
## 99 percent confidence interval:
```

```
##  0.0172132 0.1097709
## sample estimates:
##  mean of x
## 0.06349206
```

We are 99% confident that the true value of Amreican women that suffer from hypertension is between 0.0172132 and 0.1097709.

Since the p-value is 0.0004 and the confidence interval does not include 0.2, we can reject the null hypothesis that the 20% of American women suffer from hypertension.

b)

```
#prop.test(hypertension, alternative = "less", conf.level = )
```

Problem 4

Problem 5

a) An ANOVA test would be the most appropriate because `race` is has more than two groups and `bwt` is continuous.

b) k > 2, independence, normality, variances are the same