Problem Set 9

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STAT 100, SECTION 0221

PROBLEM #1

A.

```
> #1(a) generate two tables for the Activity variable, by Kristina Finley
>
> #(a-1) extract Activity variable from the dataset and present the sample size
> Activity <- BodyFatPercentage$Activity
> length(Activity)
[1] 92
> #(a-2) create freq. table & a prop. table for Activity
> Activity_Freq_Table <- table(Activity)
> Activity_Prop_Table <- prop.table(Activity_Freq_Table)
> Activity_Freq_Table
Activity
  high    low medium
    10      6     76
> Activity_Prop_Table
Activity
      high        low     medium
0.10869565 0.06521739 0.82608696
>
```

B.

Ho: p = 0.18
Ha: p < 0.18

C.

$92 \times 0.18 = 16.56 \geq 10$
$92 \times (1 - 0.18) = 75.44 \geq 10$
Both conditions are satisfied.

D.

```
> #1(d) calculate the test statistic for this hypothesis test, by Kristina Finley
> (0.1086956522 - 0.18)/sqrt(0.18 * (1-0.18)/92)
[1] -1.780192
>
```

E & F. *determine the p-value and draw a conclusion by using significance level 0.05*
P(Z < -1.78) = 0.0375
Because the p-value = 0.0375 < 0.05, we reject the null hypothesis.

G.

```
> #1(g) perform the prop test , by Kristina Finley
> prop.test(x = 10, n = 92, p = 0.18, alternative = "less", conf.level = 0.95, correct = FALSE)

        1-sample proportions test without continuity correction

data:  10 out of 92, null probability 0.18
X-squared = 3.1691, df = 1, p-value = 0.03752
alternative hypothesis: true p is less than 0.18
95 percent confidence interval:
 0.0000000 0.1736578
sample estimates:
        p
0.1086957
```

H. *perform the two-sided test*
P(Z < -1.78) = 0.0375
$0.0375 \times 2 = 0.075$

PROBLEM #2

A.

```
> #2(a) calculate the sample mean, sample s.d. and sample size for Pct_Fat, by Kristina Finley
>
> #(a-1) extract Pct_Fat variable from the dataset
> Pct_Fat <- BodyFatPercentage$Pct_Fat
> #(a-2) calculate the sample mean, sample s.d. and sample size
> mean(Pct_Fat)
[1] 26.96196
> sd(Pct_Fat)
[1] 7.142888
> length(Pct_Fat)
[1] 92
>
```

B.

Ho: mu = 25.5

Ha: mu > 25.5

C.

The sample is a normal sample.

$n = 92 \geq 30$

One of the conditions is satisfied.

D.

```
> #2(d) calculate test statistic for this hypothesis test, by Kristina Finley
> (26.96196-25.5)/(7.142888/sqrt(92))
[1] 1.963159
>
```

E.

```
> #2(e & f) determine the p-value and draw a conclusion by using a significance, by Kristina Finley
> t.test(x=Pct_Fat, mu= 25.5, alternative = "greater", conf.level = 0.95)

        One Sample t-test

data:  Pct_Fat
t = 1.9632, df = 91, p-value = 0.02634
alternative hypothesis: true mean is greater than 25.5
95 percent confidence interval:
 25.72444      Inf
sample estimates:
mean of x
 26.96196
```

F.

P-value = 0.0263

G.
Since the p-value is 0.0263 > 0.01, we cannot reject the null hypothesis.