Homework 8
STAT 104 - Introduction to Quantitative Methods for Economics

1) Suppose we have captured, weighed, and released 25 sea otter pups in Monterey Bay. For this sample, the mean weight is 750 g and the sample standard deviation (s) is 100 g. Test the hypothesis that the mean weight for all sea otter pups in Monterey Bay is 800g, for setting α = 0.05 (and using a two-tailed test).

→ Since 800 is between the confidence interval 758.722 841.278, **we can't reject the null hypothesis** and conclude that mean weight for all sea otter pups in Monterey Bay is 800g.

Ho : μ = 800
Ha : μ ≠ 800

> tsum.test(mean.x=800,s.x=100,n.x=25)

```
        One-sample t-Test

data:  Summarized x
t = 40, df = 24, p-value < 2.2e-16
alternative hypothesis: true mean is not equal to 0
95 percent confidence interval:
 758.722 841.278
sample estimates:
mean of x
      800
```

2) Toastmasters International cites a report by Gallop Poll that 40% of Americans fear public speaking. A student believes that less than 40% of students at her school fear public speaking. She randomly surveys 361 schoolmates and finds that 135 report they fear public speaking. Conduct a hypothesis test to determine if the percent at her school is less than 40%.

→ Since the p-value(0.1695) is greater than 0.05, **we can't reject the null hypothesis** and conclude that 40% of Americans fear public speaking.

Ho : μ = 0.4
Ha : μ < 0.4

> prop.test(135,361,p=.4,alt="less")

```
        1-sample proportions test with continuity correction

data:  135 out of 361, null probability 0.4
X-squared = 0.91424, df = 1, p-value = 0.1695
alternative hypothesis: true p is less than 0.4
95 percent confidence interval:
 0.0000000 0.4180465
sample estimates:
        p
0.3739612
```

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4) Seven percent of mutual fund investors rate corporate stocks "very safe," 58% rate them "somewhat safe," 24% rate them "not very safe," 4% rate them "not at all safe," and 7% are "not sure." A BusinessWeek/Harris poll asked 529 mutual fund investors how they would rate corporate bonds on safety. The responses are as follows.

Safety Rating	Frequency
Very safe	48
Somewhat safe	323
Not very safe	79
Not at all safe	16
Not sure	63
Total	529

Do mutual fund investors' attitudes toward corporate bonds differ from their attitudes toward corporate stocks? Answer this question using the chi-square goodness of fit test.

→ Since the p-value(0.9992) is greater than 0.05, **we can't reject the null hypothesis** and conclude that mutual fund investors' attitudes toward corporate bonds does not differ from their attitudes toward corporate stocks.

```
> chisq.test(x= c(.0907, .610, .149, .03, .119), p = c(.07, .58, .24, .04, .07))

        Chi-squared test for given probabilities

data:  c(0.0907, 0.61, 0.149, 0.03, 0.119)
X-squared = 0.079078, df = 4, p-value = 0.9992
```

5) The Wall Street Journal Subscriber Study showed data on the employment status of subscribers. Sample results corresponding to subscribers of the eastern and western editions are shown here.

→ Since p-value(3.376e-05) is less than 0.05, **we can reject the null hypothesis** and conclude that employment status is not independent of the region

```
> mydata=matrix(nrow=4,ncol=2,c(1105,31,229,485,574,15,186,344))
> rownames(mydata)=c("Full-time","Part-time","Self-employed/consultant","Not-
employed")
> colnames(mydata)=c("Eastern-Edition","Western-Edition")
> mydata
                         Eastern-Edition Western-Edition
Full-time                           1105             574
Part-time                             31              15
Self-employed/consultant             229             186
Not-employed                         485             344
> chisq.test(mydata)

        Pearson's Chi-squared test

data:  mydata
X-squared = 23.373, df = 3, p-value = 3.376e-05
```

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